Multilingualism

Learning and using multiple languages and varieties

Raphael Berthele

Textbooks in Language Sciences 18

language science press

Textbooks in Language Sciences

Editors: Antonio Machicao y Priemer, Stefan Müller, Kelsey Neely
Editorial Board: Olivier Bonami, Pavel Caha, Rui Chaves, Louise McNally, Marianne Mithun, Katharina Spalek, Anatol Stefanowitsch, Foong Ha Yap

In this series:

7. Stefanowitsch, Anatol. Corpus linguistics: A guide to the methodology.
8. Müller, Stefan. 语法理论: 从转换语法到基于约束的理论.
9. Hejná, Míša & George Walkden. A history of English.
10. Kahane, Sylvain & Kim Gerdes. Syntaxe théorique et formelle. Vol. 1: Modélisation, unités, structures.
11. Freitas, Maria João, Marisa Lousada & Dina Caetano Alves (eds.). Linguística clínica: Modelos, avaliação e intervenção.
12. Müller, Stefan. Germanic syntax: A constraint-based view.
13. Neacşu, Vlad A. Linguistics Olympiad: Training guide.
14. Glass, Lelia, Markus Dickinson, Chris Brew & Detmar Meurers. Language and computers. 2nd edition.
15. Marques, Rui. Modalidade e modo em português europeu.
16. The Saguaro Group (ed.). Indigenous languages of the Americas and their structures: Sounds.
17. Müller, Stefan. Head-Driven Phrase Structure Grammar: Eine Einführung. Vierte, komplett überarbeitete Auflage.
18. Berthele, Raphael. Multilingualism: Learning and using multiple languages and varieties: A textbook.
19. Reynolds, Brett. Language landscapes: The ESL teacher’s guide to how English works.
20. 弗拉德 · A · 内亚克舒. 2026. 语言学奥林匹克竞赛: 培训指南.

ISSN: 2364-6209

Multilingualism

Learning and using multiple languages and varieties

Raphael Berthele

language
science
press

Raphael Berthele. 2026. *Multilingualism: Learning and using multiple languages and varieties: A textbook* (Textbooks in Language Sciences). Berlin: Language Science Press.

This title can be downloaded at:
http://langsci-press.org/catalog/book/589
© 2026, Raphael Berthele
Published under the Creative Commons Attribution 4.0 Licence (CC BY 4.0):
http://creativecommons.org/licenses/by/4.0/
ISBN: 978-3-96110-586-1 (Digital)
978-3-98554-203-1 (Softcover)
ISSN: 2364-6209
DOI: 10.5281/zenodo.20613094
Source code available from www.github.com/langsci/589
Errata: paperhive.org/documents/remote?type=langsci&id=589

Cover and concept of design: Ulrike Harbort
Typesetting: Sebastian Nordhoff, Hannah Schleupner
Proofreading: Adriana Rosalina Galvan Torres, Alexandra Fosså, Annika Schiefner, Bondarenko Daniil, Christopher Straughn, DeAndre Espree-Conaway, Eliane Lorenz, Frederic Blum, Georgios Vardakis, Gerald Delahunty, Harold Somers, Ikmi Nur Oktavianti, Janina Rado, Kate Bellamy, Lachlan Mackenzie, Leonie Twente, Ludger Paschen, Maria Milla, Mary Burke, Nicoletta Romeo, Jean Nitzke, Paola Celentin, Sercan Karakas, Stefan Müller, Thera Crane, Tihomir Rangelov, Varun de Castro Arrazola, Vladan Sutanovac, Mary Ann Walter
Fonts: Libertinus, Arimo, DejaVu Sans Mono
Typesetting software: XeLaTeX

Language Science Press
Scharnweberstraße 10
10247 Berlin, Germany
http://langsci-press.org
support@langsci-press.org

Storage and cataloguing done by FU Berlin

FREIE UNIVERSITÄT BERLIN

Contents

1 Introductory remarks **1**
- 1.1 Focus of this book . . . 1
- 1.2 The multilingual repertoire: Introductory example . . . 1
- 1.3 Key terms: Acquisition, learning, multilingualism . . . 3
- 1.4 Learning outcomes . . . 4
- 1.5 Less emphasized and missing aspects . . . 5
- 1.6 Acknowledgements . . . 6

2 Hyperpolyglots: Can we learn from language nerds? **7**
- 2.1 The polyglot hype . . . 9
  - 2.1.1 Some famous polyglots . . . 9
  - 2.1.2 What can we learn and generalize based on evidence from polyglots? . . . 13
- 2.2 Research and research desiderata . . . 15
  - 2.2.1 Multilingualism theories: Real-life relevance . . . 15
- 2.3 Concluding remarks . . . 17
  - 2.3.1 Study in winners . . . 17
  - 2.3.2 Evidence-based policy recommendations . . . 18

3 Theories of multiple language learning **19**
- 3.1 Multilingualism, plurilingualism . . . 20
  - 3.1.1 Terminology . . . 20
  - 3.1.2 Multilingualism: Assumptions and premises . . . 22
- 3.2 Cross-Linguistic Influence (CLI), transfer, convergence . . . 23
  - 3.2.1 Where and how can we find CLI? . . . 24
  - 3.2.2 CLI and bilingualism: Romansh and German placement verbs . . . 28
  - 3.2.3 Convergence and restructuring in bimodal bilingualism 31
- 3.3 Holism . . . 32
- 3.4 Complexity . . . 35
- 3.5 Multilingual advantage, language awareness, metalinguistic awareness . . . 38

3.6 Concluding remarks 40

4 Interfaces: Interactions of explicit and implicit knowledge 43
4.1 Contrasting views of the interface 44
4.2 A weak interface theory: Noticing hypothesis 49
4.3 Awareness as a prerequisite for learning? 50
4.4 From automatized explicit to implicit knowledge 53
4.5 Explicit vs. implicit teaching 54
4.5.1 Corrective feedback (CF) in Form-focused instruction (FFI) 56
4.5.2 Learning of phonemes that are absent from L1 57
4.6 Concluding remarks 58

5 Grammar: Generativist approaches to multilingualism 61
5.1 Language acquisition: Generativists' Assumptions 62
5.1.1 Poverty of the stimulus, Plato's problem 64
5.1.2 Examples for principles and parameters 65
5.2 SLA and bilingualism: The role of input within a generativist framework 68
5.2.1 Maturation 68
5.2.2 The Critical Period Hypothesis 68
5.2.3 The initial state of additional language acquisition . . . 69
5.3 Typological proximity of languages in third language acquisition 70
5.3.1 Linguistic proximity of grammars 70
5.3.2 Linguistic proximity of structures as a predictor for transfer 72
5.4 Concluding remarks 74

6 The usage-based approach 75
6.1 Constructions as the basic unit of language 76
6.1.1 Lexically-based grammar: From simple to complex constructions 77
6.1.2 Part-to-whole or Whole-to-part 79
6.1.3 The psychological reality of constructions 81
6.2 Beyond monolingualism: Usage-based approaches to childhood bilingualism and L2/Lx acquisition 82
6.2.1 Simultaneous multilingualism 82
6.2.2 SLA/Sequential multilingualism 84
6.2.3 Learnability of Cues 85
6.2.4 Salience 85

6.2.5 Contingency 86
6.3 Overshadowing, learned attention, and blocking in an additional language 88
6.4 Concluding remarks 89

7 Grammar: Learner variety approaches 93
7.1 Neither generativist nor usage-based: A third way? 94
7.2 Basic Variety: Adult migrants in Europe 95
7.2.1 An example of a Basic Variety narrative text 97
7.2.2 Constraints of the Basic Variety 97
7.2.3 Utterance structure in multilinguals 101
7.3 The VILLA study 104
7.4 Why are languages not simpler? 107
7.4.1 Basic Variety: Fossilized vs. too simple to live comfortably 107
7.4.2 How can the Basic Variety be overcome? 108
7.5 Concluding remarks 109

8 Code-switching: Using multiple languages simultaneously 111
8.1 Categories and functions 112
8.1.1 Insertional and alternational switches 112
8.1.2 Communicative functions 113
8.1.3 Code-switching in writing 115
8.2 The grammar of code-switching 118
8.2.1 Formal constraints on code-switching 118
8.3 Code-switching in context 119
8.3.1 Input and external factors 119
8.3.2 Code-switching and language acquisition in simultaneous early multilingualism 120
8.4 Code-switching and cognition 121
8.4.1 Switching costs 121
8.5 Challenging the notion of code-switching 123
8.5.1 Dense code-switching 123
8.5.2 Questioning the notion of code: Translanguaging 123
8.5.3 Code-blending in bimodal bilingualism 124
8.5.4 Evaluating code-switching 124
8.6 Concluding remarks 125

9 Vocabulary: Basic notions and metrics **127**
9.1 Vocabulary size of languages . . . 129
9.1.1 Who has the most and the best words? . . . 129
9.1.2 Word counts and typology . . . 129
9.2 Estimating the vocabulary size of individuals . . . 132
9.2.1 Different subsets of words . . . 132
9.2.2 The word gap: Input and social stratification . . . 134
9.2.3 Testing vocabulary size . . . 135
9.3 What is the appropriate unit of analysis? . . . 136
9.3.1 Lexical diversity and sophistication . . . 137
9.3.2 Zipf's Law . . . 140
9.3.3 Comparing vocabulary metrics across authentic texts . . . 140
9.3.4 Type-token based lexical diversity metrics . . . 142
9.3.5 Lexical sophistication . . . 145
9.3.6 Lexical diversity and sophistication in the HELASCOT corpus . . . 147
9.3.7 Resources for automatic vocabulary analyses . . . 151
9.4 Concluding remarks . . . 152

10 Vocabulary: Development in monolinguals and multilinguals **155**
10.1 Vocabulary depth . . . 156
10.1.1 Swear words . . . 156
10.1.2 Components of vocabulary knowledge . . . 157
10.1.3 Measuring vocabulary depth in adults . . . 159
10.1.4 Measuring vocabulary depth in children . . . 160
10.2 Vocabulary acquisition . . . 161
10.2.1 First words in L1 acquisition . . . 161
10.2.2 Vocabulary spurt vs. linear development . . . 162
10.2.3 Vocabulary development: Biological maturation or other mechanisms? . . . 163
10.3 Bilingual development . . . 164
10.3.1 Bilingual development in Norwegian and different L1s . . . 165
10.3.2 Bilingual development English-Spanish . . . 166
10.3.3 Trilingual development . . . 167
10.4 Bi- and multilingual models of the mental lexicon . . . 170
10.4.1 The Revised Hierarchical Model . . . 170
10.4.2 Criticism and alternatives to the RHM . . . 171
10.4.3 Multilingualism and the semantic-conceptual space . . . 172
10.4.4 Incongruent concepts, language contact and change . . . 174

10.5 Concluding remarks 177

11 Vocabulary: Pedagogical considerations 179
11.1 What should be learnt (first)? 181
11.1.1 Understanding lexical coverage: Authentic French texts and oral language use 181
11.1.2 Frequent words and text coverage 186
11.1.3 Authentic texts as teaching material 187
11.1.4 Frequency: Skewed or balanced input? 188
11.2 How can and should words be learnt? 190
11.2.1 Learning from meaning-focused input 190
11.2.2 Learning from meaning-focused output 194
11.2.3 Other noteworthy use contexts involving input and output 196
11.2.4 Explicit learning of vocabulary 198
11.3 Concluding remarks 199

12 Transfer across similar languages 203
12.1 Bidialectal multilingualism? 203
12.2 Linguistic distance 206
12.3 Dialects/patois vs. standard languages as means of instruction . 209
12.3.1 Germany and German-speaking Switzerland 211
12.3.2 Patois Franco-Provençal and Standard French 212
12.4 Emancipation and celebration of varieties 213
12.5 Acquisitional consequences 214
12.6 Multilingual advantage due to dialects? 215
12.7 Linguistic proximity and skill learning 218
12.8 Concluding remarks 220

13 Transfer of Literacy: Interdependence of language skills 223
13.1 Approaches to Literacy 224
13.2 Shared or transferred proficiency 226
13.3 Literacy skills in heritage language speakers 228
13.3.1 Group comparisons of literacy skills 228
13.3.2 Testing interdependence: Hypotheses on inter-linguistic associations 230
13.3.3 Alternative explanations 235
13.4 Multilingual boost vs. general cognition 236
13.4.1 Hypotheses 237
13.5 Concluding remarks 240

14 Individual differences: Language learning aptitude **241**
14.1 On the history of modern language learning aptitude research . 242
14.1.1 Aptitude testing and language education 242
14.1.2 Learner selection 242
14.1.3 Early aptitude tests 243
14.1.4 The systematic investigation of aptitude 245
14.1.5 More recent test developments 246
14.2 Current takes on aptitude 247
14.2.1 Genetic component? 249
14.2.2 Aptitude and language teaching methodologies 251
14.3 Aptitude in young learners 252
14.3.1 Dimensions of aptitude: Factor analyses 252
14.3.2 Other predispositions 256
14.4 Concluding remarks 262

15 Bi- and multilingualism and cognitive abilities **265**
15.1 Cognitive consequences of bilingualism and multilingualism . . 266
15.1.1 Dependent variables investigated 267
15.1.2 Early investigations: Bilingualism as a pathology 267
15.1.3 Paradigm shift: Bilingualism as cognitively beneficial . . 268
15.2 The analysis-and-control framework 269
15.2.1 Overview of evidence on the analysis and control framework 272
15.2.2 Is there an advantage or not? 274
15.3 Creatitivity 276
15.4 Other effects 279
15.5 Cognition—what can we conclude? 280
15.6 Bi- and multilingualism effects on additional languages 281
15.6.1 Fluency 281
15.6.2 Vocabulary measures 282
15.6.3 Grammar, constructions 282
15.6.4 Literacy 283
15.6.5 Advantages in learning an additional language 284
15.6.6 Metalinguistic awareness in bi- and multilinguals 285
15.7 Concluding remarks 287

16 Wrapping up: Some final thoughts **291**

References **297**

Index **349**
Name index 349

1 Introductory remarks

1.1 Focus of this book

Over the last two or three decades, multilingualism has become an increasingly popular topic in many scholarly fields. Multilingual perspectives are taken on the investigation of (first, second, additional) language acquisition and of language teaching, and more generally in scholarly fields such as education, sociolinguistics, and of course language policy. In this book, I will focus on individuals who use, learn, and acquire several languages or dialects. I will pay particular attention to cognitive, learning-oriented questions and the corresponding theoretical frameworks. Meanwhile, as all major accounts of the human language capacity integrate cognitive and social factors, I also discuss social constraints and dynamics wherever they seem important.

1.2 The multilingual repertoire: Introductory example

Let us start with a concrete illustration of language use by a multilingual girl, Ana. She is 6 years, 7 months old, and is growing up quadrilingually: the main language of her family is (Mexican) Spanish, which is her father's first language (L1). The mother's first language is an Alemannic Swiss (German) dialect, the dominant language used in the town they live is (Swiss) French, and the language of schooling of the girl is Standard High German. The girl and her twin sister were born in Switzerland. Ana was one of the multilingual children in a longitudinal (3 years) study of early simultaneous multilingualism (see Reiser & Berthele 2023 for more details on this study). The study drew data from retellings of animated video clips. Example (1) is mainly in Standard German which was the German variety the girl felt most comfortable in at the time of data collection.

(1) a. nachher geht er im Bett
afterwards go.PRS.3SG he in.DAT bed
'Afterwards he goes to bed'

b. und nachher ihm en cereal gibt er die da ga essen
and afterwards him a cereal give.PRS.3SG he these there go eat
'Afterwards he gives him cereals and they are going to eat'

c. und nachher geht er ga téléphoné in dem Doktor
and afterwards go.PRS.3SG she go phone in the.DAT.SG doctor
'Afterwards he goes to call the doctor'

Understanding the transcript is not straightforward. Ana describes a scene where the main character of the video, a stop motion animated character called Pingu, pretends to be sick as he does not want to go to school. For speakers who master German, the passage is a bit unusual. For example, the motion verb (*gehen*, to go) normally pairs with a goal prepositional phrase in the accusative case (*ins Bett*), in both Standard High German and Alemannic Swiss German. The dative, typically used for static location, not telic motion with the German preposition *in*, is unusual here. A lack of systematic use of this dative-accusative distinction is a typical feature observed in German spontaneous speech even in proficient bilinguals with a Romance language and German. One possible explanation is that they don't learn the (often hardly audible) distinction as the Romance languages do not use case in the same way.

Moreover, to refer to the *cereals* Pingu is eating and to the activity of making a phone call, Ana switches languages. The pronunciation of *cereal* is not German, but resembles the way the child would pronounce it in Spanish, but there is also a French cognate *céréales*. It might be an intruder from Spanish or a fusion of the two Romance word forms. Moreover, the motion event describing the displacement of the main character before he starts eating follows the Swiss German grammar that adds uninflected particle-like motion verbs (*ga*) to certain motion verb phrases (mostly with finite verbs of coming and going followed by an activity). Lastly, given that the video shows Pingu's *mother* making the phone call, not the (male) main character Pingu, the use of the German pronoun *er* in (1) is surprising. Based on the child's other utterances at the same measurement time we saw that she uses German *er* and French *elle* to refer to both female and male entities. Our hypothesis is that there is trilingual cross-linguistic influence, namely that she maps the Spanish personal pronouns *él* to French *elle* (the feminine personal pronoun) which in turn is considered equivalent to German *er* (the masculine pronoun).

Whenever utterances produced by multilinguals reveal something about the presence of other languages or varieties in the repertoire, they are candidates for what is called *transfer* or, more generally *cross-linguistic* influence. A great deal

of this book is dedicated to such phenomena: how do we identify them and when do they occur? If a multilingual switches or mixes languages and dialects, this is called *code-switching* (or sometimes also *code-mixing* or *translanguaging*), which is another well-investigated domain in bi- and multilingualism research.

The discussion of the introductory example involved comparisons with what one might expect from monolingual children of about the same age. There are good reasons to criticize such a perspective and to focus on the fact that this child is able to tell stories in several languages. We will discuss questions of the usefulness of comparisons extensively, with respect to the multilingual development of vocabulary, grammar and skills.

Not all children grow up acquiring several languages simultaneously; multilingualism is often a fact of life related to major life events after childhood (educational and professional choices, forced or self-selected migration, etc.). This book discusses both early and later emerging multilingualism. It also addresses questions that relate to untutored learning and to classroom learning of first, second, and additional languages.

1.3 Key terms: Acquisition, learning, multilingualism

As will be illustrated and discussed extensively in this book, there are good reasons why the term *multilingualism* is defined differently by different scholars from different disciplinary subfields. As a pragmatic terminological choice, I will use the term typically (but not exclusively) for individuals whose repertoires consist of more than two languages or varieties (see Chapter 3.1.1).

Both tutored and untutored acquisition and/or learning are considered in this book. The terms *learning* and *acquisition* will be used as near-synonyms, with a preference for *learning* if class/tutored contexts are implied (including self-tutoring) and *acquisition* for natural language development. The competent but specific multilingual speaker will be approached with reference to the following dimensions:

- models and theories of multilingual competence
- acquisition/learning of new sounds
- multilingual grammar acquisition/learning
- the acquisition/learning of words in the multilingual lexicon
- multilingualism and transfer of skills (reading, writing, etc.)

- cross-linguistic influence, interferences, transfer
- multilingual interaction (code-switching, code-mixing, translanguaging)
- cognitive and other prerequisites of multilingual language learning
- consequences of multilingual language learning

This book can be used for self-study or as the basis for a university class.

1.4 Learning outcomes

While working your way through these chapters, you will …

- get to know current approaches and models of multilingual learning/acquisition
- acquire a basic understanding of the particularities of successive and simultaneous multilingual language learning
- understand cross-linguistic influence on different levels of linguistic description (phonology, vocabulary, syntax, morphology, pragmatics)
- critically engage with ideological claims about multilingualism and the extent to which scholarly results actually support them.

At the begining of each chapter you will find an introductory list of the chapter's highlights. It is not necessary to read the chapters in the order they appear in the book, as I have made efforts to write the chapters so that most of them can be understood independently of each other. Exceptions are the three chapters on grammar and on vocabulary that have a higher degree of content interdependence.

It is difficult to come up with exercises and reflection questions that make sense for a broad readership. In each chapter I include a reflection question or practical task that I use with the students I teach. Not all of them might be relevant to the readership. I hope that the contents and critical discussions in the chapters are relevent enough to trigger other thoughts and questions in a readership working in and on various linguistic and social contexts.

1.5 Less emphasized and missing aspects

There is no doubt that this book is biased towards certain languages, mostly major Western European languages and dialects. This choice is a consequence of the context in which I work, but also of the scholarly traditions and networks of which I consider myself to be part. Wherever possible I try to refer to other types of linguistic diversity, but denying the selection bias in the languages and settings discussed would be naive and hypocritical.

Despite the breadth of topics discussed, certain aspects remain underexplored in this book. Pronunciation and accent can only touched upon relatively briefly—there is no doubt that more space could be dedicated to these aspects.[1] Moreover, even though pragmatic principles of utterance organization are discussed in Chapter 7, I do not have the space to elaborate on more aspects of multilingualism and pragmatics (e.g. the transfer or convergence of pragmatic principles across languages in the repertoire).[2]

I am also aware of the fact I give priority to research that describes competence and achievement as manifest in analyses of oral or written language production and as measured via production and reception tasks and tests. Studies focusing on *on-line processing* of multiple languages are only touched upon sporadically.[3] Finally, I do not have the space to discuss intercultural or transcultural aspects of multilingualism.

The reasons for these gaps are various. I have only addressed questions of pronunciation briefly mainly for lack of space. Discussing the methodological and theoretical underpinnings of multilingual processing research requires more background and more complicated methodological discussions than I deem suitable for this book. The psycholinguistics of multilingual language processing, together with neurolinguistic evidence, undoubtedly deserves scholarly attention. At the same time I am confident that it is possible to come to a first understanding of the general principles of multilingual language learning by focusing on the measurable *outcomes* of learning and processing.

Intercultural aspects of multilingualism are at the periphery of how I would delimitate *language* competence (which is not to say that they are not relevant to using languages!), and I deem it more suitable again to treat such questions separately.

[1] See Flege (1995) for an influential model and Wrembel (2015), Nelson (2020) for more recent research on third language acquisition.

[2] See Kecskes (2006) for more details.

[3] For examples of studies that offer in-depth explorations of multilingualism and processing questions see e.g. Hopp (2016), Festman (2021).

The focus on two descriptive areas of language (*lexical* and *grammatical* patterns and structures), completed by the multilingual learning of *skills* (reading, writing, listening, speaking) in this book is therefore a deliberate restriction on my part.

Note on use of generative AI

When preparing this book, I used generative AI (mostly Infomaniak 2025 and Anthropic 2025) as an assistant. Most importantly, AI was used to sort out typesetting issues in LaTeX. Moreover, first versions of the chapter highlights were generated by these LLMs and then discussed and rewritten with the help of the first readers (students and colleagues) of each chapter. Other specific uses of generative models are explicitly mentioned in the manuscript whenever relevant.

1.6 Acknowledgements

In this book, I discuss the ideas and results of many esteemed colleagues as well as from research projects I have been involved in over the last 20 or so years. The ideas for our own research were not strokes of genius on my part. Research ideas arise in an environment that is stimulating and supportive. Research improves when there is open and controversial discussion in this environment, when what is supposedly true is constantly questioned. I was and am fortunate to work in such an environment.

With only a few exceptions, all these data and analyses are the results of joint work with many wonderful graduate students on MA and PhD levels, with postdocs, and with colleagues from my institute or other universities. Even though I was the principal investigater of many of these projects, I was often the one how learnt the most, from smart and highly motivated collaborators, and from discussions with my academic mentors, with participants, and with colleagues.

I would also like to thank the reviewers and the proofreaders for their numerous critical remarks and suggestions. Even though I don't like to admit it, most were perfectly justified.

Instead of drawing a long list of people here—and forgetting important names—I promise to buy each and every one of you a drink (or two) once this book is out.

2 Hyperpolyglots: Can we learn from language nerds?

Preview—Key points of this chapter

- The apparently simple question *"How many languages do you speak?"* requires clarification of what counts as a language and what is meant by "speaking".
- The chapter examines the phenomenon of *hyperpolyglots*—individuals using a high number of languages.
- Biographical sketches of well-known polyglots illustrate different paths and strategies of multilingual learning and raise important research questions.
- The study of hyperpolyglots serves as a lens to address fundamental issues in multilingualism research, including:
  - *individual differences* in language aptitude;
  - the relationship between *prior language knowledge* and additional language learning;
  - mechanisms of language maintenance and *attrition*.
- The discussion anticipates broader themes of the book, emphasizing the necessity of basing educational and policy recommendations on robust empirical evidence rather than on anecdotes or introspection.

How many languages do you speak? I am quite certain you have been asked this question before. If it is easy for you to give an answer, ask three people around you that same question.

If you were not sure how to answer the question about how many languages you speak/master, you are not alone. It is quite likely that at least some people will struggle to answer this simple question in a straightforward way. I myself find it very difficult and my preferred answer starts with "It depends...".

Why is this simple question so hard to answer for us multilinguals? The reason is that the two main concepts in the question both need to be clarified:

- What is a (countable) *language*?
  - Do dialects count as languages? For example, are all Swiss Germans who speak an Alemannic dialect and use Standard High German regularly therefore bilinguals?
  - When do accents count as languages? If I speak New Zealand English with my family and US English with my classmates, does that count as two?
  - I speak Moroccan Arabic with my family and I have also mastered Standard Arabic in reading and writing. Does this count as two?
  - If I speak Luxemburgish with my partner and Standard High German with my children, does that count as two?
  - If I speak a Swedish and a Norwegian dialect, does that count as two?
  - I speak Sesotho and Setswana, two rather similar languages, does that still count as two?
  - ...
- What does *speak* mean—what levels of competence and which skills should we count?
  - Does it count if I speak one of the languages (or all of them) with a strong accent?
  - Does it count if I only understand it but never actually speak it?
  - Does it count if I used to speak it but no longer use it?
  - Does it count if I only write the language?
  - ...

As long as these points are not clear, the validity of answers to the question of how many languages a person speaks is rather limited. For the same reason, it is unclear, what claims such as that the majority of the world's population is

bilingual[1] actually mean. Many fundamental concepts such as *monolingualism*, *bilingualism*, or *multilingualism* require these points to be clarified. There are rather different views in the field about how to do this. In this book, I will discuss such problems from different angles. I will also briefly discuss my personal attempt to clarify the problem in Chapter 3.

2.1 The polyglot hype

The last few years have seen a growing interest in people who speak not just two or three, but many languages. So-called *hyperpolyglots* are the object of numerous articles and books (e.g. Erard 2012). Some of these hyperpolyglots market themselves on social media, sometimes also with commercial interests. However, the phenomenon of individuals mastering many languages is not new, as the examples discussed below show.

An interesting overview of the phenomenon is given in Erard (2012). If you consider yourself enough of a polyglot to join in, there are several regular international events you may attend:

- Polyglot Conference http://polyglotconference.com
- Polyglot Gathering https://www.polyglotgathering.com/
- Youtube video with impressions from the "Polyglot Gathering" https://www.youtube.com/watch?v=NSipbcg56ZM

2.1.1 Some famous polyglots

In the following, I briefly list some individuals that were and are famous for mastering an impressive number of languages. I quote descriptions of their astonishing skills that I found in the literature. These descriptions relate to research questions that are still very much debated today; I print them in shaded boxes below. These questions will accompany us throughout the chapters of this book.

Emil Krebs * 15.11.1867 Freiburg/Silesia † 31.3.1930 Berlin:

As far as I know, *Emil Krebs* is the absolute champion regarding the reported number of languages in the individual repertoire. According to the sources I found, he had some productive skills in more than 60 languages, and he had

[1] This claim can be found in many scholarly texts. For an influential example see de Bot (1992: 2), where bilingualism is said to be "the rule and unilingualism the exception".

more or less solid knowledge about a total of 120 languages. We obviously do not know what exactly his proficiency levels were (and even less what definition of 'language' was used) as nobody has thoroughly assessed Krebs' polyglot skills and competences.

> The knowledge of closely related languages and dialects, which even in well-gifted minds becomes confused into chaos, remained sharply separated in his well-disciplined mind. (Matzat 2007: 19, translation RB)

Research question: What is the role of pre-acquired/pre-learnt language(s) and skills in additional language learning? What is the initial state in learning such an additional language (L2, L3, Lx)?

When Krebs died, his brain was analyzed using the methods that were available at the time. The experts concluded that his brain was perfectly average. However, the brain was nevertheless conserved for later analyses. Such an analysis was published in 2004, and it indeed suggests anatomical differences between Krebs' brain and control brains:

> Studies on brains of individuals with an exceptional mental capacity are of widespread interest. Here, we analyze the cytoarchitecture of areas 44 and 45 (anatomical correlates of Broca's speech region) of a person with a documented extraordinary competence in language performance (Emil Krebs, E.K.), and compared it with 11 control brains. Morphometry and multivariate statistical analysis revealed significant cytoarchitectonic differences between E.K. and the controls in left and right areas 44, in right 45, and in interhemispheric asymmetries. We conclude, that the exceptional language competence of E.K. may be related to distinct cytoarchitectonic features in Broca's region. (Amunts et al. 2004: 346)

For our current purposes, we do not need to understand the exact anatomical details referred to in this quotation. You might have heard of Broca's area before, which is one of the first regions in the human brain that has been identified a long time ago for being important for language (in 1862, by French scientist Paul Broca). Today we know that there are many other regions and neural pathways that form the language network, but Broca's area is still relevant (also for studies

on multilinguals, see e.g. Wattendorf et al. 2001). What is important here is the question whether some brains are better than others for learning languages and whether the features of such 'better' brains may be shaped by experience, by inheritance, or by some complex interplay of both.

Research question: Are we all equally apt for learning languages or is there a lot of inter-individual variation? If we are not all equally apt, can aptitude be trained? Are certain brains particularly well prepared for language learning?

Cardinal Giuseppe Mezzofanti * 1774 Bologna † 1849:

The cardinal allegedly spoke 38 languages and many (~50) dialects. He famously practiced his languages by hearing the confessions of the faithful in their respective languages.

> For a sense of what Mezzofanti was doing, one can look at what ordinary multilinguals do when they switch between languages. One theory says that they don't switch languages on and off; rather, they have them all mentally activated at the same time, but put a lid on the unwanted ones. (Erard 2012: 95)

The quotation implicitly introduces a continuum between what Erard calls "ordinary multilinguals" and polyglots or hyperpolyglots such as Mezzofanti. Some scholars have proposed counts such as (some) proficiency in at least four languages for polyglots and at least 10 languages for hyperpolyglots (Malik-Moraleda et al. 2024: 2), but such definitions often come without any discussion of the questions listed above (questions such as how to handle dialects, accents, only partial/receptive skills, etc.; I will return to this and propose a possible solution to these counting problems in Chapter 3).

Regardless of the definitorial uncertainties, I believe most of us agree that there is something fascinating about people who manage to build and maintain fluent skills in several languages, be it 'only' three or thirty, or even more.

Research question: What is the nature of linguistic competence, and how does it relate to or translate into language skills in use?

Louis Loewe * 1809 Zülz, Silesia/Prussia † 5.11.1888 London:

This scholar from Silesia specialized in oriental languages. He allegedly had very good mastery of almost 40 languages.

> The fact that a person has perfect command of 39 languages, spoken as well as written, is enough to arouse interest in those around him and those that follow him. Such a man was Dr. Louis Loewe. One of his contemporary biographers stated quite rightly: "There can be no doubt, that since the great Mezzofanti's passing away, no linguist has come as close as the one, who this biography is about." (Kurrein 2026, see also Thomas 1881: 63)

Kató Lomb[2] * 8.2.1909 Pécs † 9.6.2003 Budapest:

Kató Lomb is one of the few women in this group. She is interesting as she seems to stick to some sort of "natural approach" in multilingual language learning, which is rather atypical.

> "What Lomb Kató had was a heroic drive to get comprehensible input and to retain it," Krashen told me, holding her up as a triumph of dedication. She worked hard; she wasn't afraid of failure; she read prolifically. […] Lomb's case supported Krashen's theory of second-language acquisition, especially the central part of it, the 'comprehensible input hypothesis' […]. Krashen argued that people can both subconsciously acquire and consciously learn language, but that the former is more important. […] This is how children get their first language—they "acquire" it. So do massive multilinguals like Lomb. (Erard 2012: 73)

Guided instruction involves the explicit focus on linguistic patterns and matter, while in *natural exposure*, the focus typically lies on the propositional content and on social and relational matters.
Research question: Which respective roles do these two different foci play in additional language learning?

[2]Note that in Hungarian the first name habitually is put in second position, so officially it is *Lomb Kató*.

Alexander Argüelles * 30.4.1964 Chicago, USA:

Argüelles is a good example of a contemporary hyperpolyglot who successfully engages in self-marketing. He claims to spend 9h a day learning languages. He was interviewd by Erard who tried to understand how his polyglotism is developed and maintained.

> Then he continues with his "scriptorium" exercise, writing two pages apiece in Arabic, Sanskrit, and Chinese, the languages he calls the "etymological source rivers." "If I begin the day by writing the three of those," he said, "I know it's going to be a good day." A page of Turkish is followed by a page of Persian or Greek, then one of Hindi, Gaelic, or other languages. He works in fifteen-minute chunks, switching to a new language at the end of each period. In languages he knows less well, he writes out grammar exercises. His goal: to write twenty-four pages a day. How many books has he filled? He pointed to three tiers of them, black-spined, atop a bookshelf. "I'm on volume forty-five now." (Erard 2012: 111)

Research question: Which role do input and output play in language learning?

2.1.2 What can we learn and generalize based on evidence from polyglots?

In her 2015 blog post, Aneta Pavlenko (2015) critically engages with what she calls the polyglot hype, in particular with the typical, often unsubstantiated descriptions of the language skills ('perfectly fluent in 10 languages') of these individuals. There are indeed a number of questions that one wishes to raise from the scholarly point of view in the context of this polyglot hype:

- Why are most (hyper-)polyglots men and only very few women? This is suprising as in Western educational systems girls and women typically outperform boys and men in language learning.
- The Global South seems rather underreprresented, most famous individuals seem to be living in the West/North. This is on the one hand astonishing given the high degree of linguistic diversity in the South, on the other hand it might be less surprising as polyglotism in the South might be considered much more normal than in the North.

- When describing polyglots, their skills and their learning strategies, the focus lies usually on literacy skills and on explicit knowledge (grammars, dictionaries, parallel texts/translations as resources). Is it really possible to be orally fluent in, say, 30 languages?
- What is striking is the capacity of polyglots
  - to memorize (new) information
  - to separate languages in use, i.e. to limit intrusions, or interferences across languages
  - to counteract language attrition, i.e. their faculty (via learning stragies?) to limit the decay of language knowledge
- Do polyglots possess a specific type of giftedness or can anybody quickly learn additional languages?

As also discussed in Pavlenko's piece, any scholar experienced in bilingualism and multilingualism research will have doubts when attributes such as "perfect", "native-like" are used to describe hyperpolyglots. Were these skills validly tested or explored or are we dealing with self-assessed competences? What do such attributes actually describe, are they fitting at all for the description of multilinguals? Is "native-likeness" a useful, necessary goal of language learning?

As was the case for the polyglots described above, we often have insufficient and only biased information on actual skills or competences of polyglots (past and present). As far as I know, there are only a few recordings of the demonstration of unprepared polyglot language use.[3]

In any case, hyperpolyglots are a self-selected sample. Multilingualism enthusiasts sometimes forget that there is a fundamental difference between people who are multilingual due to internal (motivational, aptitudinal) and external factors: minorities (local or immigrated) often do not have the choice between remaining mono- or becoming multilingual (*non-elective* multilingualism), whereas other people deliberately choose to become multilinguals or even hyperpolyglots (*elective* multilingualism). This distinction is crucial, as the predispositions for language learning across such rather different groups may be fundamentally different.

[3] One exception I am aware of could be a TV inteview with Stuart Jay Raj, in which he seems to be translating spontaneously a text into several languages (Raj 2007).

Research question: What are adequate and sufficient empirical grounds (samples, methods, analyses) to test theories of multiple language acquisition/learning?

> Perhaps the only difference between multilinguals and polyglots is that the latter spend their time studying languages they do not need for everyday practical purposes. In this they may be akin to amateur musicians who learn to play dozens of musical instruments. Interestingly, we do not see reports on such musicians – even though they undoubtedly exist and have valuable knowledge and expertise – because we know that the end result still lands them quite far from Yo-Yo Ma. (Pavlenko 2015)

We will learn in Chapter 14 how the question of individual talent for polyglotism can be empirically investigated.

2.2 Research and research desiderata

The study of hyperpolyglots is useful as it draws our attention to important points that are all related to theories and insights in the scholarly investigation of multilingual language learning and using.

Figure 2.1 gives an overview of the topic structure of this book. I will not discuss all topics in equal detail. The figure will serve for orientation (because things unfortunately sometimes get a bit complicated, not to say confusing).

2.2.1 Multilingualism theories: Real-life relevance

As we will see in Chapter 3, a widespread belief is that learners who already master two languages are better learners of an additional language. Or, in other variants of the theory, that the more languages one masters, the easier it is to learn a new language.

The question whether there is a causal link from mastering many languages to additional language learning will be addressed again (repeatedly) in the remainder of this book. A particularly difficult issue in this context is the possibility of proving a causal link from *number of* and *proficiency in* previously learnt languages to additional language learning.

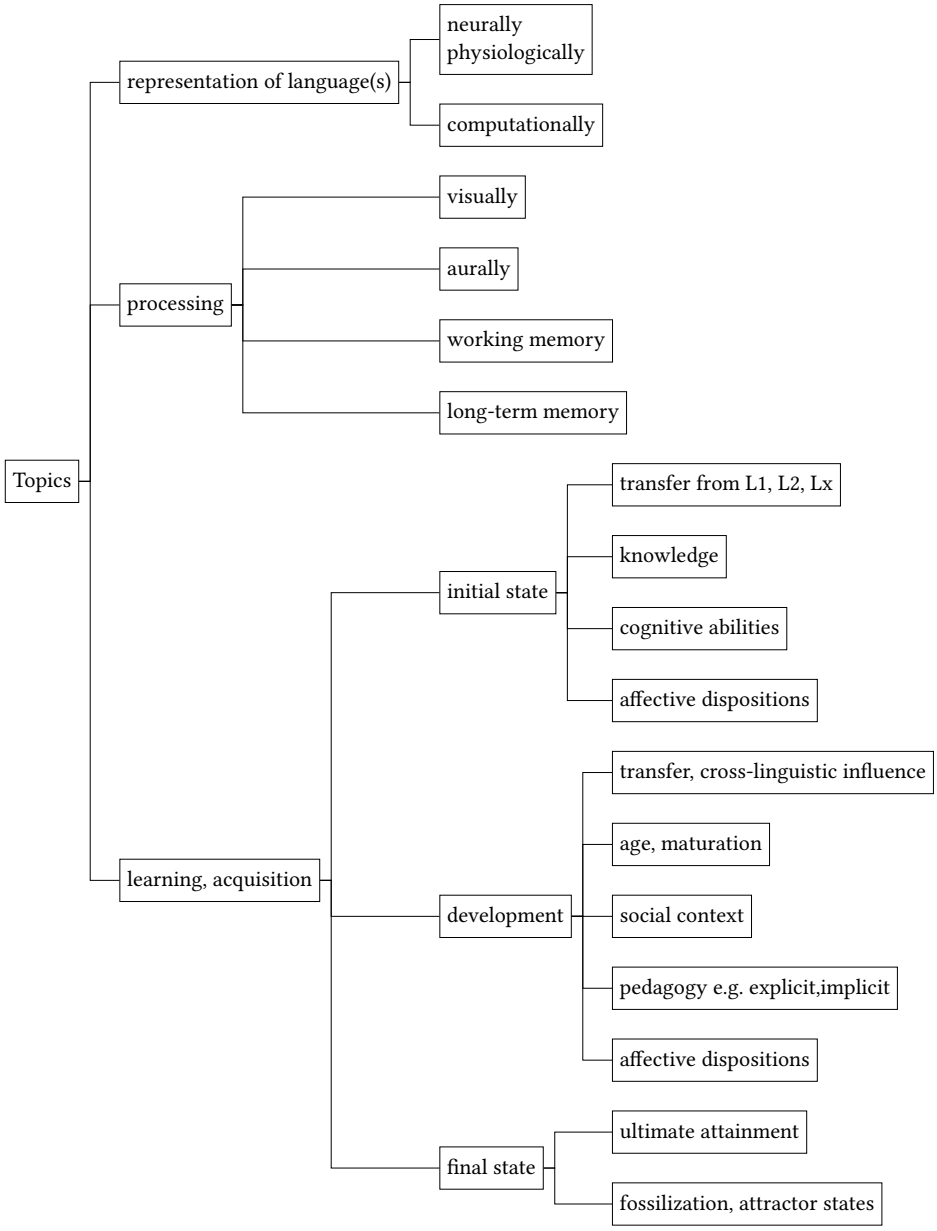


Figure 2.1: Topics in the field of multilingual language learning. Note that the Figure is not exhaustive but merely listing main dimensions that are currently discussed in the literature (and in this book). All three main categories (representation, processing and learning/acquisition) are characterized by invdividual variability (e.g. in predispositions, abilities, emotional stances, etc; cf. in particular Chapter 14 for more on this).

A related question that is important for the application of multilingualism research is whether some learners are overwhelmed by learning several languages, as is the norm in an increasing number of national (European) curricula.

The worry about overwhelmed primary school language learners articulated by the colleagues from special education is legitimate and, as far as I know, not well investigated. I will come back to this issue in the context of the discussion of differences in language aptitude.

What struck me when I started working on such questions was that many claims made in the literature are not based on sufficient empirical evidence. It is not rare that actors in the field of language education base their recommendations on a mixture of self-observation and insights gathered via rather unsystematic and anecdotal observation.

2.3 Concluding remarks

Polyglots are undoubtedly a fascinating study subject. It is certainly interesting to study their predispositions and their strategies to understand what the human mind is capable of. However, are they also good inspiration for general recommendations on language teaching and learning?

2.3.1 Study in winners

Since it is often people who *love learning languages* who are actively involved in language pedagogy and policy, it is not surprising that recommendations about language teaching and curricula are often made on the basis of introspection or data gathered with language-savvy, gifted people ('people like us'). It is quite obvious why this is problematic: while good language learners may benefit from certain pedagogical dispositions (curricula, teaching methods, etc.), it is not guaranteed that *everybody*, including less gifted learners (let alone people with learning disabilities) will do so. There are curriculum reforms that show signs of this 'study in winners problem'.[4] There is an increasing awareness in the field that it is important to overcome such *sample* or *selection biases*. I will return to this in the context of language aptitude (Chapter 14).

[4] See e.g. Berthele (2019b: 6) for the example of the implementation of multilingual curricula in Europe. See also Andringa & Godfroid 2020 for a more general discussion of sampling bias in applied linguistics.

2.3.2 Evidence-based policy recommendations

Related to this last problem there is the more general question of what represents sufficiently robust evidence for recommendations (for parents, educators, language policy makers) about how languages should be learned and taught. This present book is an attempt to contribute to multilingualism scholars' expert knowledge[5] about crucial questions of multilingual language learning. The more we can base our recommendations (or our hesitations to give any recommendations, i.e. our known unknowns) on robust scholarly knowledge, the less we fall into the traps laid by pure introspective and wishful/ideological thinking about languages and language learning.

[5] See Willingham (2012) on the problem of the 'expert' status in education.

3 Theories of multiple language learning

Preview—Key points of this chapter

- Theories of multilingual language learning must consider multiple possibly interacting factors.
- Core terms (*multilingualism, plurilingualism, bilingualism*, etc.) inherit the conceptual fuzziness of the notion of *language* itself. A possible way to clarify these terms is to construe them as natural categories with prototypical and peripheral cases rather than strictly delimited 'scientific' categories.
- Four recurring assumptions shape current debates:
    1. *Cross-linguistic influence* (CLI), *transfer, convergence*: multilinguals' languages interact rather than being isolated.
    2. *Holism* and *multicompetence*: multilingual repertoires should be understood as integrated wholes, not as multiple languages stored in separate boxes.
    3. *Complexity*: multilingual acquisition involves many interacting factors.
    4. Multilingual advantage: multilinguals are sometimes assumed to possess enhanced *language awareness* and *metalinguistic skills*.
- While cross-linguistic influence is uncontroversial, many other claims—holism, complexity, multilingual advantage—remain contested and require more empirical research.

The object of the study of multilingual language learning and use is only partially accessible. While we obviously can observe language use, elicit linguistic patterns, and probe metalinguistic knowledge in multilinguals, the learner-internal processing and the acquisitional mechanisms at work have to be inferred indirectly. Moreover, there are potentially many (social, cognitive, affective, linguistic …) factors that may or may not have an impact on multilingual acquisition, and they might also interact among themselves.

3.1 Multilingualism, plurilingualism

Many notions in linguistics, from *language* to *word* to *bilingual*, are contested and controversial. For good reasons, many of our central terms cannot be defined in the way a chemist can define the elements in the periodic table. As has already been briefly mentioned in the previous chapter, this also affects also the terms at the core of multilingualism studies: who is multilingual? Who is bilingual? Should dialects be counted when defining bilingualism? Does bilingualism entail using two languages *perfectly* and since birth?

The fact that multilingualism has become a fashionable topic in academia over the last decades comes with a proliferation of different words used to denote more or less the same phenomena (*multilingualism, plurilingualism, metrolingualism, translingualism*, etc.), although many authors emphasize (in their view) important differences in construal. In this book, I will take a pragmatic perspective on such matters (see Berthele (2021b) for my general approach). Rather than contributing to the proliferation of fancy new terms, I will stick to what I believe is the currently most widespread use of the core terminology.

3.1.1 Terminology

Many scholars use *multilingualism* to refer to both institutions or groups—"South Africa is officially a multilingual country"—and individuals—"Emil Krebs was impressively multilingual"—that are somehow characterized by several languages (sometimes at least two, sometimes at least three).

The term *plurilingualism* is often used to refer to the use of more than two languages by the same individual, with the goal of distinguishing multilinguals from bilinguals. Sometimes terms such as *multi-* or *plurilingual* are also used to refer to both bilinguals *and* speakers of more than two languages. As long as these terms involve language counts (n = 2, n ≥3, etc.), their terminological precision hinges on the definition of what counts as a *language*. As all linguists know,

defining a language is notoriously complicated and ultimately depends on both linguistic distinctiveness within the usage patterns of speakers and institutional recognition (see Section 12.1 for more on this). Given the problems linguists have distinguishing languages from dialects (or sociolects), all these terms cannot be unambiguously defined—they inherit the conceptual fuzziness of the term *language* and add some more. Therefore, it is important to clarify in each study's context, what *bilingual*, *multilingual*, or *monolingual* refer to.

Related to these problems of definition, some currently very popular postmodern approaches to multilingualism radically question the sense of language counts altogether:[1]

> The Dynamic Bilingual Model that is related to our theories of translanguaging […] posits that there is but one linguistic system […] with features that are integrated […] throughout. (García & Wei 2014: 15)

I will come back to the problem of delimitation of languages (e.g. vs. dialects) towards the end of this book, in the context of my discussion of the topic of linguistic proximity (Chapter 12). For the time being, let us just accept the fact that categories such as bi- and multilingualism are not entirely clearly defined in the Aristotelian sense, that is, with necessary and sufficient criteria all members of the category share. In fact, constructs such as *bilingualism*, but also *language* and *dialect* are better captured by the notion of *natural categories* (Rosch 1973, Lakoff 1987): they radially extend from good, typical, or even stereotypical examples at the center to less typical examples at the periphery of the category (see Figure 3.1). It is also often unclear where the cateogry ends—am I a bilingual if I master one language at a very high level and another only receptively? Similarly, as shown in Figure 3.1, the notion of a multilingual arguably evolves around a prototype of an individual mastering three or more languages that are clearly typologically different. Moreover, this mastery is *balanced* in the sense of involving comparable and typically high skill levels in all participating languages. In contrast to such balanced mastery, there are less prototypical, more marginal, and maybe limiting cases: for example, less prototypical multilinguals master a subset of their languages on more modest levels, in some cases only receptively with no production skills. Moreover, some of the languages involved may be closely related to each other and thus be considered "mere dialects" of the same language.

[1] See Berthele (2021b: 107) for a critical discussion and the reasons I do not subscribe to this view.

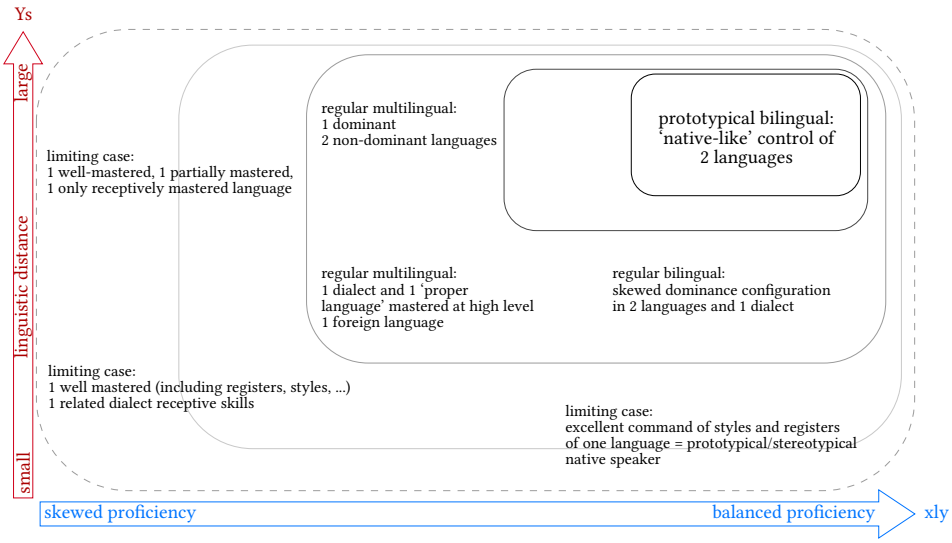


Figure 3.1: Category of multilingualism with different criteria mapped onto two dimensions; cf. Berthele (2021b: 26). Repertoires may involve different "Ys" (dialects, sociolects, languages) mastered perfectly or poorly ("xly"). The notion 'proper' language refers to a language that neither in linguists' nor in laypeople's minds a candidate for a dialect of some other language.

3.1.2 Multilingualism: Assumptions and premises

Most current takes on multilingual language acquisition/learning refer to four related features of the multilingual repertoires:

1. Cross-linguistic influence (CLI), transfer, convergence: multilinguals' languages are not strictly isolated from each other but interact.

2. Holism, multilingual repertoire, multicompetence: the multilingual repertoire should be modeled and understood as a whole and not as a set of separate entities.

3. Complication and/or complexity: the number of possible factors having an impact on multilingualism is high (=complication), and there are many potential directions and interactions within this set of factors (=complexity).

4. Multilingual advantage, language awareness, metalinguistic awareness: bi- and multilinguals are better language learners than monolinguals and benefit from other cognitive advantages.

Please note that this list is not supposed to represent *what is the case*, but rather what the mainstream claims are. We will devote considerable attention in this book to the search for evidence supporting such claims.

3.2 Cross-Linguistic Influence (CLI), transfer, convergence

The text below is taken from the corpus generated for a study on the use of digital tools in learning English as a foreign language (Berthele et al. 2025). The first languages of these learners are either French or German, none of them claimed being simultaneously bilingual with both French and German as L1.

(1) Dear Ms Miller, I am starting my last year of practice, and to be able to the professional world, I would like to follow an exchange in a company based in New York. This is the main reason why I am writing to you today. First of all, the last year of formation include 6 months of stage, we can only choose the company and the desire moment (winter or summer). …

Detecting cross-linguistic influence: If you know some French and German, think about example (1)—what is the likely source of transfer here?

If you are not proficient in these languages, think of someone you know who speaks one of your languages well but with manifest influence from another language. How can we pinpoint the source of such influence?

Hint: One of the things we need to make sure when identifying transfer is that deviations from so-called native speaker ways of using the language are indeed somehow replicating structures from another language—and not simply a consequence of limited vocabulary and partial mastery of the grammar.

If you are familiar with the language pair French-English, you might have noticed the use of the lexical items *stage* and *formation* in the text: they are false cognates (aka *false friends*), i.e. they are word forms that are very similar in both languages, but their use in the text reveals the French lexemes meaning 'internship' and 'education program' respectively. In our text sample, these use patterns are only observed in the texts written by L1 speakers of French. L1 speakers of

German do other interesting things, but they never use these English words "the French way" (even though all of them have French as another foreign language in their repertoires).

Transfer is a central notion in all subdisciplines related to second language learning/acquisition, bilingualism and multilingualism. The term is used for a wide range of phenomena, as shown in the classic definition by Odlin:

> Transfer is the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired. (Odlin 1989: 27)

On the one hand, the term refers to linguistic patterns that are considered deviations from the norm, whatever the norm of the target language may be (interferences, negative transfer). On the other hand, the term refers to patterns generated on the basis of source language knowledge that matches the target language norm (positive transfer). This positive variant of transfer is what motivates—among other things—the fourth claim in the list above. It is a central aspect of the current-day programmatic discourse on multilingual/plurilingual language teaching.[2]

3.2.1 Where and how can we find CLI?

The introductory example above shows language use patterns that arguably instantiate cross-linguistic influence: a semantic or syntactic pattern from one language is "carried over" to the other language within the multilingual mind. Since nothing is literally carried over from L1 to L2 (and therefore no longer present in L1 but only in L2), many scholars prefer terms such as *replication* (Matras 2009) or *copying* (Johanson 2023).

Not all deviations from the target language norm in multilinguals' productions are instances of transfer. Jarvis (2000: 253) identifies three conditions that help scholars identify interlingual transfer:

1. intra-group homogeneity: speakers of the same L1 resemble each other when using L2
2. inter-group heterogeneity: speakers of different L1s differ in their use of L2
3. cross-language congruity: L1 provides a model for a pattern used in L2

[2] See Berthele (2018) for a critical appraisal.

In our introductory example, we could thus only make a case for L1 transfer if:

1. we can show that many multilinguals with L1 French and a somewhat weaker L2 English use certain words whose forms resemble each other in French and in English in specific ways
2. other multilinguals (e.g. with L1 German) in their L2/Lx English do not show the same patterns of use
3. the use of the 'odd' English words corresponds to how the cognate words would be used in French.

The example discussed here represents the most commonly investigated type of transfer, the replication of a pattern or of matter from L1 in L2. But there are many other, often more subtle types of transfer. Let us look at some examples for these other types of transfer within the multilingual repertoire.

Transfer L2 → L1 Laufer (2003) investigated linguistic repertoires of Russian-speaking immigrants in Israel. She looked at 30 bilingual participants (L1 Russian, L2 Hebrew; migrants) and 14 monolinguals (Russian). They had to assess the correctness of Russian collocations. Among these collocations were translations (calques) from Hebrew that are not typical for (some may say wrong in) Russian:

(2) Ja zakryl telvizor
I closed TV
'I switched off the TV'

(3) Ja vykluchil telvizor
I switched.off the.TV

Bilinguals accept around 40% of these constructions modeled on Hebrew. The monolinguals' acceptance rate is much lower, at 16%.

A Francophone member of the 2023 Swiss cabinet, Guy Parmelin, once said the following when asked whether his language skills were good enough for his new function in the government:

(4) I can English understand

This gave rise to considerable hilarity in the Swiss media.

If you know some French and German, think about example (4)—what is the likely source of transfer here?

Typically, the Swiss living in the Francophone areas of the country unsurprisingly go to schools whose language of instruction is French, and their first foreign language is the country's majority language, German. English is the third language learnt in today's curriculum, and it is also possible that Parmelin, being of a certain age, only learned English after school as the curriculum has changed considerably in the last 30 years. Thus, Parmelin's language learning biography is likely to be L1 French → L2 German → L3 (or Lx, if he learnt other languages after German) English.

(5) Parmelin's English
   a. Je peux comprendre l'anglais [GP's L1]
   b. *Je peux (l')anglais comprendre
   c. Ich kann Englisch verstehen [GP's L2]
   d. *I can English understand [GP's L3]
   e. I can understand English

Parmelin's English utterance (5d) can thus hypothetically be explained as transfer from his L2 German (5c), as his L1 French (5a) does not provide a pattern on which the English construction could be calqued. Again, this is merely a hypothesis, and Jarvis' three criteria need to apply to show that the theory is actually correct.

Transfer and crosslinguistic influence between the subcomponents of the multilingual system have been observed to act in all imaginable directions:

> In a multilingual system crosslinguistic influence not only takes place between the L1 and the L2 but also between the L2 and the L3, and the L1 and the L3, not forgetting the fact that the influence can also work vice versa in all cases. (Jessner 2008: 31)

Scholars have indeed shed light on all kinds of manifestations of transfer or CLI. An additional language (such as Parmelin's L3 English) can show signs of transfer:

- from L1
- from L2
- from both L1 and L2
- from L1 or L2 (conditional transfers, governed by constraints)

There is a recurrent list of factors that are generally believed to shape/constrain such transfer (cf. Williams & Hammarberg 1998):

- Recency—which languages were (more) recently acquired?
- Proficiency—how well does the person master a language?
- L2 Status—is it a first ('native') or a second, additional language?
- Typological proximity—how much do the languages resemble each other?
- Psychotypologogy—how similar do learners pereceive languages to be?

Transfer is a central notion in many Western curricula and language educational policy documents. In particular the view of the plurilingual repertoire as promoted by the language policy division of the Council of Europe emphasizes the positive role of transfer:

> The didactic activities that make use of the similarities and differences between languages come within the scope of reflexivity [...]; they establish strategies for transfer [...] and as such contribute to the ability to learn.
> In the first place, this involves contrastive reflective activities that allow comparisons to be made between the languages that the pupils speak and the ones they come into contact with in school and in society. These awareness-raising activities also provide training in how to manage the plurilingual resources of repertoires and in various strategies, including metalinguistic and metacognitive ones, to facilitate learning. (Beacco et al. 2016: 49)

In such policy-oriented documents, positive interlingual transfer or more generally beneficial effects of being bi-/multilingual on additional language learning are often taken for granted. As we will see later in this book, things are not as straightforward as these affirmations suggest. The scholarly questions that should be asked and answered by way of empirical research are:

- What are the conditions under which positive/negative interlingual transfers take place?
- What kind of transfer can we observe given specific language/repertoire configurations?
- (How) can pedagogy foster positive/beneficial transfers?

These questions should ideally be answered before changes towards multilingual curricula and teaching practices are considered.

3.2.2 CLI and bilingualism: Romansh and German placement verbs

In this section, I illustrate transfer phenomena in the lexicon of highly skilled multilinguals: Speakers of Romontsch Sursilvan. These speakers of a Romance minority language in the Eastern Alpine area of Switzerland do not have the choice but *have* to learn German, Swiss German, and other languages given the minority status of their native language. The Romansh are thus non-elective multilinguals, very much unlike the superpolyglots discussed in Chapter 2 who are *elective*, self-selected multilinguals.

(6) Participant sd12, clip 59

a. Romansh
ella ha semudergiau da metter quella flur el-s cavels al-la
she has labored to put this flower in-the hairs of-the
dunna
woman
'she laboriously put this flower in the woman's hair'

b. Swiss German
die persoon laid e blueme i de hoor
this person lays a flower in the hair
'this person puts a flower in her hair'

(7) Participant sd2, clip 21

a. Romansh
ina persuna metta quei toc crap ell=aua
a person puts this piece rock in.the=water
'a person puts this piece of rock into the water'

b. Swiss German
dia frau stellt an stai in-s wasser
this woman puts-standing a rock in-the water
'this woman puts a rock into the water'

(8) Participant sd9, clip 2

a. Romansh
ella metta giu in cup culla bucca sin meisa
she puts down a cup with.the mouth on.the table
'she puts a cup on the table with her mouth'

b. Swiss German
di frau laid de becher uf em tisch
this woman lays the cup on the.DAT table
'this woman puts the cup on the table'

The examples show how individuals describe identical video clips with simple events involving putting things in certain places in two of their languages. Please note that the cup in the last example, at the end of the event, is standing, not lying. An analysis of the verb choice in the responses[3] shows that the multilingual speakers of L1 Romansh, when communicating in German, use verbs such as *legen* differently from L1-German speakers: the verb covers a part of the larger Romansh category covered by the lexeme *metter*. The shared semantics of *metter* and *legen* can be considered a *pivot* (Matras & Sakel 2007: 830), i.e. semantics of the two lexical items that match across the languages. Relying on the shared semantics, the multilinguals map the whole category of *metter* onto the verb *legen*. From a German normative point of view this is an error (or *negative transfer*), as German speakers distinguish different verbal categories within the relevant semantic space and do not use *legen* for the examples listed here. The use of the dative case in example (8b) is equally a deviation from (Swiss) German norms (accusative marking is expected here). Not everybody in the field is happy about this type of analysis that compares the Romansh uses of German to those of German (near) native speakers. Less normatively speaking, the phenomenon could be termed *convergence*, as the semantic categories in the two subsystems in the multilingual mind converge to form a single shared semantic representation.

Whereas the terms *interference* and *negative transfer* imply a deviation from a (often monolingual) norm, many bilingualism researchers prefer the less evaluative term *convergence* to refer to the often observed increased similarity in use patterns across the languages of bi- and multilinguals:

> In the context of language contact in a bilingual's mind […] convergence can be defined as the enhancement of inherent structural similarities in the two linguistic systems […]. (Ameel et al. 2009: 271)

Convergence can refer to the individual language use patterns in bi- and multilinguals who increase interlingual similarities in their repertoires, as shown in the examples from the multilingual speaker of Romansh and German.

Whether a phenomenon that is a manifestation of languages in contact in bilinguals' or additional language learners' minds is referred to using terms such as

[3] See Berthele (2015: 634) and Berthele (2012b) for details.

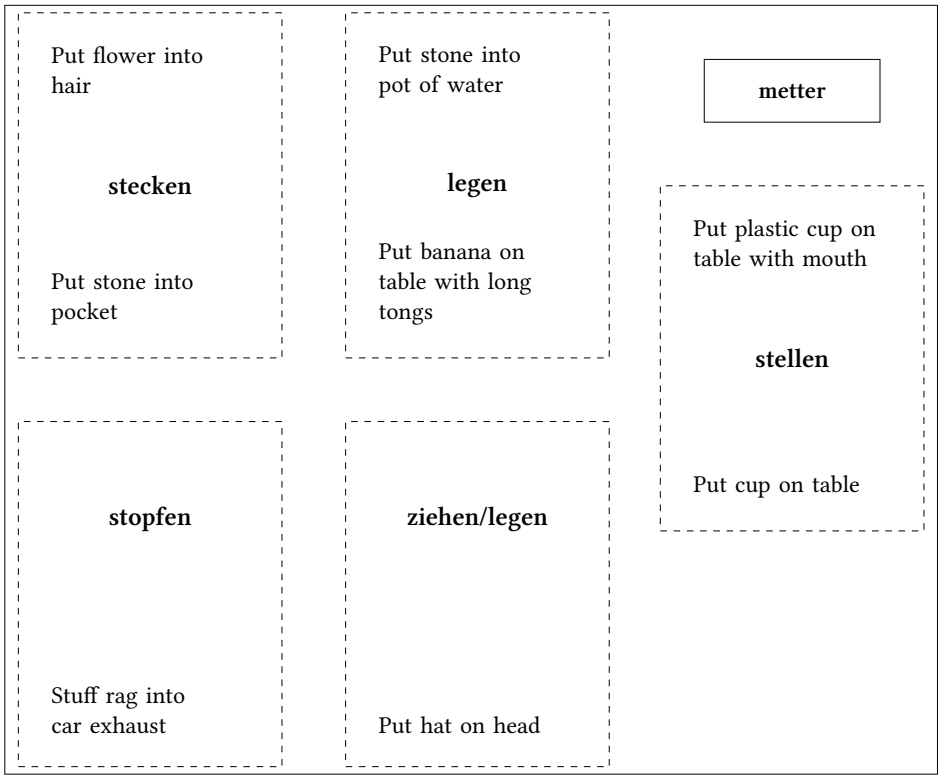


Figure 3.2: Romansh (solid line) and German (dashed lines) PUT-categories; cf. Berthele (2012b): 153

convergence, *(negative) transfer* or alternatives such as *restructuring* depends to some extent on the disciplinary stances mentioned above. Even though good scholarship first and foremost aims for accurate descriptions of patterns in the data, comparison of linguistic patterns (across individuals, groups, dialects, languages, etc.) unavoidably presupposes reference points.

A reference point for comparison is ultimately some sort of linguistic norm—be it a monolingual, a bilingual or a multilingual one. Unless the very idea of comparing patterns is entirely discarded, the best we can do is make our choice of reference points transparent. I have framed the bilingual patterns of the Romansh speakers above in various ways, with a preference for the term *convergence*, as it is a common bias to compare minority language speakers' patterns to monolingual norms. Scholars have also suggested that the study of second and additional language learning is monolingually biased (e.g. Kachru 1994). This should, however, not hide the fact that the convergence phenomena described

above bear a certain similarity to the restructuring phenomena as described in second language acquisition research. As an example on a similar cross-linguistic difference, Gullberg (2009) shows how L1 speakers of English with different degrees of L2 Dutch proficiency show very similar 'transfer to nowhere' strategies of generalizing one of the Dutch caused motion verbs (*zetten*, 'to put-sitting') or use a dummy verb (*doen*, 'to do'). This study also uses gestures as a window into the individuals' cognitive-linguistic processes and shows how not only verbal descriptions but also the speech-aligned gestures show either conformity with L1 patterns or increasing restructuring towards target language Dutch patterns.

The acquisition of the target language verbal classification system of caused motion events is a gradual and often slow process that involves restructuring of pre-acquired semantic categories. Some learners might never actually acquire the target language pattern (an example of an *attractor state* or of *fossilisation*, see Section 7 for more on this). In sustained language contact situations, the collective long-term outcome of partial restructuring/learning may lead to language change or to the emergence of new languages/varieties (Mufwene 2009, Thomason 2020). If converging patterns become generalized within a speech community, dialects or languages may become increasingly similar over time. This is typical for the varieties spoken in areas with intensive and sustained contact and can lead to long-term convergence of genealogically different languages ('Sprachbund'; see e.g. Chapter 4 in Thomason 2001).

3.2.3 Convergence and restructuring in bimodal bilingualism

Convergence and restructuring are a well-established area of research in bilingualism and second language acquisition (SLA) research. They are consistently observed in bi- and multilinguals using written or oral languages. Over the last decades, an additional interest has emerged in bimodal bilingualism and second language learners of sign languages.

Sign languages are fully developed linguistic-semiotic systems in a different modality (usually a visual one, although there are also tactile sign languages) with specific typological regularities and constraints. For example, they generally show a higher degree of iconicity, their words tend to be monosyllabic, and, unlike oral languages, they provide means for the expression of multiple meanings simultaneously (see e.g. Pfau et al. 2012: 517). Since sign languages typically coexist with oral and written languages, they are also studied from a bilingualism and an additional language learning/SLA perspective.

In a study in the Dutch context, Manhardt et al. (2021) compare monolinguals (L1 Dutch and L1 Dutch Sign Language, respectively) to fluent bimodal bilinguals.

They find evidence for cross-linguistic influence in both of the bilinguals' languages: for example, the strong attentional focus of Dutch Sign Language on the iconic representation of physical properties of objects (for example whether an object is pointing upwards or downwards in a description of a spatial configuration with two objects) leads to more verbal expression of these properties. However, when using sign language, bimodal bilinguals add fewer depicting signs in their descriptions than monolingual signers (Manhardt et al. 2021: 434). The study suggests that both of the bilinguals' languages have measurable effects on the other language.

Unsurprisingly, cross-linguistic influence across modalities is not only observed in speakers who are fluent and early bimodal bilinguals as in the study just discussed. Similar to other SLA contexts, L2 learners of sign languages, be they young or adult, have shown patterns of influence from their L1 in the emerging system of the sign languages. For example, as Marshall et al. (2020: 7) discuss, second/additional language learners of a sign language tend to calque the order of the signs on L1 syntax.

A specific feature of sign languages as targets of additional language learning is that lexical gaps, in particular in very early stages of language learning, may be filled by iconic inventions of signs. As shown by Smith et al. (2010: 90), learners at early acquisitional stages of a sign language can successfully draw on this iconicity and come up rather consistently with plausible iconic signs to fill lexical gaps.

This short section on bimodal bilingualism and second/additional language learning of a sign language shows that many notions developed for the study of oral/written languages in the multilingual repertoire describe phenomena that may also be observed in repertoires containing languages of different modalities. Despite this large linguistic difference between the two or more systems, cross-linguistic influence can be investigated and will be observed. There is thus no evidence whatsoever for a total separation of languages within the multilinguals' repertoires. The pervasiveness of CLI motivated scholars to develop a 'holistic' view of such repertoires which will be the topic of the next section.

3.3 Holism

As a contrast to a normative view of bilinguals/multilinguals being somehow less idiomatic speakers of at least one of their languages due to CLI, many scholars today advocate a *holistic* (sometimes also termed *wholistic*) view of the multilingual repertoire that emphasizes the fact that multilinguals are *competent* while admittedly being different from idealized monolinguals:

> Holistic approaches such as Grosjean's realistic view of bilingualism and Cook's concept of multicompetence have strongly influenced recent research on TLA, as mentioned above. They both describe the bilingual as a competent or multicompetent but specific speaker-hearer whose mind is not comparable to the monolingual in either language […]. (Jessner 2008: 25)

There are many more or less equivalent terms referring to manifestations of cross-linguistic influence in the literature, and the terminological proliferation is sometimes confusing. Figure 3.3 is an attempt to create some order in this highly dynamic terminological field. Following Matras (2009), I find it useful to distinguish between the replication of *linguistic matter* (e.g. phonemes, word forms) and *linguistic patterns* (semantics, syntactic structures), as done in the nodes to the right of the upper node of the second level of the taxonomy. Cross-linguistic influence is not merely detectable in linguistic matter and patterns, it also relies on cognitive mechanisms that are not located on the levels of the production or reception of linguistic matter and patterns. The discussions over the last decades have indeed shown that two other types of resources participate in cross-linguistic influence in multilinguals. On the one hand, there are cognitive resources that are shared or shareable across languages, for example knowledge about text genres such as stories or letters (node "shared representations" in Figure 3.3). On the other, there are also resources that are not language-specific such as learning strategies, that is, knowledge learners have about their best way of learning things, be they difficult words, idioms, or inflectional verb paradigms.

The following frameworks are currently being used to theoretically capture multilingual language learning:

- Activation-inhibition (Green 1986)
- Multicompetence (Cook 1992)
- Language modes (Grosjean 1998)
- Factor model (Hufeisen 2000)
- Dynamic model of multilingualism (Herdina & Jessner 2002)
- Cumulative Enhancement (Flynn et al. 2004)
- Typological Primacy model (Rothman 2010)
- Linguistic Proximity model (Westergaard et al. 2017)
- Scalpel Model (Slabakova 2017)

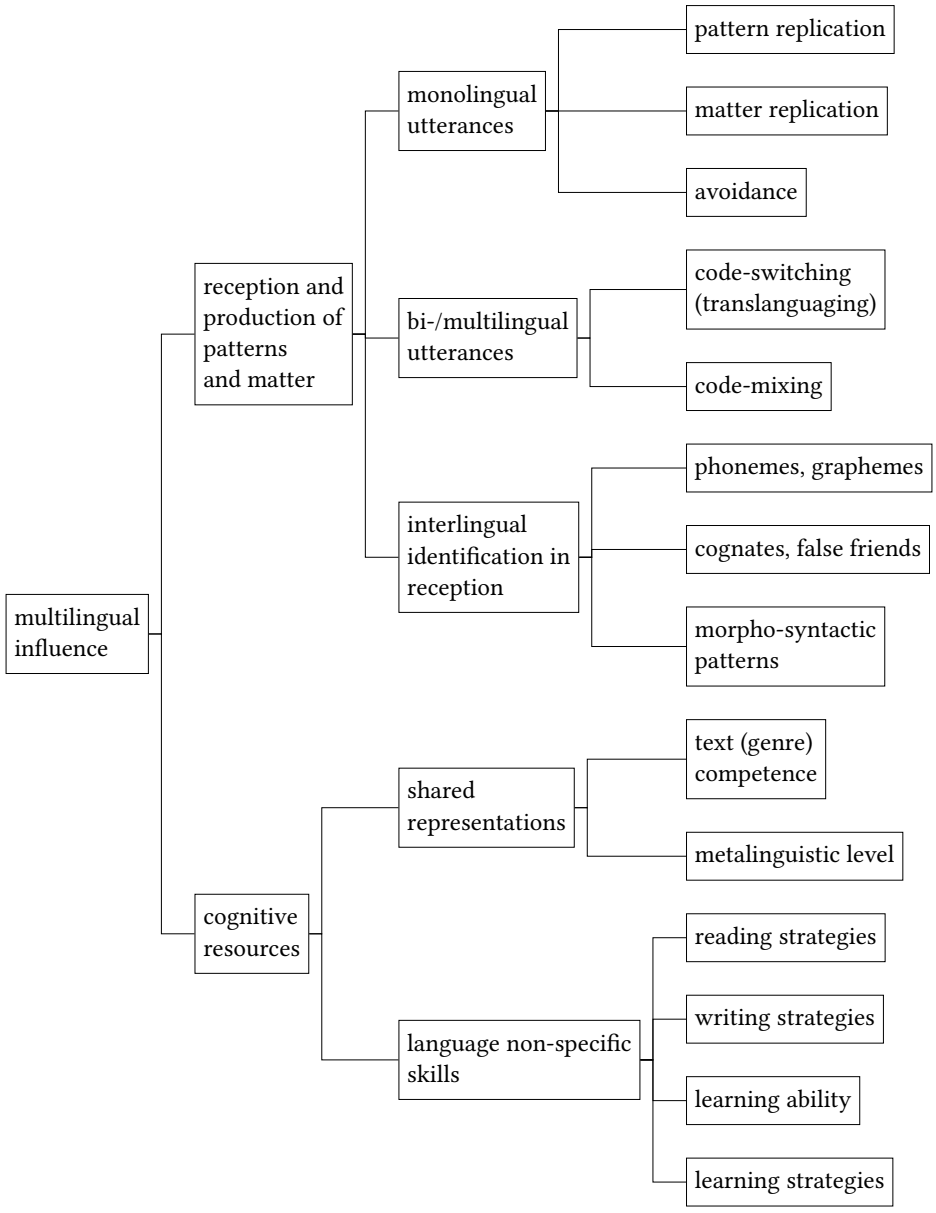


Figure 3.3: Overarching taxonomy of influences across languages

I discuss a selection of these models in this as well as in some of the following chapters.

3.4 Complexity

Given the large number of possible effects of the many languages and other individual and contextual factors on multilingual language learning and use, many scholars appeal to *complexity* as a feature of the phenomenon:

> [T]he process involved in the learning of a third language is characterised by its complexity, which is a characteristic property of an autodynamic system [...]. This complexity is the result of interaction between various factors, linguistic, social and individual. (Herdina & Jessner 2002: 94; see also Jessner 2008: 20)

Please note that complexity does not simply refer to a large number of factors that have an impact on an outcome, in our case e.g. additional language learning (see left side of Figure 3.4). Listing many impacting factors merely refers to a *complicated* state of affairs. *Complexity* arises when we have to deal with various multi-directional interactions among a set of factors, as illustrated on the right-hand side in Figure 3.4.

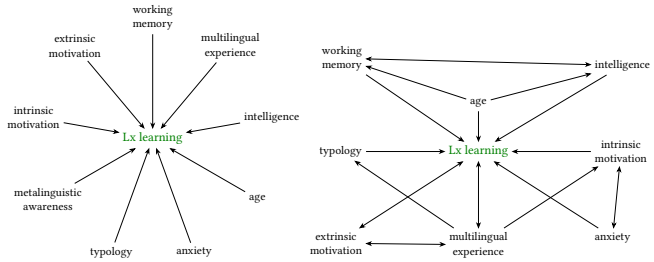


Figure 3.4: Complicated (left) vs. complex (right)

It is important to note that, in the view of such Dynamic (Systems) Models, complexity not only arises from the fact that several languages are used (and learnt) by multilingual individuals, but each language system *on its own* is of a complex and unpredictable nature:

> An SB[structure-based]-inspired approach assumes language is a complex system in which different sub-components (such as syntax and lexicon) interact predictably according to rules. In contrast, a DUB[dynamic usage-based]-inspired approach assumes language is a dynamic system in which

> all components are interconnected and can change unpredictably; there is no fundamental difference between syntax and lexicon. Moreover, language learning dynamically interacts with cognitive, affective, and contextual factors. (Rousse-Malpat et al. 2022: 21)

Is multilingual language learning really complex or just complicated? Below is a list of factors that scholars consider important for additional language learning:

- general language acquisition capability
- age
- gender
- learning environment
- motivation
- type and amount of input
- cultural heritage
- L2 learning traditions
- metalinguistic awareness
- learner type
- strategies
- individual foreign language learning experiences
- previously learnt languages (including partial competences)

The list is inspired by Hufeisen's "Factor model" (Hufeisen 2000: 214).

Studies that take into account many different sources of influence as listed above *and* possible interactions among these factors are scarce. One often cited example of a study that models complex relationships among factors is Gardner et al. (1997). Figure 3.5 shows the modeled effects among latent constructs. The graph is based on data from 102 anglophone Canadian students learning French. It includes measures of self-confidence, language anxiety, other attitudinal and motivational constructs, but also language aptitude and learning strategies.

Figure 3.5 shows the strength of linear association among 'constructs', as for example language aptitude, motivation, and language proficiency. The direction

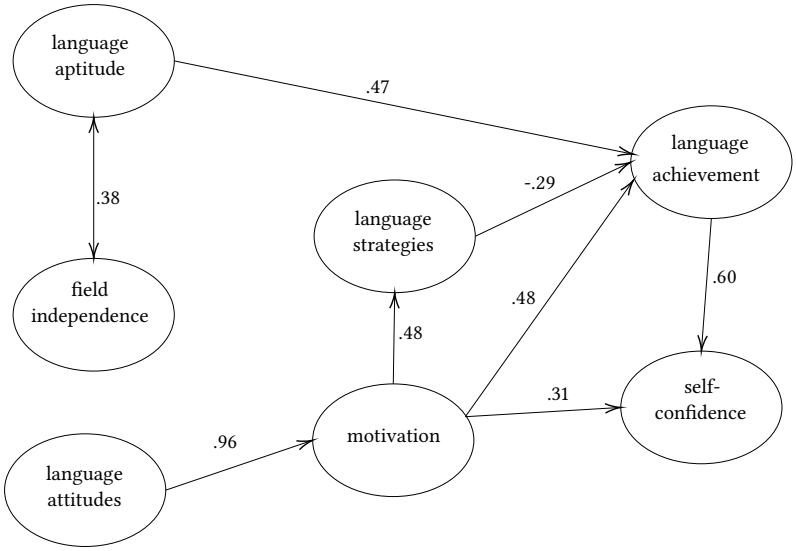


Figure 3.5: A simplified version of Gardner's model of second language learning, for details cf. Gardner et al. (1997: 354)

of the arrows is based on theoretical thinking, rather than a result of empirical investigation. For instance, the assumption that achievement has an impact on self-confidence is but one of two possible directions of influence—confidence might also be higher in the first place and lead to better achievement. Proving causal links is one of the most challenging aspects in this kind of multi-variable analysis. We will frequently return to this problem throughout this book.

Because there are so many different ways to model relationships and much room for interpretation of statistical patterns, scholars who appeal to complexity formulate rather general statements on the impact of the different factors:

> [E]ach learner will develop a specific factor complex, and some factors may turn out to be predominant and exert a strong influence on the learning situation. Others may become completely unimportant and irrelevant for the individual learning process. (Jessner 2008: 24)

Inspired by chaos theory, Herdina and Jessner developed appealing ideas about the nature of these different associations, including claims regarding their complexity and non-linearity:

> According to [the Dynamic Model of Multilingualism] DMM, the development of a multilingual system changes over time, and is non-linear, reversible – resulting in language attrition and/or loss – and complex. (Jessner 2008: 25)

An important idea of this model is that being multilingual (here: learning and using more than two languages) leads to a qualitatively new state of the multilingual mind and to fundamentally different emerging behavior. The authors term this emerging quality of the multilingual system the *M-factor*.

Beisbart (2021), a philosopher of science, examines some of the central claims of Dynamic Systems Theories in multilingualism research. He observes that this complexity claim in theories such as the DMM is "put in by hand", i.e. it is not an automatic consequence that is reliably observable as in naturally 'chaotic' systems:

> Consider, for instance, a pendulum: A single pendulum that is somewhere fixed and subject to gravity is subject to a nonlinear dynamic, but it is not chaotic. Things change in a qualitative way if two pendulums are coupled in a simple manner such that the second one is attached to the bottom of the first, which is still fixed at the top. This system displays chaotic behavior. Its behavior is very irregular and quite different from the periodic motion of the single pendulum. In this example, the qualitatively new dynamics is not put in by hand, but rather arises automatically, once the differential equations for the pendulums are adequately coupled. […]
> But whether or not this is so is a matter of empirical research. This research has to establish whether there are qualitatively novel features of multilingualism. The empirical research should ideally also use models to answer the question of which sort of complexity is decisive for the novel features. (Beisbart 2021: 28)

3.5 Multilingual advantage, language awareness, metalinguistic awareness

Despite the appeal to unpredictability inspired by chaos theory, authors working within Dynamic Systems approaches (see quotations above) do not refrain from making generic claims about effects of multilingualism on the group level. For instance, the authors of the DMM invoke the existence of the aforementioned M-factor that distinguishes multilinguals (as a distinct group) from monolinguals. The list below contains some possible manifestations of this specificity that characterizes multilinguals (Jessner 2008: 26):

- Acquisition of L3, Lx (x>2): sometimes faster and more efficient […]
- Larger repertoire of strategies (linguistic and metacognitive), more frequent and better use of strategies […]
- Higher metalinguistic awareness […]

This superiority arguably leads to advantages in additional language learning:

> Another investigation evidencing the advantages of bilingual learners over monolinguals in the process of learning an L3 […] showed that English–Spanish bilingual students performed significantly better than their monolingual peers when learning French in the classroom. (Jessner 2008: 17)

The appeal to complexity of the phenomena comes with a criticism of traditional approaches to multilingual language acquisition as being reductionist, i.e. they are criticised for oversimplifying reality. As a consequence, language development is difficult or impossible to predict.[4]

As highlighted by Pallotti (2021: 3), there is a paradox between the appeal to complexity and virtually unpredictable non-linearity of interactions on the one hand and the very notion of 'model' on the other: a scientific model—for very good reasons—is a deliberate and necessary simplification of reality. Just as a useful map does not contain all information on the minutest details of a landscape, a model abstracts away from certain less important aspects in order to formulate testable claims about the *important* relationships among certain factors.

This raises an important question for applied linguists: if the dynamic of multilingualism is similar to a double pendulum, then it is chaotic and its state at a given point in time is difficult to predict. Therefore, it is unclear how predictions for groups or even for individuals can be made.

Although I find the proposal by Herdina and Jessner appealing and intellectually stimulating, its direct use for designing empirical research on multilingualism seems complicated, unless we let go of the ambition to answer policy-relevant questions on effects of conditioning variables (for example comparing different curricula or teaching practices) on acquisition and learning. It may be possible to apply such ideas to the ex post description of individual learner behavior. However, if taken seriously, the complexity advocated in the DMM to some extent contrasts with non-complex claims on the level of learner groups

[4] See e.g. statements such as "language development is essentially non-linear and difficult to predict" (Lowie 2017: 5).

as in the quotation above. If everything is complex, dynamic, and unpredictable, how could we possibly be able to give any evidence-based recommendations on classroom learning, teaching, and more generally on educational language policy?

One possibility to lower this tension between the complexity of the theoretical models and the ambition to answer policy-related questions could be that, despite the assumed complex mechanics, there are some strong effects, for example in the domain of individual bilingualism and the resulting metalinguistic awareness, that override other sources of variability. Such claims have resonated considerably in the European context.

Although the positive view as expressed in the quotation above clearly prevails,[5] not everybody finds positive effects of L1 and L2 on L3 learning. Studies that test the added-value assumption underlying the M-factor will be discussed in detail later in this book (Chapters 13 and 15).

3.6 Concluding remarks

One point that is uncontroversial in multilingualism research is the massive presence of cross-linguistic influence (CLI) within speakers' (emerging) multilingual repertoires. Almost everything else, e.g. the direction, the amount, the cognitive underpinnings and consequences, and many other conditional aspects of multilingual language acquisition remain unclear and sometimes contested, and therefore are fertile areas for further thorough scholarly investigation.

Table 3.1 summarizes the main dimensions of multilingualism discussed in this chapter and the converging (or inconsistent) findings for each dimension. The last column lists what I consider to be currently controversial or unclear aspects, that, therefore, deserve more scholarly attention.

[5] See e.g. Montanari (2019: 299) or D'Angelo (2023: 8) for recent examples; see also Sánchez (2020: 21) for more discussion.

Table 3.1: Claims and debates in current multilingualism research

Assumption, Premise	Main findings	Current debates
Cross-linguistic influence (CLI), transfer, convergence	CLI and convergence as normal phenomena in bi-/multilingual repertoires; transfer within repertoire observed in many (all?) directions	Constraints on transfer, what is the initial state of additional language learning?
Holism, multilingual repertoire	Bi- and multilingual repertoires as specific and unlike multiple monolinguals	Which consequences for language teaching?
Complexity	A claim, not implemented in research plans	"Dynamic (systems)" approaches as adequate way to tackle complexity?
Multilingual advantage, language awareness, metalinguistic awareness	Controversial: findings point in different directions	[cf. Discussion in Chapter 15]

4 Interfaces: Interactions of explicit and implicit knowledge

Preview—Key points of this chapter

- Is it necessary to have *explicit knowledge* in an additional language to master it, or is it all a matter of automatized *implicit knowledge*? The issue of the existence of an *interface* between explicit and implicit knowledge is a controversial topic in theories of second/additional language acquisition:
  - No interface position: acquisition (implicit) and learning (explicit) are separate, and learning is less important.
  - Strong interface: explicit knowledge can become implicit (via practice), and implicit knowledge can inform explicit *awareness*.
  - Weak interface: processes such as *noticing* mediate between explicit and implicit knowledge.
- Studies show that awareness and *noticing* play an important role in successful learning, though there are nuances and causal effects that remain difficult to prove.
- The evidence indicates that explicit and implicit knowledge interact dynamically. The key pedagogical message is that directing attention to form (via *corrective feedback*) can facilitate learning.

Should we teach the grammar of the target language in the foreign language classroom? If so, should it be taught explicitly or implicitly (or both)? Do learners need to be taught explicitly how to pronounce the sounds of the target language? Should teachers explain semantic nuances of difficult words?

These questions relate to what is generally called the 'interface' between explicit and implicit knowledge in language acquisition/learning. As we will see in this and also the following chapters, there are various positions in the literature on the nature of this interface and on its role in foreign and additional language learning.

4.1 Contrasting views of the interface

Scholars who think that there is *no interface* often insist on the use of the term *acquisition* for the implicit processes that mainly draw on input, and on the term *learning* for the explicit processing of information. However, many scholars use "the terms LEARNING and ACQUISITION […] synonymously" (Jessner 2008: 18). Once again, the terminology in the field is not used consistently and readers often need to infer the authors' assumptions about language learning and/or acquisition based on the co-text.

Ordinary people (i.e. non-specialists) often have very strong feelings about the question of good foreign/second/additional language instruction and learning. This shows in the comments and media reports that were published when the Swiss authorities decided to introduce so-called "early" (i.e. starting in primary school) foreign language instruction:

(1) Early English is useless. To learn a foreign language properly, you have to be able to conjugate verbs, and since you don't learn this even in German until 4th grade, you cannot learn a foreign language in 2nd grade. In addition, other subjects such as mathematics and other sciences suffer.[1]

(2) The best thing is still to show the children movies and series exclusively in English. It works great in all Nordic countries - everyone speaks perfect English.[2]

(3) Criticism of the "Mille Feuilles" and "Clin d'Oeil" teaching materials was clear: grammar is neglected, basic vocabulary is too meagre, many elements are too difficult, the method relies too much on students' personal responsibility, critics admonished.[3]

[1] Quotation from a viewer's comment on a broadcast (Siegler 2015), translation RB.
[2] Quotation from a viewer's comment on a broadcast (Siegler 2015), translation RB.
[3] Newspaper article (Le Matin 2016), translation RB

Folk theories of language teaching and learning: Have you encountered similar claims about how people/children should learn additional languages? Are there similar public debates where you study and work? What do these quotations reveal about underlying assumptions on the relationship between declarative knowledge about languages and language proficiency?

As Roehr-Brackin (2024: 1–2) explains, we need to distinguish implicit/explicit *knowledge* from implicit/explicit *learning* and *teaching*. The citations above refer vaguely to linguistic knowledge, teaching and learning, but without clarifying their respective status: should we know explicitly how to conjugate verbs (i.e. spell out the rules) or should we just learn via explicit instruction of these rules—or both? Do we learn the grammar (and again: does this mean explicit or implicit knowledge of grammar?) via explicit grammar instruction or via mere exposure, as the second example seems to suggest?

Arguably, even within a purely implicit (e.g. communicative, immersion) setting, explicit knowledge may be activated: if learners focus their attention on grammatical or semantic features of the language they encounter and produce, they may be activating and learning explicit knowledge. Likewise, learners may also learn implicitly from explicit instruction.

The most influential attempt to define and operationalize implicit and explicit knowledge has been made by Ellis (2005).[4] Ellis' approach involved the following test components:

1. an oral imitation test involving grammatical and ungrammatical sentences
2. an oral narration test
3. a timed grammaticality judgment test (GJT)
4. an untimed GJT with the same content
5. a metalinguistic knowledge test

Tests (1)–(3) were considered to be metrics of implicit knowledge, (4)–(5) of explicit knowledge.

Ellis' fundamental distinction is still considered valid, but in the meantime new analyses with methods such as eye-tracking have contributed to a more nuanced

[4] See the discussion in Roehr-Brackin (2024: 4).

understanding of the association between tasks and different types of knowledge (see e.g. Godfroid et al. 2015).

An important addition to the distinction is the idea that knowledge can be more or less *aware* and more or less *automatized* (Roehr-Brackin 2024: 7).

Table 4.1: Two dimensions and three types of knowledge

	−automatic	+automatic
−aware	–	implicit
+aware	explicit	automatized explicit

Along these lines, scholars today generally distinguish between the following three types of knowledge that may be important in language learning:

- implicit knowledge: tacit, unconscious; cannot be taught easily, rapid access
- automatized explicit knowledge: explicit conscious knowledge that affords rapid access; result of extensive practice with language
- explicit knowledge: conscious, verbalizable knowledge of forms and regularities; acquired through instruction; slow, effortful access

There are various positions in the scholarly literature on the question of the interface between explicit and implicit (grammar) knowledge: Figures 4.1, 4.2, and 4.3 are all based on influential work on second language acquisition. Each of them stands for a different position regarding the interface between explicit and implicit knowledge about language.

A radical position is the one represented in Figure 4.1. The Figure schematically represents that input is transformed into language knowledge that enables use (called "output" in the figure). This transformation is called acquisition and is done by a cognitive module, the *Language Acquisition Device* (LAD), that does its job relatively effortlessly once the input gets to it, that is as long as there is no affective resistence to acquiring the language.

The author Stephen Krashen, with whom this type of schematic representation is frequently associated, argued thus that acquisition and learning are clearly separate and that the latter only interacts with the former via the 'monitor'. His pedagogical approach is called the *Natural Approach*, as the more 'natural' acquisition is, i.e. the more implicit knowledge is acquired by means of the LAD, the

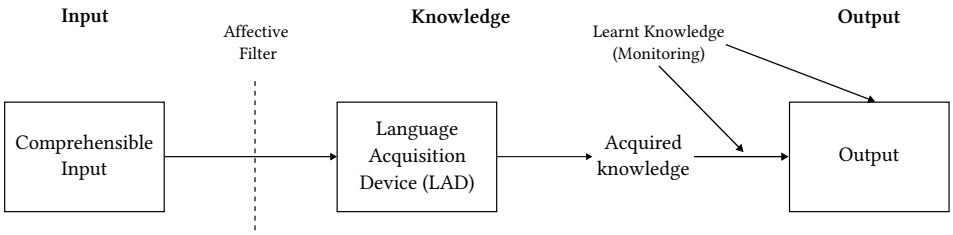


Figure 4.1: No interface as advocated by Krashen (1980); please note that although figures similar to this one are often used in presentations and publications, it is not a representation Krashen himself ever produced, but an elaboration of much simpler figures by Krashen; this figure is based on the one in Cook (1993: 54)

better. In this view, there is no interface between implicit and explicit knowledge. We will return to the influential idea of an encapsulated LAD in Chapter 5.

Other scholars have proposed quite different views on this question.

The *strong interface* stance can be traced back to earlier work in cognitive psychology. This perspective involves establishing direct connections between explicit and implicit knowledge, considering them as opposite ends of a spectrum. Interfaces can go both ways: on one side, authors such as Ellen Bialystok contend that linguistic knowledge begins as implicit and gradually transforms into explicit knowledge as the language learner's proficiency improves. This view is sometimes refered to as the *reverse interface*, i.e. implicit knowledge that has an impact on explicit knowledge (see also Williams & Rebuschat 2023).

Conversely, as discussed in Andringa (2005: 11), scholars like Robert DeKeyser assert that the progression of second language proficiency involves the transformation of explicit knowledge into implicit knowledge through a process of automatization.

Figure 4.2 is inspired by a Figure shown in Bialystok (1978: 258). The main reason it is replicated here is because it shows that both focusing on the linguistic form in (e.g. classroom) practice *and* processing language communicatively leads to relevant knowledge. Relevant knowledge is of two types, implicit and explicit. The dotted arrows linking the two types suggest that explicit knowledge may become implicit (by way of formal practicing) and implicit knowledge may also become explicit, by way of inferencing. In particular, the way explicit knowledge becomes (increasingly) implicit is the topic of ongoing scholarly research, as the studies discussed in the following subsections show.

Figure 4.3 is simpler. It schematically represents how input may become output in a second/additional language. Input is integrated into short- and medium-term memory, helped by a process called *noticing* which involves some level of

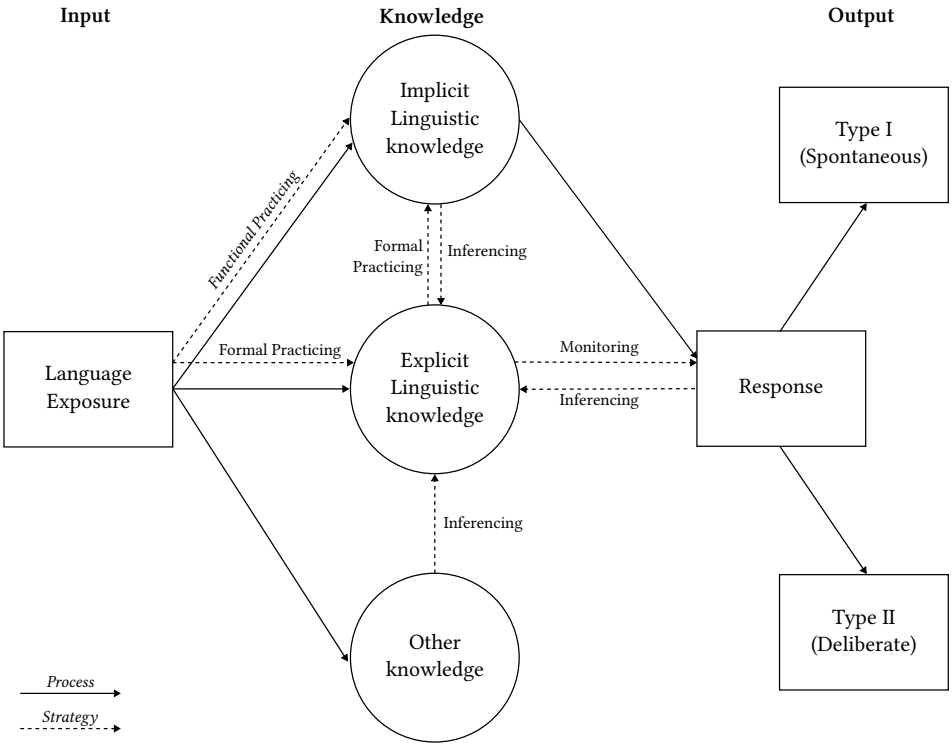


Figure 4.2: Strong interface, a simplified version of the figure in Bialystok (1978: 258)

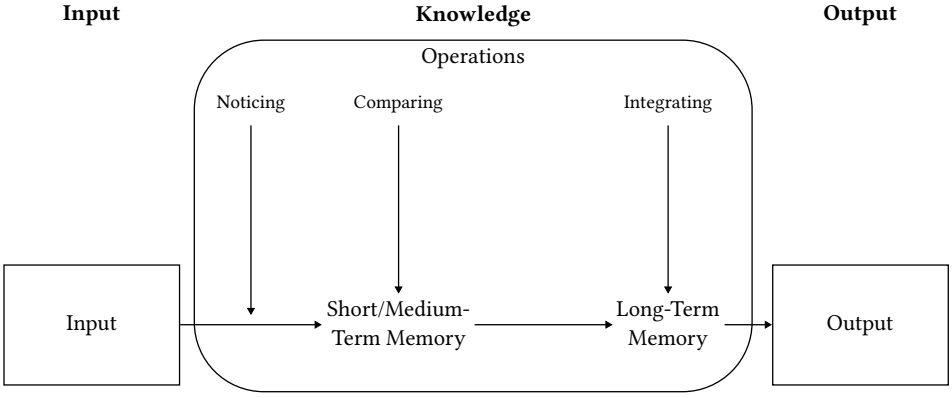


Figure 4.3: Weak interface, based on Ellis (1997: 119)

metalinguistic awareness (see Section 4.2 for more on this). The part of the input that "is held in short-term memory and from which connections with long-term memory may be created or strengthened" (Reinders & Ellis 2009: 284) is commonly called *intake*. Intake that has made its way into long-term memory is the basis for functional second/additional language skill. Notice that unlike in Figure 4.1, there is no LAD in this schematic representation.

4.2 A weak interface theory: Noticing hypothesis

Noticing, attention to form: Leow (2000) is often cited as a pioneering study showing the importance of conscious noticing of a grammatical feature of the target language. The study is taken to support of the existence of a weak interface between explicit and implicit knowledge. It is an investigation of the acquisition of Spanish verb morphology. The researchers tested the learning of an irregular aspect of Spanish grammar drawing on verbal protocols.

In this study, data were collected from a group of 32 adult second/foreign language learners. The participants engaged in a problem-solving task while simultaneously thinking out loud about the task. In this task, specific target items, such as "Pretérito perfecto simple" as in the verb *preferir – prefirió*, were presented. The task itself involved completing a crossword puzzle that included inflected forms with changes in the verb root. Following the task, the participants underwent postexposure assessment tasks, which included a multiple-choice recognition test and a written production task. The pre- and post-test results revealed that 'unaware' learners did not acquire the target forms, whereas 'aware' learners did. This outcome is consistent with the assumption that awareness plays a crucial role in the subsequent processing of L2 data, as discussed in the study (Leow 2000: 557).

Such evidence gave rise to what is called the *Noticing Hypothesis*:

> Input does not become intake for language learning unless it is noticed, that is, consciously registered. (Schmidt 2012: 27)

Thus, even if the input for learners is comprehensible, i.e. even if they know enough words and structures to understand it, constructions in the input will only be learnt and used if they are noticed. Often a rather strong hypothesis as the one discussed here undergoes changes as more evidence on the matter is gathered. As discussed in Ortega (2009: 96), Schmidt has later on reformulated the hypothesis in correlational terms ("more noticing leads to more learning"), and other scholars have suggested nuances regarding the necessity of having

both noticing and rehearsal for learning (Robinson 1995: 296) and that noticing might be crucial for the "initial registration" of difficult elements of the target language (Ellis 2002: 145).

To further deepen our understanding of the current views on attention and awareness for grammar learning, the next section is dedicated to a recent study that experimentally taps into the role of becoming aware of a regularity when learning an artificial language.

4.3 Awareness as a prerequisite for learning?

The fundamental question raised by the Noticing Hypothesis is to what extent learning requires cognitive attention to features of the language input and output. The question of whether a minimum awareness of linguistic regularities is a prerequisite for learning a language is still unresolved. Over the last decades, the research methods have evolved considerably. In a recent study, Andringa (2020) tested 39 students, all Dutch native speakers (age range 18-28, mean age 23). Their task was to learn an artificial (Esperanto-based) language that involves a new but systematic set of determiners. They are markers for two distinctions simultaneously: animacy of the noun and distance from the viewer (see Table 4.2).

Table 4.2: The determiner system invented for Andringa's study

anim./dist.	near	far
animate	*gitene*	*ultene*
inanimate	*rotene*	*netene*

(4) tio estas ultene cato
that is DET.ANIM.FAR cat

The participants were confronted with a visual world paradigm where they saw two target objects on the screen. They were asked to learn the new language in a picture matching task, and their eye movements were recorded.

In every trial, participants would first see two objects in a visual scene. Then they heard a sentence as described above. Participants had to identify the corresponding left- or right-hand side object by pressing <z> or <m> on a keyboard. These responses showed whether the participants had learnt the new language

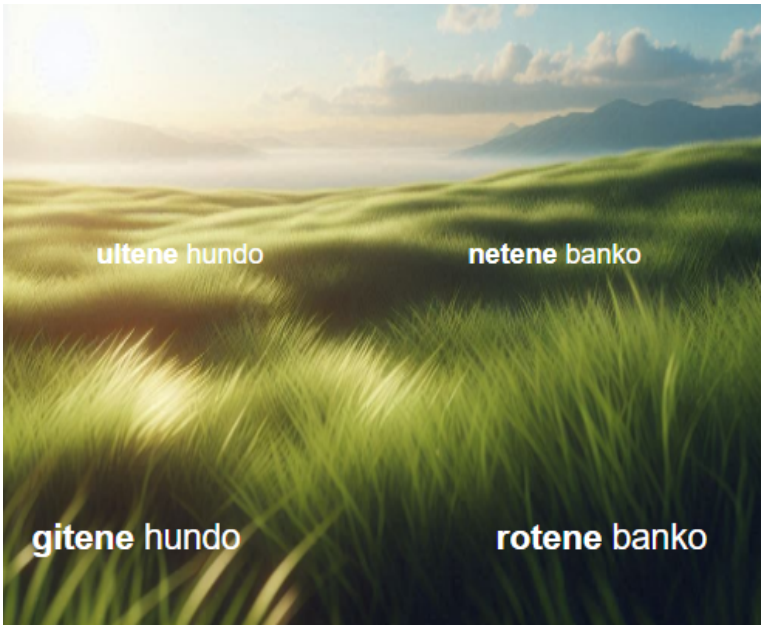


Figure 4.4: Illustration of the determiner system used in Andringa's study (background created with Microsoft Pilot; Andringa 2020: 343)

or not. Participants were vaguely informed that the study was about automatization of knowledge.

There were several sets of trials: animacy, distance, and control trials. In animacy trials, participants were exposed to both an animate and an inanimate object. If they heard a sentence as in (5) and saw a bike and a cat, looking at the cat when the word *gitene* is heard would show signs of learning the animate vs. inanimate distinction.

(5) tio estas gitene cato
that is DET.ANIM.NEAR cat

In the other type of trials, distance trials, both objects were either animate or inanimate but the distance was contrasted, so that the learning of the other aspect of the determiner semantics can be detected upon the presentation of the relevant determiner words.

In the control trials, no prediction was possible because there were no contrasts.

> Evidence of learning would be provided by contrasting experimental and control items. If participants looked at the correct image earlier on experimental trials in comparison to control trials, this would mean they had incorporated knowledge of the animacy or distance contrast. (Andringa 2020: 343)

This task was repeated many times (288!), in seven blocks. In each break between the blocks, the participants had to carry out a special activity, as a mnemonic marker, so that in the debriefing they would remember the different blocks. The debriefing included several questions to find out whether participants had become aware of the grammatical regularity displayed in Table 4.2. If they were aware, they were asked when they noticed the regularity. This allowed Andringa to code the responses for awareness. Then the gaze behavior could be analyzed, comparing the aware and the unaware participants and the aware participants before and after they became aware. The results show several things:

- Unaware participants do not use the information in the determiners to predict the correct answer, neither for animacy nor for distance (Andringa 2020: 348).
- From the moment participants noticed the grammatical function, their gaze anticipates the correct item on the screen when the determiner is heard.
- More fine-grained analyses of the gaze behavior in all blocks show that there is indeed no sign of learning without awareness (350).

Results as those from the classic study by Leow and from the more recent study by Andringa suggest that there is indeed an important connection between learning and awareness (which, to some extent, suggests explicit knowledge), even in settings where absolutely no explicit instruction is given.

The evidence suggests that there is an interface (or certainly an interaction) between implicit and explicit knowledge in learning. This does not automatically prove that explicit knowledge and implicit knowledge are transformed from one form into the other the way ice can be melted and becomes water. Some scholars in the field (e.g. Paradis 2009: 76) disprefer the term *interface* and refer to (indirect) *influence* or *interaction*. It is certainly true that explicit and implicit knowledge are not 'physically' transformed into the other state respectively (Lichtman & VanPatten 2021: 7), and in this respect the question of an interface in the strict sense could be considered obsolete. The research discussed here, however,

shows clearly that the two types of knowledge interact in language learning. The question is what this means for (explicit and/or implicit) teaching and learning paradigms.

Whereas the Noticing Hypothesis seems intuitively sensible, some scholars urge us to be more cautious about its universal validity. In an interesting article that reviews evidence from literate and non-literate learners of first and second languages, Tarone & Bigelow (2005: 87) question the validity of the Noticing Hypothesis for illiterate second language learners. They argue that the capacity to consciously recognize and process oral input in a second language (L2) into distinct linguistic units could be a skill intrinsically associated with literacy and thus specific to literate L2 learners. Illiterate adults may have an ability to 'pick up' the L2 with lower levels of analysis, maybe in the same way they initially acquired their first language (L1). However, once adults attain literacy, they must consciously attend to the structure of the L2 to internalize it.

In this sense, perhaps a fundamental set of uncomplicated syntactic structures may be acquired unconsciously, without the need for explicit noticing. Consequently, an illiterate L2 learner could attain a high level of fluency in using these structures in oral communication:

> However, the more complex set of syntactic structures characteristic of written English, and the full mastery of linguistic literacy in the L2, may require conscious attention and noticing if they are to be acquired. (Tarone & Bigelow 2005: 87)

4.4 From automatized explicit to implicit knowledge

Along the lines of Rod Ellis' take on explicit and implicit knowledge, a more recent study tests whether (automatized) explicit knowledge and implicit knowledge of a foreign/second language are associated. The study by Suzuki & DeKeyser (2017) also addresses the question whether learners have specific aptitudes for learning explicit and/or implicit knowledge (we will come back to the notion of aptitude in Chapter 14).

The study tests one hundred second language speakers/learners of Japanese whose L1 is a Chinese language. All of them started learning Japanese after the age of 17, and all of them had high levels of proficiency in the target language.

I do not discuss the tests administered to these participants in detail here, suffice it to say that they tap into both explicit (automatized) knowledge of Japanese (e.g. a timed auditory grammaticality judgement task) and implicit knowledge (e.g. a visual world task, similar to the main task in Andringa's study).

The main question was whether implicit knowledge was predicted by explicit knowledge.

The analysis in this study suggests that assuming a path leading from automatized explicit knowledge to implicit knowledge is statistically valid. In other words, the linear associations between these constructs suggest that learners with high automatized explicit knowledge also have high implicit knowledge. It needs to be said (and the authors also admit this on p. 781) that proving that there is a causal relationship leading from one to the other is not possible based on such cross-sectional data.

Moreover, the analysis in this study shows that an aptitude task such as the freely available LLAMA F is associated with automatized explicit knowledge. I will discuss other uses of such tests in Chapter 14.

Overall, this study again suggests that there is an interaction of explicit and implicit knowledge—whether we still want to call this an interface or not is not essential in my opinion.

The interaction of the two types of knowledge gets additional support from evidence on the neurobiology of two memory systems, the *declarative* and the *procedural* memory systems (Ullman 2025): these systems have different functions and properties and their efficiency changes across the lifespan. They are also related to sex differences and more generally, individual variability (see Chapter 14). While both implicit and explicit knowledge may be learnt via the declarative system, the procedural system specializes in implicit knowledge. The evidence suggests that procedural learning is more efficient in children, and declarative learning increases and plateaus later, in adolescence and young adulthood. Both types of learning are necessary for L2 or additional language learning, and they can be shown to interact (Ullman 2025: 127). The model makes interesting predictions on how an additional language may be learnt as a function of age and learning environment (immersion vs. focus on form, see Section 4.5 below).

4.5 Explicit vs. implicit teaching

The distinction between explicit and implicit knowledge types is related to questions of second/foreign language teaching and learning, as discussed by Roehr-Brackin (2024). The question thus is, "to what extent and in what ways learner attention should be directed to the elements of language involved in mapping" (Doughty 2003: 265).

In the literature, whenever learners are explicitly taught a piece of information about the target language (grammar, pronunciation, semantics, etc.) or whenever

they are guided to discover such knowledge by paying attention to formal aspects of the language, the term *explicit instruction* is used. *Implicit instruction* may be used for instruction that does neither of these two, that is instruction that focuses not on linguistic form or rules, but on the content conveyed by language.

There is a grey area betweeen the two:

> [T]here is, however, the possibility that phonological or grammatical forms get into the focus of instruction because the teaching involves high frequency of certain occurrences or other forms of 'implicit focus on form'. (Doughty 2003: 265)

Foreign, second or additional language teaching is rarely exclusively focused on forms or on content. Most teaching mixes elements further towards the content end of the continuum in Figure 4.5 with elements towards the form/language end. As discussed in Madlener-Charpentier & Pagonis (2022: 213–250), contemporary approaches to L2/Lx teaching, while giving priority to content and communicative skills, use various degrees and tools of focus on (target language) form to draw learners' attention to formal aspects that might go unnoticed if the focus were uniquely on communication.

On a historical note, our ideas about 'progress' in language teaching are often rather ignorant about practices of the past. For instance, the idea that in earlier times all language teaching was focused on forms (roughly the "Grammar-Translation method") rather than communication and content misses important teaching practices in the past.[5]

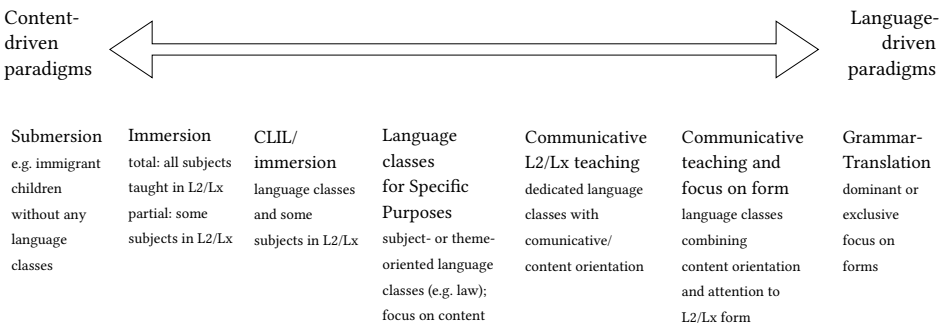


Figure 4.5: Continuum from focus on content to focus on forms/language

[5]See e.g. Musumeci (2009: 44) and Kelly (1969).

Is explicit instruction efficient? Many authors in the field (e.g. Roehr-Brackin 2024 or Wulff & Ellis 2018) refer to the seminal meta-analysis by Norris & Ortega (2000) that suggests that the answer is yes, at least for adults.

In Norris & Ortega (2000), the two authors examined the results of studies utilizing varying degrees of explicitness in second language (L2) input. The analysis revealed that form-focused instruction (FFI) led to significant improvements in L2 skills. Their analysis also indicated that explicit instructional methods were more effective than implicit ones, and that the positive effects of L2 instruction were lasting over time. There are other, more recent meta-analyses that overall support the initial finding that explicit instruction is effective, but the picture has become somewhat more nuanced in the meantime. As an example, Kang et al. (2019) suggest that while explicit instruciton is effective, implicit instruction might have more positive effects if learning is tested in delayed post-tests instead of immediately after the learning phases (p. 440; see also Goo et al. 2015 and Wulff & Ellis 2018: 51 for more discussion and additional references).

4.5.1 Corrective feedback (CF) in Form-focused instruction (FFI)

Assuming that learners' noticing is a prerequisite for learning, this raises the pedagogically important question whether and when learners' errors should be corrected. Additional questions are which errors should or shouldn't be corrected, and how the correction should be done (see Lyster & Ranta 1997 for an influential study on these questions). After decades of research, the evidence seems to converge on certain insights.

Teachers, when providing form-focused feedback, typically go for recasts:

(6) a. student: Parce que il veut juste lui pour être chaud.
student: Because he wants just him for be hot

b. teacher: Oh. Quelqu'un qui veut juste avoir la chaleur pour
teacher: Oh. Somebody who wants just have the heat to
lui-même.
himself

Example (6) from Lyster & Ranta (1997: 47) shows a teacher's recast that reformulates what the learner just said but corrects the grammatical error. Whereas many studies show that this seems to be the dominant teacher behavior, it turns out that recasts often go unnoticed, in particular in younger, less analytical learners. There are other types of corrective feedback which tend to be used less frequently by teachers, such as explicit error correction or prompts:

> Prompts include elicitation, metalinguistic clues, clarification requests, and repetition. Although prompts include a range of CF types, they have one important feature in common that differentiates them from reformulation moves: they withhold correct forms and instead provide clues to prompt students to retrieve these correct forms from their existing knowledge. (Lyster & Saito 2010: 268)

(7) a. student: Le chien peut court
student: The dog can runs

b. teacher: Le chien peut court? Le chien peut …
teacher: The dog can runs? The dog can …

Example (7) shows one form of a prompt, in which the teacher repeats the utterance containing the grammatical error and then elicits the (hopefully) correct form from the student.

Prompts are also shown to trigger more active and deeper cognitive processing of the formal problem in learners (as detectable in their verbal responses) than direct corrections or recasts by a teacher or a peer (Schlatter Gappisch 2022: 86).

After decades of research on the effects of different forms of feedback, we can conclude that CF overall yields better learning results than no CF, and that when the different types of CF are compared, recasts turn out not to be overwhelmingly efficient because other forms of CF are less likely to go unnoticed (Lyster & Saito 2010: 295). Prompts seem to yield superior learning results overall, with stronger effects in particular in younger learners.

4.5.2 Learning of phonemes that are absent from L1

In her PhD study, Dherbey Chapuis (2021) investigated Swiss-German pupils (N=127) learning FL French in the canton of Berne (last year of primary and first year of lower secondary school; see also Dherbey Chapuis & Berthele 2024). The intervention took place over 6 weeks, and several tests were administered after 6 and 18 weeks. The study focused on the French phonemes /ʒ/ and /ɔ̃/ which are both absent from (or only allophonic in) Swiss German and/or Standard High German. The investigator taught half of the sample (group on the left in Figure 4.6) with an explicit approach focusing on articulation, perception, and phoneme-grapheme correspondences of the French sounds. In the control condition (group on the right in Figure 4.6), she applied an implicit focus on form paradigm involving various productive and receptive activities with a high density of examples containing the phonemes and their neighbors in phonological space, but no explicit focus on form was involved.

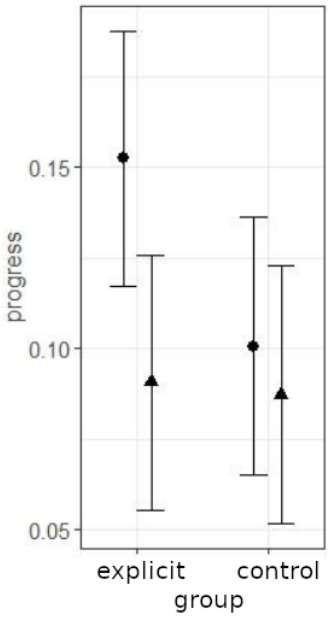


Figure 4.6: Group comparisons from Dherbey Chapuis (2021: 103) for the pronunciation of the two target phonemes. The black circles represent the pronunciation of /ʒ/, the triangles /ʒ̃/

The thesis tests overall five different constructs (pronunciation, discrimination, phoneme-grapheme mappings, memorization, lexical learning) and yields some surprising and nuanced findings. One of them is presented in Figure 4.6. The figure shows the progress in the assessed pupils' pronunciation after the intervention (test after 6 weeks).

The results gathered by Dherbey Chapuis suggest that both teaching paradigms are associated with progress in pronunciation accuracy for both phonemes, but /ʒ/ benefits more from an explicit focus on form.

4.6 Concluding remarks

The question of the interface started out as a philosophical debate related to what the nature of linguistic knowledge is. Strong claims, e.g. the one made by Krashen on the superiority of 'natural' acquisition and implicit knowledge, still shape both laypersons' and experts' views on language learning and teaching today.

Today, we have a solid understanding of explicit and implicit knowledge and learning thanks to a wide range of empirical investigations. The evidence suggests that implicit and explicit knowledge interact. It also suggests that explicit pathways of instruction and attention/awareness to linguistic regularities have a positive impact on learning, not only for the sake of knowing grammatical or semantic structures explicitly, but also to pass from (automatized) explicit knowledge to implicit mastery of the structures. Whether this interaction should be called an interface or not remains controversial, but that is not crucial for our understanding of the process of additional language learning.

Most of this research on the interface was done with (young) adults. Thus, many questions remain open, including the important one raised by Roehr-Brackin (2024: 10): "Establish if, and to what extent, older adults differ from younger adults with regard to utilising explicit knowledge and learning."

5 Grammar: Generativist approaches to multilingualism

Preview—Key points of this chapter

- Generativist approaches make specific assumptions about representation, processing, and learning of grammar:
  - Abstract competence: Grammar consists of highly *abstract* and hierarchical *representations* not directly inferable from input.
  - Poverty of the stimulus: Input is insufficient for acquiring grammar, leading to the postulation of *innate linguistic knowledge* (*Universal Grammar*, UG).
  - *Language Acquisition Device* (LAD): Acquisition is enabled by a biologically endowed, *domain-specific module*, distinct from general cognition.
- In additional language acquisition, debates center on:
  - Critical Period Hypothesis: Whether access to the LAD is constrained by biological *maturation*, limiting acquisition after childhood.
  - Initial state: Whether transfer in L3 learning comes primarily from L1, L2, or both.
- Ongoing debates focus on the role of *linguistic similarity* in transfer, and whether similarity is based on objective typology or perceived (*psychotypological*) proximity.

There are numerous substantial differences between the generativist and other, e.g. usage-based (see Chapter 6) approaches to mono- and multilingual language

competence and acquisition. They pertain most prominently to rather opposed assumptions about how languages are represented and processed in the human mind. In other words, disagreement on the top two nodes "representation" and "processing" in Figure 2.1 leads to rather different views of the third node "learning, acquisition".

Some of these diverging assumptions are reflected in the contrasting views on the interface between explicit and implicit linguistic knowledge discussed in Chapter 4. The way grammar is described, e.g. the degree to which scholars rely on abstract formalisms, also varies across the different schools of thought. The studies on third language acquisition discussed in the present chapter use the *generativist* formalism. This formalism has evolved substantially as the theory evolved, but all variants are designed to capture hierarchical and abstract grammatical representations that are considered the (computational and representational) core of linguistic competence. Such abstract representations are either absent from or less foregrounded in other approaches to language acquisition that will be discussed in other chapters of this book.

Below I first highlight important generativist ideas about first language acquisition. In the remainder of the chapter I discuss the generativist interest in cross-linguistic influence (CLI) in multilingual grammar acquisition. The two studies discussed in the last part of this chapter both emphasize the importance of linguistic similarity for additional language acquisition. I do not introduce any variant of the generativist formalism used by the scholars whose work I refer to, as it is not crucial for understanding the main points made in the studies discussed. Those wishing to learn the formal aspects of the generative approach will easily find texbooks on the subject (e.g. Adger 2003).

5.1 Language acquisition: Generativists' Assumptions

Generativist approaches to language acquisition all share certain assumptions about the nature of linguistic competence and how it gets acquired. These assumptions are in stark contrast to those of the usage-based approaches (Chapter 6).

Language competence as a set of highly abstract and hierarchical representations: In the generativist view, acquiring competence in a language means acquiring linguistic properties that are subtle and not directly inferable from the input. Therefore, language/grammar cannot be learnt without innate, specifically language-related principles or constraints (see e.g. White 2003: 20 for more on this).

Poverty of stimulus: Input is considered insufficient for grammar acquisition. This idea is sometimes also referred to as the "logical problem of language acquisition" or "Plato's problem". It is related to the first idea of language being highly abstract: the subtleties and complexities of grammar cannot be learned based on (the child's) input, as the input is insufficient and partly deficient, to the learner, said input is "an arbitrary sample of their target language" (Eisenbeiss 2009: 275). Since children after several years nevertheless master the grammar of their respective surrounding language, the only way to explain this acquisition—according to the generativist rationale—is innate linguistic knowledge of the abstract features of grammar.

The term *Plato's problem* refers to the Platonic idea that learning is not so much assimilating new knowledge but rather discovering knowledge that is hidden but already acquired—through experience in previous lives of the human soul, as Plato/Socrates believed in reincarnation. Plato demonstrates this view in the dialogue *Menon* (Plato 1931: 1).

Pre-acquired/innate concepts: Lexical acquisition in L1 is too fast to be mere learning. Although generativists mainly focus on grammar, the founder of the generativist approach also made strong claims about innateness of conceptual knowledge required for vocabulary acquisition:

> The speed and precision of vocabulary acquisition leaves no real alternative to the conclusion that the child somehow has the concepts available before experience with language and is basically learning labels for concepts that are already part of his or her innate conceptual apparatus. (Chomsky 1988a: 28)

Chomsky's ideas about the important part of innate linguistic knowledge were very influential. In the quotation below, the psychologist Steven Pinker draws on this idea when he describes the (supposedly) rapid acquisition of lexical labels for spatial events in first language acquisition:

> Children must carve the flux of unique situations into recurring event types, and it is not unreasonable to expect that among them are ones that can be defined by chunks of semantic structure corresponding to the definitions of some common verbs. […] And presumably parents use verbs like have, hit, move, put and give, or their equivalents in other languages, in talking to their children. (Pinker 1989: 254)

Common verbs as 'universal' concepts: Remember the example of semantic convergence in the Romansh-German bilinguals discussed in Chapter 3, Section 3.2.2. How does this example of CLI relate to Pinker's claim on event-category labeling?

We will return to questions of L1 and Lx vocabulary acquisition in Chapter 10.

5.1.1 Poverty of the stimulus, Plato's problem

As we have seen above, the generativist tradition views language as complex, subtle, and abstract, but also creative and capable of unlimited recursions, as in example (1).

(1) the friend of the father of the daughter of the friend of my teacher [...]

The possibility to produce creative and complex embedded structures like example (1) is only limited by working memory capacity—theoretically, an unlimited number of such embeddings can be formed, and the sentence would still be grammatical. This conceptualization of the nature of language as an infinite and creative system of abstract rules applied to words also bears a relation to the role of input for language acquisition: as mentioned before in relation to "Plato's problem", generativists argue that input is not enough for language acquisition. Input, according to the generativists' view, involves hardly any negative evidence, as parents or other relevant caregivers don't systematically correct children's utterances. Therefore, impossible constructions are not flagged or explicitly mentioned, but nevertheless certain types of constructions never show up in children's productions. Input thus provides mostly positive evidence, but it also contains errors, allegro forms, ellipses—in sum, it consists of insufficient and at times degenerate data that do not fully represent the target language's grammatical complexity. Language in use is not considered the 'real' language competence, but only (often flawed) *performance*. Language in (social) use is considered overall underdetermined given the target system of the language.[1]

However, despite all the flaws the generativists detect in the input, children arguably learn the target system quickly, without effort, in robust acquisitional

[1] "People attain knowledge of the structure of their language for which NO evidence is available in the data to which they are exposed as children" (Hornstein & Lightfoot 1981: 9).

sequences, and independently of their respective cognitive capacities.[2] The generativist conclusion is that language *cannot be inductively learnt from input* via domain-general learning mechanisms. Therefore, the abstract structure of grammar needs to be *innate* and the organism has to be biologically prepared for *acquisition*, a process fundamentally different from *learning*. Often, this acquisitional capacity is referred to with the term *language acquisition device* or LAD. We have already encountered this idea in Chapter 4, Figure 4.1: Krashen's idea is that input in a second/foreign language is processed by this LAD similarly to L1 acquisition.

The principles and mechanisms in this LAD have been spelled out by generativist authors in different variants. As is the case e.g. in Rothman (2010),[3] the variant that has had the most lasting influence on second/additional language acquisition theory was Chomsky's Theory of *Principles and Parameters*. Although Chomsky himself no longer advocates this version of the theory, it still shapes the generativist approach to second/additional language learning.

An important aspect of Chomsky's view of language in the mind is that he considers it a *module*—an autonomous, encapsulated, hard-wired, innate part of the human mind that is independent from general cognition and computationally autonomous. Chomsky's notion of module is based upon ideas proposed by Fodor (1983). This is quite the opposite of the domain-general mechanisms that are at the core of language acquisition according to the usage-based model (see Chapter 6).

5.1.2 Examples for principles and parameters

The grammar Chomsky focuses on is an abstraction, an idealization. It is constrained by what he calls *biological endowment*, or Universal Grammar (UG):

> Viewed against the reality of what a particular person may have inside his head, core grammar is an idealization. From another point of view, what a particular person has inside his head is an artifact resulting from the interplay of many idiosyncratic factors, as contrasted with the more significant reality of UG (an element of shared biological endowment) and core grammar (one of the systems derived by fixing the parameters of UG in one of the permitted ways). (Chomsky 1988b: 8)

[2] From the generativist perspective, studies showing that learners with unusually low IQ scores such as savants (Smith et al. 2010) or children suffering from Williams syndrome (Musolino et al. 2010) may still acquire one or more languages fluently are also relevant as they can be interpreted as evidence for the cognitive modularity of grammar/language.

[3] "Syntactic transfer is taken to be the actual grammatical system of abstract mental representation (features and functional categories) as conceived of within a Principles and Parameters framework (see Chomsky, 2007, for review) […]" (Rothman 2010: 124), see also Chomsky (1981).

The innate principles, according to the 1981 version of Chomsky's theory, are part of this biological endowment. Here are two examples for such principles:

The first example refers to the possibility of having null-subjects in Italian as opposed to German or French. The principle is often called *pro-drop*.

(2) Italian vs. German
   a. Che cosa fai?
      what do.PRS.2SG
   b. Was machst du?
      what do.PRS.2SG you
      'what do you do?'

(3) Italian vs. French
   a. Vado a casa.
      go.PRS.1SG at house
   b. Je vais à la maison.
      I go.PRS.1SG at the house
      'I'm going home'

The principle can be phrased as follows: All sentences have a subject. The parameter to be set is ±pro-drop. This means that the pronominal subject can be phonologically filled '+', or phonologically empty, '–'.

The second principle illustrated below refers to where the *head* of noun phrases (NPs) is located: left or right. This means that *modifiers* such as adjectives are placed either before or after the head.[4]

(4) Italian and French
   a. i bambini coraggiosi
   b. les enfants courageux
      the children brave

(5) English and German
   a. the brave children
   b. die mutigen Kinder

[4] Rothman (2010: 115)

In Italian and French, the canonical position of the adjective is after the noun (=the head), whereas in English and German, the canonical (and grammatically correct) position is before the noun. As discussed in Rothman (2010), the position may change in Romance languages, but within the generativist framework the canonical parameter for the modified noun phrase in Italian is head-initial, whereas it is head-final in English and German.

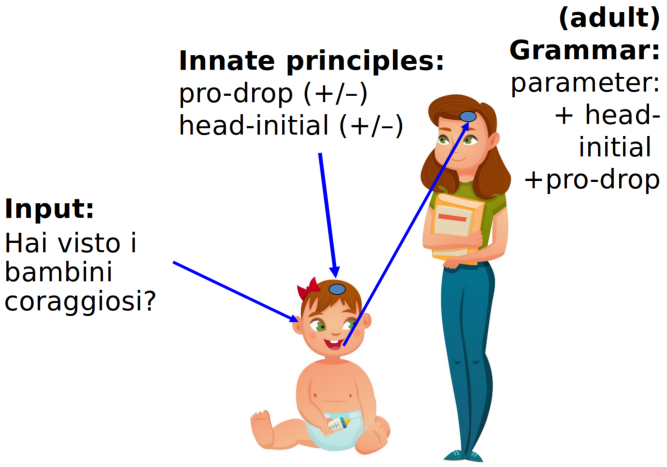


Figure 5.1: Triggering; setting the parameters for head-initial and pro-drop in Italian

The generativist view of first language acquisition, therefore, is that despite deficits in the input the children acquire the language with all its—arguably abstract—grammatical constraints and categories. Given the a priori assumption that they cannot learn it from the input, the abstract model has to be innate. Grammar is thus not learnt from scratch, but merely parametrized by the triggers in the input.

The task of the child is not to learn the principle and its parameter, but only to *set the parameter* in the biologically 'endowed' principle—imagine a computer program with predetermined options (e.g. landscape vs. portrait orientation of a page in a word processor), in which one option is the default but can be changed by the user. The options don't need to be installed or defined; they are already in the program. Selecting those options to achieve the language-appropriate settings corresponds to the generativist idea of acquisition in the form of *triggering*. It is much less effortful than 'normal' learning and obeys its own modular logic determined by the LAD.

The LAD is also involved in second/additional language acquisition, provided one assumes that the learner still has access to it (see discussion of this below). Remember Krashen's emphasis on acquisition being fundamentally different from learning (Chapter 4)—the generativists' view on (implicit!) linguistic knowledge and its acquisition is the philosophical basis for his view.

5.2 SLA and bilingualism: The role of input within a generativist framework

Based on these strong assumptions regarding acquisition (via LAD) and learning (general cognitive processes), the view of second or additional language acquisition depends on the question whether the LAD is still accessible for second/additional languages. This is related to ideas about critical periods and cognitive maturation.

5.2.1 Maturation

Generativists hypothesize that there is a fundamental difference between learning two (or more) languages from birth or only one from birth and the others (much) later.

For instance, generativist authors claim that before a certain age (e.g. about 3;0 to 3;6, cf. Carroll 2015: 7, or even earlier, cf. Abrahamsson & Hyltenstam 2009), acquisition of two or more languages is just like L1 acquisition, whereas adding a language later is something different, due to *maturational constraints* on language acquisition. After this hypothesized age threshold, the LAD is no longer available.

> The crucial factor is not the quantity or quality of the input but rather maturation. (Carroll 2015: 7)

Just as in monolingual L1 acquisition, the generativist view assumes that acquisition is different from learning, but in the case of successive bilingualism the crucial question is whether the second language is acquired before or after this assumed *critical period*.

5.2.2 The Critical Period Hypothesis

One of the questions within a generativist approach is therefore to what extent the parametrization of the UG (universal grammar) remains possible across the

lifespan or is subject to maturation. Most generativists assume that there is a *critical period* or *window of opportunity* for (second) language acquisition that closes at some point (cf. the quotation by Pinker below).

> Cases in which people make it to puberty without having learned a language are rare, but they all point to the same conclusion. […] Among the wolf-children who are found in the woods or in the homes of psychotic parents after puberty, some develop words, and some, like "Genie", discovered in 1970 at the age of thirteen and a half in a Los Angeles suburb, learn to produce immature, pidgin-like sentences: […] But they are permanently incapable of mastering the full grammar of the language. In contrast, one child, Isabelle, was six and a half when she and her mute, brain-damaged mother escaped from the silent imprisonment of her grandfather's house. A year and a half later she had acquired fifteen hundred to two thousand words and produced complex grammatical sentences […]. (Pinker 1995: 291)

Here, it is important to state that (1) even within generativist circles there is no agreement on a single age threshold after which acquisition becomes different/impossible, and that (2) the very idea of a critical (or sensitive) period for language acquistion is highly controversial and rejected by many scholars in the field.[5]

5.2.3 The initial state of additional language acquisition

Aside from the question of a potential critical period and of sustained access to universal grammar in additional language learning, generativists wonder whether the initial state of the grammar when a language is added to the repertoire is the parametrized state of an already acquired language or not. Moreover, if the initial state is indeed a parametrized grammar, which language would that be—the first? the second? both? As brief summary of these debates can be found in Rothman (2010: 108).

Generativists theorize multiple language learning in different ways:

- L1 is the priviledged source of transfer in additional language learning (Hermas 2010)
- L2 is the priviledged source of transfer (L2 status model, Bardel & Falk 2007)

[5] See Birdsong (1999), Singleton & Ryan (2004), van der Slik et al. (2022) for a thorough discussion of this topic.

- All previously acquired languages contribute in a positive way (cumulative enhancement model; Flynn et al. 2004)
- The typologically closer language is the initial state (typological primacy model, Rothman et al. 2011)
- Several factors have different impacts on linguistic properties (scalpel model, Slabakova 2017)
- Linguistic features are transferred piecemeal (negative and positive transfer; linguistic proximity model; Westergaard et al. 2017)

For our needs, spelling out the differences between all these models is not necessary. Only two models will be discussed below.

5.3 Typological proximity of languages in third language acquisition

Rothman works within a generativist approach to (multiple) language acquisition. One of his studies' (Rothman 2010) main interest concerns the initial stages of the learners' grammar when learning a third (or additional) language. The adults he investigates already master at least two languages, and they have had at least some basic experience in a third target language. Rothman is interested in cross-linguistic influence (CLI) or transfer from the two pre-acquired languages on the third.

5.3.1 Linguistic proximity of grammars

The study explores a grammatical difference between languages in the domain of the determiner phrase (DP). The DP is a term used by generativists that refers to an abstract grammatical category that is hierarchically above (among many other categories) the noun phrase (NP). As we have seen in examples (4a) and (5a) above, modifiers (mostly adjectives [ADJ], as in the AP in Figure (3)) in DPs, in some languages, can be canonically positioned left or right of the noun (N). Depending on the language, this position of the adjective has an impact on the semantics of the DP and the utterance as a whole.

(6) i soldati coraggiosi
the soldiers courageous
'the soldiers who are brave' (as opposed to those who are not)

The construction N-ADJ in Italian is set-denoting: the features of a subset of soldiers are described.

(7) i coraggiosi soldati
'the brave soldiers' (general statement about soldiers)

The construction ADJ-N in Italian is kind-denoting: a feature of the whole kind is described; *the soldiers, who all are courageous* […].

This distinction is made similarly across the Romance languages mastered by the participants' repertoires in the study: Italian, Portuguese, and Spanish. It is not made in English, as the canonical word order in English is ADJ-N. In formal terms, the head (=the N) of the NP in English is on the right hand side.

There are 2 groups of participants:

Group 1	L1 English	L2 Spanish	L3 Portuguese
Group 2	L1 Italian	L2 English	L3 Spanish

Given this chronological and language-typological variability in the participants, it is interesting to investigate what language (L1 or L2) the learners of L3 draw on. Transfer from English could be hypothesized if they did not transfer the distinction between kind- and set-denoting semantics, transfer from Spanish or Italian if they did.[6]

The first task is a semantic interpretation task in which participants have to identify the correct paraphrase of the sentence—the two alternatives corresponding to the two possible interpretations of a DP with an adjective in the Romance languages investigated.

In the second task, participants were asked to read a short story and to fill in either the pre-nominal or post-nominal blank for the adjective which was provided.

The responses of these two tasks can be evaluated as either fitting in with the typical DP interpretation rule of the Romance languages or not. Rothman found that irrespective of the L2 status (see discussion in Chapter 3), participants transferred their knowledge of this Romance semantic rule to the additional language.

Based on his results, Rothman concludes that the language that is typologically closest to the target is the source for transfer: given that knowledge of the subtle target language distinction seems to be present in the learners regardless whether it is their L1 or their L2 that contains the same feature (while English lacks it), Rothman concludes that there is transfer of the more similar grammar

[6]Remember the criteria for the identification of transfer discussed above, Section 3.2.1.

at the initial state of additional language learning. The paper discussed here is not entirely clear about whether the similarity is objective or merely perceived as such by the learners (*psychotypology*, see the end of this chapter for more on this).

An assumption in Rothman's work seems to be that whole grammars of an L1 or an L2 are transferred to the L3. An alternative view is that it is not wholesale grammatical systems that are transferred when an additional language is learnt, but individual features. This is the view Westergaard et al. (2017) holds.

5.3.2 Linguistic proximity of structures as a predictor for transfer

Both Rothman and Westergaard assume that linguistic similarity is important for transfer, and both assume that transfer can be negative or positive (unlike other models that only predict positive transfer, e.g. Flynn et al. 2004).

The study reported in Westergaard et al. (2017) explores transfer from Norwegian, Russian, or both languages to the additional language English. Just as in Rothman's study, there are interesting differences and similarities between the languages, but this time they cross-cut the linguistic genealogy. 110 secondary school learners of English are tested (age range 11–14). The task is a grammaticality judgement task (both correct and incorrect items are presented). Three groups are tested: Norwegian-speaking monolinguals and Russian-speaking monolinguals (they are not actually monolinguals, but they don't speak the other language respectively), and Norwegian-Russian bilinguals.

Two cross-linguistically interesting syntactic patterns are investigated:

Russian = English ≠ Norwegian in terms of adverb placement (ADV-V)

(8) Emma *často* jest konfety.

(9) Emma *often* eats sweets.

(10) Emma spiser *ofte* konfekt.

Norwegian is a V2 language, i.e. the finite verb in the main clause is in second position, regardless of what precedes. Thus, in terms of *adverb placement*, Russian and English are similar, and L1 speakers of Russian can potentially positively transfer from Russian, whereas Norwegians will potentially transfer negatively from Norwegian. The bilinguals are the interesting group, as they can potentially transfer positively or negatively.

Russian ≠ English = Norwegian in terms of inversion of the subject and the finite verb in wh-questions (Aux-S)

(11) Čto eta malen'kaja devočka *budet* čitat?
what this small girl.DIM be.FUT.3SG read.INF
'what will the little girl read?'

(12) What *will* the little girl read?

(13) Hva *vil* den lille jenta lese?
'what will the little girl read?'

In this case, Russian is different from both Norwegian and English. Hence the Norwegian monolinguals should show positive transfer and the Russian group negative transfer from Russian. Once again, the bilinguals are the interesting group, as they can potentially transfer positively or negatively.

The results discussed in Westergaard et al. (2017: 674) for the descriptive statistics of the two conditions suggest that in particular for the adverb placement, positive transfer from the language that is more similar can be observed (Russian in the monolinguals and bilinguals). The bilinguals give fewer correct responses than the monolinguals. The authors interpret this as evidence for both facilitative and non-facilitative transfer in the case of the bilinguals. In the case of the subject-verb inversion, the effect is less clear, although the tendency goes in the same direction: there is evidence for transfer from the more similar language (in this case Norwegian) both in the monolinguals and in the bilinguals.

The important insight of this study is that even though Russian is clearly typologically further away from English, it can still be a basis for cross-linguistic influence, which is not in line with the alternative assumption that the whole grammar of the typologically more similar language will be transferred.

Westergaard et al. propose the following explanation for the patterns in the data:

> *Linguistic Proximity Model*: L*n* acquisition involves incremental property-by-property learning and allows for both facilitative and non-facilitative influence from one or both previously acquired languages. Crosslinguistic influence occurs when a particular linguistic property in the L*n* input reveals abstract structural similarity with linguistic properties of the previously learned languages. (Westergaard et al. 2017: 670)

5.4 Concluding remarks

Some of the generativists' claims paraphrased and cited above stem from early developments of the paradigm. Even though they shaped many linguists' and also non-specialists' conceptions of language acquisition, not all of them are still shared in their absolute formulation by present-day generativists. Indeed, in its earlier versions, the generativist view on language acquisition was quite radical, particularly with regard to the strongly downplayed role of input and with respect to the assumption that substantial amounts of grammatical knowledge must be innate. Today, many of these strong claims have either disappeared or have been watered down substantially. For instance, not even the most strongly convinced generativists doubt that input indeed *is* important for language acquisition. Moreover, the founder of the school, Noam Chomsky himself, no longer believes in many of the earlier formulations of abstract and innate rules of the universal grammar (UG). What is universal, in the meantime, has shrunk to the principle of *recursion* (Hauser et al. 2014: 5).

Nevertheless, there remains an important and—in my opinion–-interesting tension between the generativist and the usage-based views: grammar acquisition as the setting of parameters of (innate) abstract principles based on modest amounts of input, on the one hand, vs. piecemeal and fully input-based learning as in the usage-based approach on the other.

There are also debates *within* the generativist framework regarding multilingual language acquisition: which pre-acquired grammar exactly is transferred to the target language? Does such transfer involve the whole grammatical system of a learnt/acquired language or only certain features? What are the constraints that shape interlingual transfer? As we have seen, Rothman and Westergaard both emphasize linguistic similarity as an important factor, but they differ regarding the question of piecemeal vs. 'whole grammar' transfer.

A notorious problem with proximity-related claims, however, is that it often remains unclear whether the focus lies on descriptive typology (i.e. comparisons as those made by linguists) or on the perceived typology (often referred to with the term *psychotypology*), that is "the provisional typology the learner is building up" (Kellerman 1979: 40).

As an example, Rothman refers to "perceived proximity" of the languages in the study discussed above (p. 112). The distinction between objective (measurable) and perceived proximity is important, and in the ideal case, claims about perception in learners should be supported by evidence. One way to test perceptions is the Visual Language Distance Measure, cf. Nelson et al. (2021).

We will return to the effect of genealogical proximity of languages in multilingual language learning in Chapter 12.

6 The usage-based approach

Preview—Key points of this chapter

- The usage-based approach views competence as an expanding inventory of *constructions* learned through communicative language use.
- Constructions as the basic unit: Words, collocations, and abstract patterns are all constructions stored in the *constructicon*. Grammar and lexicon are integrated rather than separate.
- Item-based learning: Early child language emerges as fully and partially *fixed expressions*, which gradually expand toward more *abstract constructions*.
- Multilingual acquisition:
  - Simultaneous bilinguals acquire mixed constructions and separate languages through use, often without explicit separation strategies.
  - Sequential L2 learners are sensitive to *frequency*, *salience*, and *contingency* of forms, which affect *learnability* of linguistic features.
  - Phenomena such as *overshadowing*, *blocking*, and *learned attention* explain what learners notice and transfer to new languages.
- Explicit instruction can help redirect learned attention and overcome entrenched L1 biases.
- The usage-based approach portrays grammar as *emergent*, usage-driven, and rooted in *domain-general cognitive mechanisms*.

Many debates in first and additional language learning/acquisition relate to two opposed views on what it means to know a language—two different views of competence.[1]

In the following I give a brief account of how language acquisition/learning is typically viewed by those who do *not* consider language competence as knowledge of words to which abstract rules are applied. Rather, the usage-based approach construes language competence as an ever growing inventory of constructions on different levels of complexity and abstraction.

> Constructions, not categories and relations, are the basic, primitive units of syntactic representation. (Croft 2001: 45–46)

This approach views general cognitive principles of attention and learning as the driving force of language acquisition. In this respect it is rather different from the generativist approach (see Chapter 5).

6.1 Constructions as the basic unit of language

The central notion of usage-based approaches is the *construction*. Sometimes usage-based approaches are also called *construction grammar* approaches. From the usage-based perspective, learning a language means learning its constructions. Single words are simple constructions. The lexicon (vocabulary store) and grammatical knowledge are not considered as separated, but as an integrated whole, which is sometimes called the *constructicon*. Unlike in the generativist approach, grammatical formalisms that are inspired by or compatible with the usage-based approach focus on the symbolic nature of linguistic representation (in the tradition of de Saussure 1916). For example, Construction Grammar (Fillmore & Kay 1999) or Head-Driven Phrase Structure Grammar (Müller et al. 2021), to name just two such lexicalist approaches, construe linguistic units of various levels of complexity in terms their signifiant/signifier and signifié/signified components.

Learning a language, in this view, is item-based, slowly and gradually progressing from specific word forms towards abstract categories. This view is supported by evidence from L1 acquisition studies of diverse linguistic contexts by various authors. Here are some examples:

[1] For a discussion of the notion of *competence* in language pedagogy see Bronckart & Dolz (1999). Note also that in sociolinguistics, there is an expanded notion of *communicative competence* (Hymes 1976) that covers a wider range of phenomena than what is discussed in the current chapter.

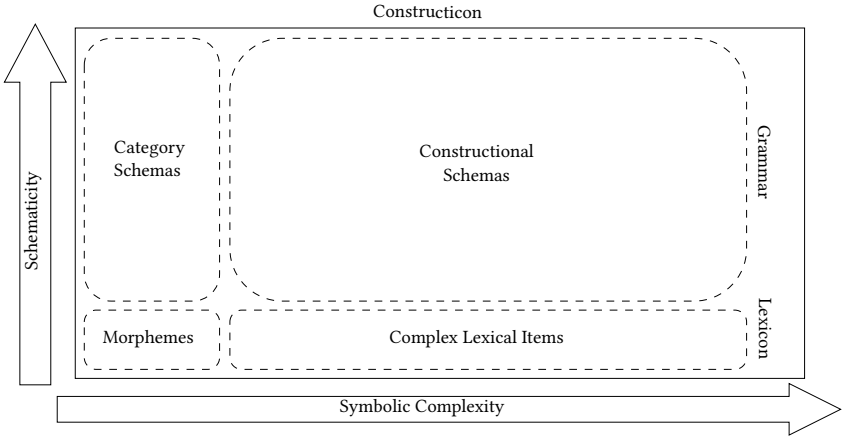


Figure 6.1: Two dimensions and four types of constructions in the constructicon, figure based on Langacker (2005: 108)

In early L1 acquisition of Italian, children up to age three employ verbs overwhelmingly in singular inflected forms, with plural inflections remaining rare (Pizzuto & Caselli 1992: 533). Furthermore, research conducted on early child language corpora in L1 English reveals that almost all verbs are employed within lexically fixed contexts (Lieven et al. 1997: 207). Rather than acquiring a grammatical system, children appear to acquire individual verbs (see more on this *verb-islands hypothesis* in Tomasello 2000: 157 and below). Additionally, the acquisition of abstract categories is marked by the early use of concrete nouns, with abstract nouns emerging much later in development.

6.1.1 Lexically-based grammar: From simple to complex constructions

One of the prominent advocates of a usage-based approach to first language acquisition is Elena Lieven. In her work, she shows that children start speaking in relatively stereotypical, fixed patterns that then are gradually expanded as time goes by. For instance, Lieven et al. (1997: 197) show that about 30% of child language utterances between the ages of 1;8 and 2;8 are invariable 'frozen' collocations, while a majority (60% on average) of utterances are variants of about 25 fixed *frame-and-slot* schemata (or constructions):

(1) there's an X

(2) I want a Y

(3) Z it

'X', 'Y', and 'Z' are the slots that may be filled with variable content words.

According to this account of first language acquisition, the early grammar in L1 is a collection of lexically specific constructions. This view is also present in other work on child language acquisition. Fore example, Dabrowska & Lieven (2005: 451) investigate the grammar of questions in child language. They show that about 90% of all questions in the child language corpus analyzed (2;0–3;0) are juxtapositions or superimpositions of the same lexically specific units.

The typical method used in the investigation of language/grammar learning from a usage-based point of view is the *traceback method*: following different heuristics (some need to be applied manually by the researcher, others rely on automatic procedures), longitudinal corpus data is scanned for the antecedent use of exactly the same chunks or for frame-and-slot constructions with lexically fixed ('I want' in 'I want X') and lexically variable ('X') parts. This allows scholars to assess the proportion of language produced by a learner at a certain point in time that is a form of recycling of language previously attested in the same person's or in other people's output.[2]

Table 6.1: Constructions: from a lexically specific request item to the abstract WH-construction; cf. Diessel (2015: 306)

				what can I do for you?
				who is to blame?
		/what/ + agent + action/ing/		where will we go this year?
	/what/ + agent + /doing/		what are you thinking?	
		what's Georgie saying?	what were the boys doing?	*abstract wh... construction*
chunk		what's Mommy holding?	what is daddy watching?	*/wh.../+Vfin +...+Vinf+...*
not analyzed	what's Nomi doing?	what's toy doing?	*/what/+AUX NP(agent)+V/ing/*	
	what's donkey doing?			
what doing?	what's Mommy doing?			

I exemplify this view of language acquisition moving from concrete items to abstract constructions in Table 6.1, using examples from Diessel (2015: 306). The basic idea is that the learner moves from the exclusive use of simple and semantically concrete signs (which corresponds to the lower left corner in Figure 6.1) towards more schematic, abstract constructions that are also symbolically more complex (upper right corner of Figure 6.1).

Another important author in this field is the developmental psychologist Michael Tomasello. In his 2005 book he describes the trajectory from simple constructions to more complex ones as an "inventory of relatively isolated, item-based constructional islands" (Tomasello 2005: 140). Based on what is frequently

[2]For more on this, also with respect to bilingual acquisition, cf. Hartmann et al. (2022: 248).

present in the input, the child then expands her grammar step by step. Thus, input is not simply a source for sudden triggering, but the material necessary for incremental learning:

> Under no circumstances does this development look like an instantaneous setting of parameters in which all verbs and other lexical items immediately participate in a totally abstract construction. (Tomasello 2005: 140)

Please note how radically this view differs from the generativists' assumptions that grammar is innate and only waits for its parameters to be set (cf. discussion in Chapter 5).

6.1.2 Part-to-whole or Whole-to-part

Some authors in this field suggest that children start as 'holistic' language users and become more analytic over time. According to Alison Wray (see Figure 6.2), around about age 8, a more holistic type of processing can be observed again.

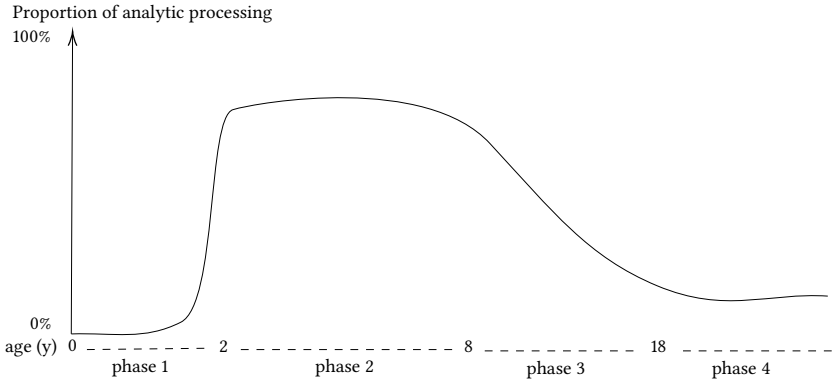


Figure 6.2: The proportion of analytic and holistic processing from birth to adulthood, based on Wray & Perkins (2000: 20)

Tomasello assumes that processing of input can go both ways at all times. According to his account, children after year 2 may deploy variable proportions of analytic and holistic processing (which is a more variable scenario than that suggested in Figure 6.2):

> Young children come equipped to move in either direction – part to whole or whole to parts. […] All children probably use both processes to some extent in different aspects of language acquisition. (Tomasello & Brooks 1999: 166)

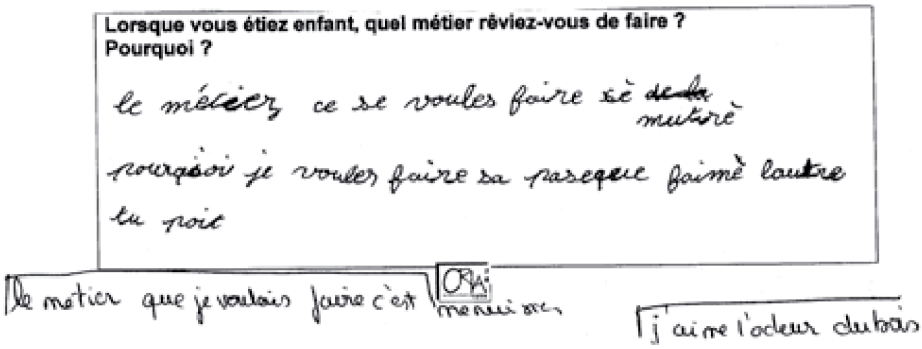


Figure 6.3: An example from GIP ALFA Centre & Réseau régional des Missions locales et PAIO du Centre (2008)

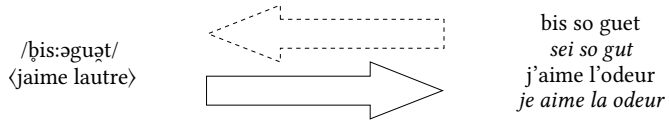


Figure 6.4: Whole to part paths in illiteracy and child language acquisiton

In holistic processing, constructions may remain un- or under-analyzed by learners, because large units are used in fluent communication as wholes.

Look at example (4), a token of writing by a semi-literate adult who is a native speaker of French (the example is taken from Figure 6.3).

(4) jaime (?) lautre tu poit
j'aime (unreadable) l=odeur du bois
'I like the=smell of wood'

(5) gänd-si mer bis-so-guet no-chli schoggi?
give-2SG.POLITE me be-PRS.2SG.IMPERATIVE-so-nice more-a.bit chocolate
'Could you give me some more chocolate, please?'

The Swiss German example (5) is based on diary notes on my son's linguistic development. It shows a frequent feature in child language where there is a mismatch between the formal verb morphology and the informal (but highly frequent) variant of a polite request.

Both examples show how the human mind learns chunks and does not necessarily analyze them internally, unless of course (normative) pressure incites

them to do so. This pressure can be due to the requirement to develop writing skills (and thus analyze language in a rather specific way), or it can be expressed via negative feedback from peers or adults on a potentially impolite utterance. In all languages there is a gap between language analysis required for oral and for written production (see also the discussion of the role of literacy in noticing, Section 4.3). However, in languages such as French, with its deep orthography (with notoriously unreliable contingency of graphemes and phonemes, see below, Section 6.2.2) and its requirement to spell out grammatical relations in writing that are inaudible in spoken language, the gap between language analysis necessary for speaking and for writing is particularly wide.

Remember the concept of *noticing* discussed in Section 4.2: it is quite sensible to assume that noticing also plays a role in L1 acquisition. Moreover, in the acquisition of literacy, if it is part of the target language's language culture at all, it is an important resource for noticing grammatical regularities both in L1 and L2/Lx.

6.1.3 The psychological reality of constructions

In a highly original study, Johnson & Goldberg (2013) test whether the idea of constructions as form-meaning pairs above the word level has any psychological reality. To do this, they use a nonsense language inspired by the Jabberwocky poem in Alice in Wonderland.

First, participants were presented with a phrasal construction where the content words had no meaning which they had to read out loud (within one second). Second, they were prompted with a target word and they had to decide whether it was a word or not ("lexical decision task"). The scholars investigated to what extent actual English words that matched the constructional frame implied by the nonsense language were recognized faster than those that didn't match (see examples below).

(6) He jorped him the brap - *gave* (vs. *made*)

(7) She jorped it miggy - *made* (vs. *gave*)

The result was that the real verbs that fit into the constructional frame implied by the nonsense clause were primed, i.e. pre-activated, by those clauses. This was implied by the response times for the recognition of fitting verbs, which were faster than the reaction times for non-fitting verbs.

6.2 Beyond monolingualism: Usage-based approaches to childhood bilingualism and L2/Lx acquisition

The same idea of learning form-meaning pairs on different levels of abstraction and complexity is applied to second, foreign and additional language learning. The usage-based approach to second/additional language learning assumes that learning of such languages is governed by the same principles as first language acquisition. Scholars working within a usage-based framework do not deny that there are also important differences between monolingual and bi-/multilingual language learning (which we will discuss below), but for them there is no such thing as a Language Acquisition Device or an abstract Universal Grammar that needs to be parametrized within a certain *window of opportunity* (aka *critical period*, see Chapter 5).

6.2.1 Simultaneous multilingualism

If a child grows up using and learning two or more languages (or dialects) simultaneously, the input she receives involves constructions that stem from two or more sets of constructions (i.e. partially overlapping constructicons of the speakers of the languages in question). Moreover, the child will typically be exposed to and produce mixed constructions, as they are characteristic of multilingual contexts. The mixed constructions are generally seen on a cline from alternations of two languages over longer stretches (e.g. clauses) as in (8) to insertional mixing as in (9) (see Chapter 8 for a discussion of code-switching/mixing) to borrowing as in (10).[3] The last cannot be categorically distinguished from insertion, but in its typical form borrowing means that the replicated word or structure is phonologically and morphologically integrated into the host language.[4]

(8) Ciao amur, nus essan grad en il tren enavos a fribourg. Ina
'Hello love, we be.PRS.1PL currently in the train back to Fribourg. A
dumonda: [häsch luscht silvester bir cristallina
question: [have.PRS.2SG desire New-Years-Eve at-the Cristallina
z=verbringa—mit guido, mary etc.]
to=spend—with Guido, Mary, etc.]

[3] All these examples are from the text message corpus of Romansh speakers analyzed by Grünert (2011).

[4] For more on these phenomena cf. the extensive literature on language contact, e.g. Matras (2009), Johanson (2023).

'Hello love, we are currently in the train back to Fribourg. A question: would you like to spend New Year's Eve at the Cristallina with Guido, Mary, etc.' (the text between [] is in Swiss German)

(9) has FESTNETZ enzanua?
do-you-have LANDLINE.GERMAN somewhere?
'do you have a landline somewhere?'

(10) Nus mein GRAD ord savognin.
we go NOW out-of Savognin
'we are leaving Savognin'

Note that the *grad* borrowed from German appears also in example (8). Since such German particles have long been used by speakers of Romansh, it is unclear whether they should still be labelled as German in the glosses. Mixed codes, whether instantiated in clear switches to another language or habitual replication of words or structures from another language that have become integrated into the host language (typically termed 'borrowing') are ubiquitous, and bi-/multilingual children are exposed to them from the onset of acquisition. Western middle-class parents typically try to separate the languages (e.g. following the famous One-Parent-One-Language/OPOL[5] strategy), but there is solid evidence that even if no such strategy is chosen children are perfectly capable of distinguishing between the different languages used around them.[6]

From a usage-based perspective, simultaneous multilingual acquisition means that there are constructions from two or more languages that will be present in the input and therefore be learnt in the same piecemeal, item-based way as in monolingual L1 acquisition. The methods of investigation are the same: scholars typically try to account for the emergence of increasingly abstract grammatical constructions as in Table 6.1, only that the input provided *to*, as well as the output produced *by* the child/learner are not constrained to one language.

Hartmann et al. (2022) discuss several studies that have used the traceback method to understand bilingual first language acquisition (the authors discuss examples such as (11) and (12), cf. p. 252), and the results overall seem in line with the monolingual results discussed in Section 6.1: a substantial part of the production of emergent bilinguals can be traced back to a restricted set of previous, often lexically fixed utterances.

[5]See Lanza & Lomeu Gomes (2020) on family language policy.
[6]See e.g. Byers-Heinlein (2014) for more on this.

(11) ich want X
I want X

(12) I'm suching my UHR
I'm searching my WATCH.GERMAN

One study discussed in this overview analyzes mixed utterances (English-German) from the bilingual child Tim (30h of recordings between age 2;6 and 2;7). 88% of mixed utterances as in (11) can be traced back to lexically fixed precursor utterances. This illustrates how bilingual children draw on (often monolingual, but sometimes also bilingual) previously established frames and combine them with (new) words that may or may not be from the same language.

Obviously, one of the changes as the bilingual system expands is that the sometimes rather wild mixing of young bilinguals as in (12) declines over time as the bilinguals acquire both more language-specific grammatical knowledge and competence in the (normative, often monolingual) expectations of communicative partners in a given linguistic setting.

6.2.2 SLA/Sequential multilingualism

The speed of and ultimate success in learning an additional language is shaped on the one hand by language-related aspects, and on the other by learner-related factors (cf. Chapter 14). The most relevant language- or construction-related factors are frequency of occurrence, salience of form and meaningfulness of content; the status of constructions as prototypes or as atypical tokens; and overall the contingency of form and function/meaning (i.e. the reliability with which a given form is associated with a given function or meaning).[7]

On the side of the learners, the theory assumes that previously learned languages shape learners' attention to linguistic *cues* (i.e. morphological information in the input) in specific ways, but also other processes such as *overshadowing* and *blocking* play a role. We will discuss examples in the remainder of this chapter.

To understand the specifics of *second* language learning of constructions, in particular with respect to grammar, the distributional features of grammatical markers and general learning principles need to be taken into account.

A particularly interesting aspect of L2 learning in this respect is morphosyntax, more specifically grammatical markers, as they are typical in French, German, or other Western European languages: they are relatively short, not salient (not

[7]For more on this cf. Wulff & Ellis (2018: 40).

accented), often redundant, and with relatively low levels of contingency. In other words, they are notoriously difficult to learn.

The acquisitional consequences of these characteristics of grammatical morphemes are that they are often overshadowed (e.g. by semantically equivalent adverbs), and that their acquisition gets blocked (by learned attention to other, L1-related features). The latter is the usage-based way of describing (negative) transfer from L1.

6.2.3 Learnability of Cues

Given the specific properties of grammatical markers, their learnability varies considerably across and within languages (cf. Wulff & Ellis 2018: 40-43). Frequency is the first dimension that makes markers more or less learnable, as there is a positive association between the frequency of a construction in the input and its relative time point of acquisition as well as the fluency with which it is processed.

Frequent items and constructions have a high *resting activation*, which means they are more easily retrieved and activated than low-frequency items. The learners, when exposed to L2 input or/and producing L2 output, fine-tune their multilingual system to accommodate it to the target model.[8] To what extent a marker or construction is learnable does not only depend on its frequency in the input. Other important parameters that I discuss below are *salience*, the level of *contingency* of the form-function association, and the learners' previously conditioned or *learned attention*. The last can lead to positive or negative transfer, depending on the similarity to or difference from patterns in the multilinguals' languages.

6.2.4 Salience

One of the easiest ways of describing salience is looking at the length of a word or construction. Figure 6.5 shows the length of words in a film subtitles corpus plotted against the corpus frequency of these words.

The figure suggests rather clearly that long words tend to be low frequency. Moreover, most of the highly frequent words are short. Many of those short words are grammatical words, such as complementizers or prepositions. More generally, grammatical markers (free words and bound morphemes) are highly frequent and relatively short. That makes them low on saliency and therefore more difficult to learn than highly salient forms.

[8] "Unconsciously and implicitly" are the terms used by Wulff & Ellis 2018: 41; I do not think there is absolute certainty that such fine-tuning is categorically unconscious.

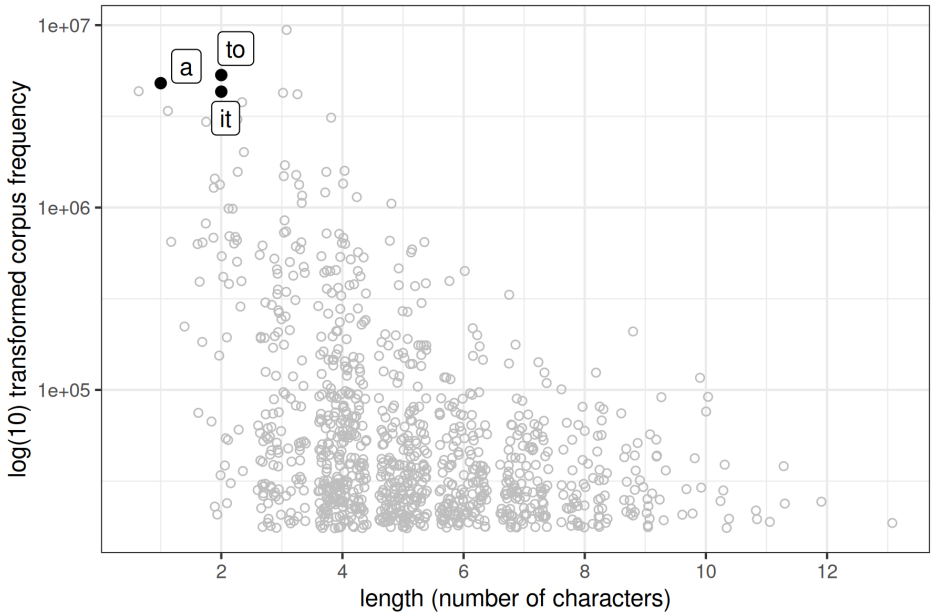


Figure 6.5: Saliency of words: length of words and corpus frequency. The frequency counts are based on the subtlex-uk subtitle corpus; van Heuven et al. (2014).

Another aspect of short (which, from a diachronic point of view, usually means shortened) words is that they are homophonous with other words: think of English *to*, *too*, and *two*. Homophonous words are more difficult to learn in spoken language than words with clearly different phonological forms.

6.2.5 Contingency

Contingency is a metric for the consistency with which the occurrence of a form or cue (C) coincides with a specific (grammatical or other) interpretation or outcome (O) (cf. e.g. Wulff & Ellis 2018: 45). This measure is called ΔP, and the more it converges to 1, the higher the contingency.

> The degree to which animals, human and other alike, learn associations between cues and outcomes depends upon the contingency of the relationship. In classical conditioning it is the reliability of the bell as a predictor of food that determines the ease of acquisition of this association (Rescorla, 1968).

> In language learning it is the reliability of the form as a predictor of an interpretation that determines its acquisition and processing [...]. (Wulff & Ellis 2018: 45)

Table 6.2: The four combinations of cues and outcomes for a given construction

cue	outcome	no outcome
present	a	b
absent	c	d

The metric corresponds to the probability of the outcome given the cue minus the probability of the outcome in the absence of the cue (Wulff & Ellis 2018: 46):

$$\Delta P = P(O|C) - P(O|\neg C) = \frac{a}{a+b} - \frac{c}{c+d}$$

Contingency and language learning: plural marking Languages such as French have a typical plural suffix {-s} that marks the plural of nouns (*langue—langue**s***). Unfortunately, there are also many exceptions to this simple rule, as there are also singular nouns ending with <-s> (*le fil**s***, 'the son'), there are other plural markers (*le cheval—les chevaux* 'the horses') and the same suffix {-s} may be used to mark other grammatical relations, e.g. on finite verbs (as in *je par**s***, I am leaving).

Think about how this affects the formula used to calculate contingency, and compare cases like French to the formation of nominal plural in a language such as Esperanto (Lingolia n.d.):

Plural

We form the plural by adding -j to the end of the word.

Examples:

- hundo → hundoj
- parko → parkoj
- pilko → pilkoj

Why aren't all languages like Esperanto?

6.3 Overshadowing, learned attention, and blocking in an additional language

We have seen that a domain that seems particularly relevant to testing the usage-based model's predictions is inflectional morphology. To test what learners pay attention to when learning a language with rich morphology, Ellis & Sagarra (2011) had speakers of different first languages (main L1s were Spanish, Russian, English, Chinese) learn Latin, or more specifically they exposed them to two-word clauses in Latin that contained redundant information about tense. The learners were all adults (N=67)—either university students or non-student volunteers.

(13) cogit-as hodie
think-PRS.2SG today
'today you think'

(14) heri cogit-avit
yesterday think-PRF.3SG
'yesterday s/he thought'

(15) cras cogit-abo
tomorrow think-FUT.1SG
'tomorrow I will think'

All two-word clauses contained a lexical (e.g. {heri}) cue and a bound morpheme (e.g. {-vi}) that both denote temporal relations/tense. The learners were told that the clauses referred to present, past, or future, and in the learning phase they received feedback if their guess on temporal reference was incorrect. The question was which of the two cues they would learn, and whether the attention paid to the less salient cue (the bound morpheme) depended on the first, dominant languages used by the participants.

In the test phase, the learners had to attribute tense interpretation to individual items (adverbs or verbs) and combinations thereof (both combinations that make sense and others that do not). Based on these answers, the weight the learners attributed to the two kinds of cues could be calculated (Ellis & Sagarra 2011: 612).

The results show that learners from an English background overwhelmingly learn the adverbs (standardized estimate 0.93) and only weakly rely on the cues in the bound morphemes (0.17). Chinese learners exclusively rely on the adverbs (0.95 vs. -0.02), which is expected, as Chinese does not have inflection at all. Russian L1 speakers were a little more inclined to use the inflectional morpheme

(0.91 for the adverbs vs. 0.22 for the inflection), and the group that most strongly relied on the morphology was the L1 Spanish speakers (0.75 vs. 0.41), which is not surprising, as Spanish not only has similar temporal markers on the verb but is overall a cognate language (with Latin).

The study thus illustrates that more salient cues are easier to learn, regardless of the first languages, as all learners rely more on the adverbs. These more salient cues overshadow the less salient cues, the suffixed morphemes at the end of the verb stems. Moreover, the data show that learned attention can have an effect on the probability that some learners use one type of cue over the other, as the Spanish L1 speakers transfer their attention to verbal morphology whereas the Chinese speakers exclusively rely on their L1 based focus on words, not bound morphemes.

6.4 Concluding remarks

From a usage-based perspective, the acquisition of a first language starts with very simple and restricted constructions—it is item-based. No (innate) knowledge of abstract grammatical rules is presupposed; the main motor of acquisition is driven by the need and the will to be social and communicate.

Acquisition then proceeds in a piecemeal fashion, adding more items to the inventory and gradually building up more abstract representations, resembling increasingly what linguists call grammar when they describe languages. Grammar, in this view, emerges as the repertoire of the learner is extended.

A lot of this learning is implicit; it is viewed as a form of fine-tuning to the input provided by peers and adults.

The shape of the learning curve depends on the frequency, saliency, and contingency (i.e. the learnability) of the items in the target language. As input in foreign and additional languages is often smaller than in L1, differences in learnability have more dramatic consequences, and some aspects may never be mastered (*fossilization*) if these additional languages are learnt implicitly only. The learning curve is affected not only by the specifics of the target language and the input, but also by individual differences. The usage-based approach—unlike the generativist school of thought—views language learning as following *general cognitive* and not *domain-specific linguistic* principles. Given that we know from extensive studies on individual differences that learners' cognitive resources for general learning are notoriously variable (see Chapter 14 for more on this), the usage-based approach does not expect identical but rather different outcomes of language learning, in L1, L2 or Lx.

Moreover, the learned attention that learners carry with them from previous language learning experiences has an effect on their capacity to infer the target language's patterns: if temporal markers in L1 are exclusively expressed via free morphemes such as temporal adverbs, it is unlikely that bound morphemes expressing tense, as is typical in inflectional languages, will be spontaneously discovered, in particular if they are often accompanied by (redundant) temporal adverbs (overshadowing). The interaction of the characteristics of the previously learnt languages and learner characteristics explains the phenomenon of blocking and more generally of unsuccessful learning of target language grammar.

Transfer in L2 learning, in this view, is mainly the effect of entrenched structural representations and processing routines associated with them that were learned in L1 acquisition (or in the context of any other pre-acquired language), and the application of this learned attention to the L2 or L3. This is where explicit instruction has an important role to play: by pointing out such learned attention habits and by helping learners to attend to the target language regularities instead of the habitual attentional patterns, the teacher facilitates faster learning and increased accuracy in the target language (see the discussion of corrective feedback in Chapter 4).

Even though authors who work within the usage-based framework sometimes refer to *unconscious* and implicit mechanisms in learning (as discussed above), the usage-based perspective does not assume that (language) learning is simply the implicit process of picking up language from input, as in a simplistic view of statistical learning from input. The notions of *noticing* and *awareness* are also part of the picture, in particular when the goal is to understand how and when learners overcome learned attention biases.

Let us finish this chapter by taking another look at quotations that represent the generativist and the usage-based approaches.

Usage-based perspective:

- In the initial stages […] children's linguistic competence is most accurately characterized not as 'a grammar,' but rather as an inventory of relatively isolated, item-based constructional islands. Development […] then proceeds gradually and in piecemeal fashion […] depending on the type and token frequency with which children hear particular constructions […]. Under no circumstances does this development look like an instantaneous setting of parameters in which all verbs and other lexical items immediately participate in a totally abstract construction. (Tomasello 2005: 140)

- The linguistic input learners receive is the primary source for their second language (L2) learning. The cognitive mechanisms that learners employ in language learning are not exclusive to language learning, but are general cognitive mechanisms associated with learning of any kind. (Wulff & Ellis 2018: 37)

Generative perspective [recap]:

- Within these approaches there is a consensus that certain properties of language are too abstract, subtle, and complex to be acquired in the absence of innate and specifically linguistic constraints on grammars. (White 2003: 20)

- …these input features do not provide a sufficient solution to the "logical problem of language acquisition" or "Plato's problem"—the fact that the competence of adult native speakers is underdetermined by the input …: Children only hear a small, arbitrary sample of their target language, but acquire the capacity to create an infinite number of sentences and sentence structures (quantitative underdetermination). (Eisenbeiss 2009: 275)]

- The speed and precision of vocabulary acquisition leaves no real alternative to the conclusion that the child somehow has the concepts available before experience with language and is basically learning labels for concepts that are already part of his or her innate conceptual apparatus. (Chomsky 1988a: 28)

In Figure 6.6 I try to summarize the rather fundamental differences regarding language acquisition/learning between the two approaches. The most important differences relate to what the nature of linguistic representations is and how these representations are formed (see Wulff et al. 2026 for a critical engagement with the generativist/usage-based dichotomy). Whereas the underlying idea of the generativists' innate principles recalls Plato's idea of inherited knowledge that merely needs to be triggered to become what we might call *competence*; the usage-based assumption recalls more the Aristotelian idea of the young child as a *blank slate*. We will return to these opposing views in Chapter 14 on individual differences.

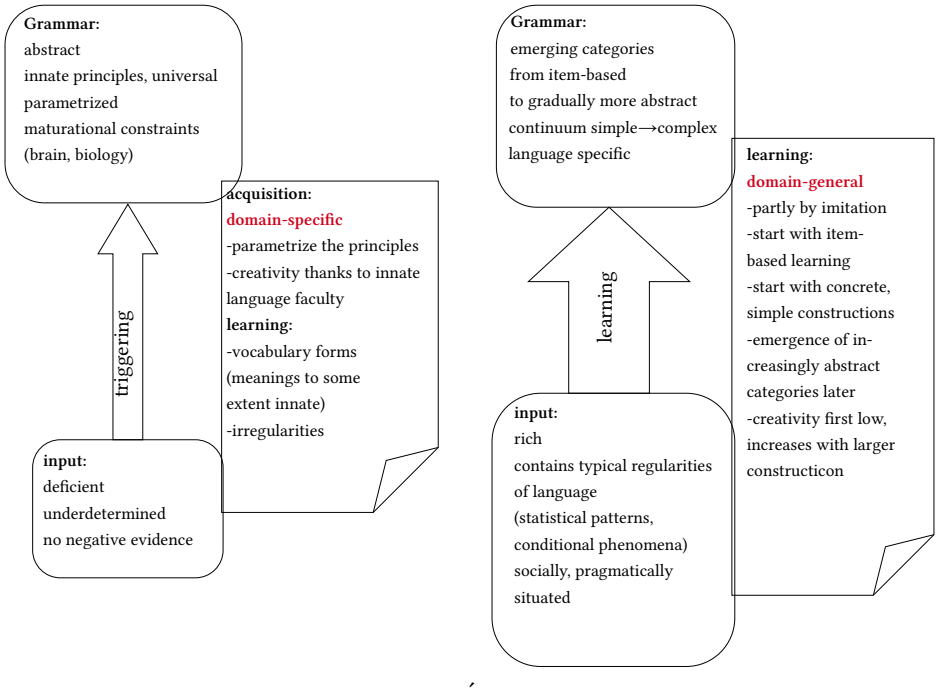


Figure 6.6: The generativist (left) and the usage-based (right) views of language acquisition and learning

7 Grammar: Learner variety approaches

Preview—Key points of this chapter

- The learner variety approach studies *interlanguages* as systems in their own right.
- As in generativism, there is a universal human *language-making capacity* which shapes (additional) language learning/acquisition. However, this capacity relies on less abstract principles than generativist UG.
- There are syntactic, semantic and pragmatic principles shaping grammar.
- Input and transfer are part of the picture but they are less important than in the usage-based account.
- The *Basic Variety* (BV) is an example of a learner variety:
  - BV is a relatively stable, simplified language/variety,
  - typically emerging in *untutored contexts*.
  - BV has no inflectional morphology, but a strong reliance on *word order*.
- Learner varieties sometimes correspond to *fossilization* points in acquisition.
- Multilingual learners' simplifications shed light on what belongs to the *core functional principles* of the human language making capacity.

The central assumption of the learner varieties approach is that learners of a target language develop systems, *learner languages, learner varieties* or *interlan-*

guages, that "have properties on their own" (Dimroth 2018: 868). These intrinsic properties are more than simply consequences of input frequencies or of cross-linguistic influence.

Second language acquisition and learning research (SLA) has always been interested in the differences between the ways native speakers and learners of a given language put equivalent communicative meaning into words. Since many aspects of second/additional language learner productions in a target language seem relatively predictable and coherent, influential authors early on claimed that learner languages are *systems*:

> …[O]ne would be completely justified in hypothesizing, perhaps even compelled to hypothesize, the existence of a separate linguistic system based on the observable output which results from a learner's attempted production of a TL [target language] norm. This linguistic system we will call 'interlanguage' (IL). (Selinker 1972: 214)

One of the consequences of this assumption is that learner varieties as systems in their own right should not naively be compared to the systems used by native or near-native speakers. Such comparisons, if the emphasis unilaterally lies on what are normatively perceived as errors, bear the risk neglecting that these deviations from (native-speaker-based) norms are manifestations of learning. The deficit-oriented comparison of learners to native speakers is traditionally termed the *comparative fallacy*—in post-modern sociolinguistics the more morally loaded term is *native-speakerism* (Bley-Vroman 1983, Holliday 2006).

We have already encountered a similar phenomenon when discussing the comparisons of bilinguals/multilinguals to monolinguals (Chapter 3.2).

7.1 Neither generativist nor usage-based: A third way?

The Learner Variety approach focuses on some of the aspects of learner languages we have discussed within the usage-based framework. For example, it also acknowledges the difficulty of learners in figuring out the morphosyntax of modern languages, in particular if they come with the contingency problems we have discussed in Chapter 6. The usage-based approach and the learner variety paradigm differ, however, regarding the domain-specificity of the postulated mechanisms at work.

As the studies discussed below show, the assumption is that uncovering the structure of (very) simple learner varieties that emerge in second language acquisition tells us something fundamental about the nature of the human language making capacity.

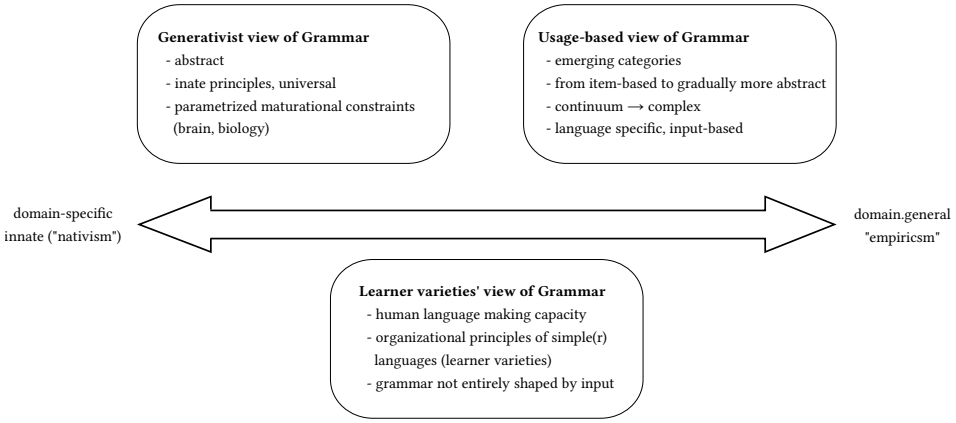


Figure 7.1: Three views of grammar/language and acquisition

A prominent example of such a learner variety is the *Basic Variety* (BV; see Klein & Perdue 1997, Benazzo et al. 2025). It emerges typically when adult learners are exposed to a new language without any substantial explicit teaching. Typically, the BV captures central features of adult migrant workers' emerging interlanguage systems of the language of their new environment. The BV is argued to be simple and fairly stable, which means it may remain unchanged over long stretches of time within individual learners. BV's grammar is all about word order, and these syntactic regularities are mainly governed by semantic and pragmatic principles that will be discussed below. BV does not have purely grammatical/functional morphemes and hence no inflectional morphology whatsoever—BV speakers use a 'nonfinite' learner variety:

> Verb forms do not agree with the relevant subject noun phrases (NPs), and they are not inflected for tense. The Basic Variety's nonfinite utterance organization is its main characteristic and sets it apart from later stages of development. (Dimroth 2018: 868)

7.2 Basic Variety: Adult migrants in Europe

In their seminal study on adult migrants in Europe, Klein, Perdue and their team investigated the emergence of learner varieties in (largely) untutored second language learning settings. The goal was to compare the learner varieties of speakers of different L1s and different L2s.

Data from 40 adult learners of different first and second languages were collected. The idea was to capture *natural* (i.e. untutored) acquisition of the new language system. Possible influences of specific first and target languages were accounted for by including different L1s and L2s in the sample, as depicted in Figure 7.2. All learners were immigrants, and the study documented the emergence of their second language learner varieties right after their arrival in the new (language) context and over approximately 30 months.

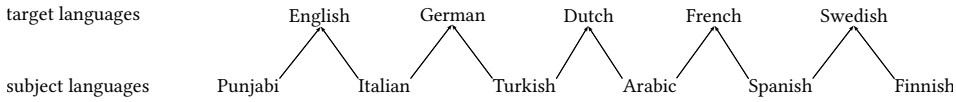


Figure 7.2: The languages in the European Science Foundation funded study on the Basic Variety; based on Klein & Perdue (1997: 309)

The project provided evidence for a relatively stable state of development, a simple grammar that is efficient from the point of view of communication. The hypothesis is that the description of the BV sheds light on what is shared by (potentially all) humans learning and using languages, because it is not part of a long-standing tradition of ways of speaking as the 'old' natural languages are. In this respect, the BV tells us something about the "human language-making capacity" (Slobin 1985: 1157). Many of the hard to learn aspects of grammar (e.g. low-contingency aspects as discussed in Section 6.2.2) have accumulated across the centuries as a form of cultural heritage or, as John McWhorter calls it (McWhorter 2001: 192), "gunk" (see Figure 7.3).

Think about the different ways of marking nominal plural in languages such as French (see Chapter 6). The French marker {-aux} contributes to a lower contingency score for the main plural marker {-s}. This is a good example of linguistic 'gunk', as things used to be more regular and therefore also more learnable. The complicated present-day situation is a result of the development of specific cultural uses of the French language: the medieval French plural marker had been {-s}, also in words with vocalized <l> such as <chevau-s> ('horses'). A misunderstanding of the handwritten shortcut for <-aus> that resembled <-ax> led to the present day written French irregular plural marker {-aux}.

Such irregularities accumulate in particular if languages are written and codified relatively early on. The written tradition unavoidably exerts a conservative normative force that constrains the pace and direction of successive language change.

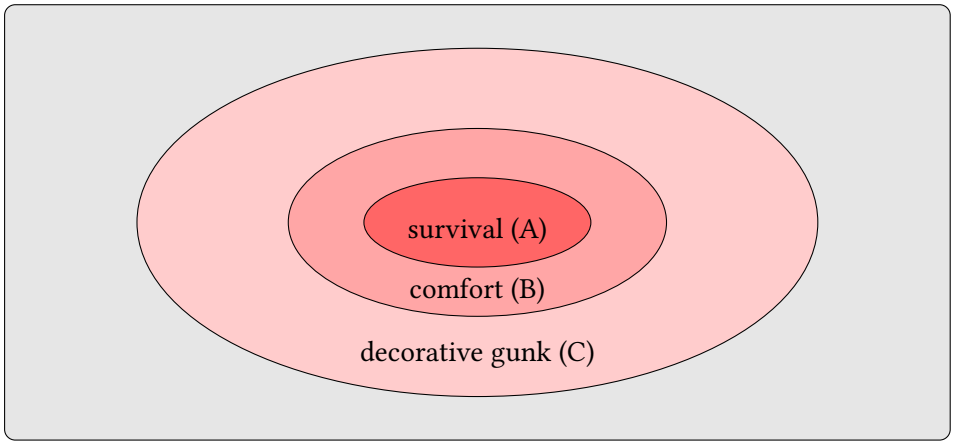


Figure 7.3: (A) what is strictly necessary for survival, (B) the minimum required to lead a comfortable life, (C) accreted layers of decorative gunk in needlessly complex languages; inspired by McWhorter (2001: 192)

7.2.1 An example of a Basic Variety narrative text

One of the means of collecting data[1] in this project was to show participants the film *Modern Times* by Charlie Chaplin. The stimulus was a silent film with no spoken dialogue, thus well suited as a task that is language neutral. The fieldworker left the room during the screening and came back after a while. This was supposed to generate a relatively natural situation in which it makes sense for the participants to tell the fieldworker what s/he had missed in the film.

The interactions between the field workers and the subjects were transcribed meticulously with substantial information on phonological and prosodic features of the spoken language. Other data were also collected in this project, with more controlled tasks and via interviews.

7.2.2 Constraints of the Basic Variety

The idea of the learner variety approach is to discover the principles or constraints that govern the structures of the learners' language production. The learner languages are hypothesized to be not random but structured and systematic. This emerging structure can be described via constraints of three different types: *phrasal*, *semantic*, and *pragmatic* constraints.

[1]The data are freely available via the MPI Nijmegen server (European Science Foundation 1988).

The examples in this chapter are mostly drawn from the aforementioned corpus of the European Science Foundation funded project (unless stated otherwise).

The first group of constraints related to syntax. They are called *phrasal constraints* (PH).

(1) PH1: NP1 V (NP2 (NP2)), French L2:
   a. dotor sapel guillermo
   b. Pain fini

(2) PH2: NP1 Cop Adj/NP2/PP, French L2:
   el e gentil

(3) PH3: V/Cop NP2, French L2:
   arrive du petits garçons

"Cop" in the above examples refers to the copula verb (*to be* in English). Given that the utterances in BV are short and there is not much syntactic complexification, these three syntactic frames suffice to capture virtually all BV utterances. Note that there are no syntactic roles such as subject or object, as these do not form part of the BV framework. In most target languages of the sample, the analysis of the subject or object status of a noun phrase relies on the presence of specific inflectional morphology, which the BV notoriously lacks.

The *semantic constraints* (S) pertain to the relative status of the nouns/noun phrases in the utterance. The central notion of *control* refers to agentivity or the capacity of an entity (most often an animate entity, the controller) to influence the state of another entity (the controlled). Although typically the controller, in our languages, would correspond to the subject and the agent in an active verb construction, while the controlled to a (direct or indirect) object and the patient, these correspondences are by no means categorical.

(4) SEM1: NP referent with highest control comes first, English L2:
   Charlie give present for young children

If there are two controllers, as in an event of *giving* or *taking*, then the preference goes to the controller of the initial state. The same applies to events of verbal exchange—the speaker comes before the hearer:

(5) SEM2: Controller of source state outweighs target state, French L2:
   y el di à la police
   'and he tells it to the police'

However, often there is no control asymmetry, as in the following examples:

(6) il se trouve avec la fille (French L2)
he himself finds with the girl
'he is with the girl'

(7) il se trouve avec Chaplin (French L2)
he himself finds with Chaplin
'he is with Chaplin'

(8) hier is die cafe (German L2)
'here is the coffeeshop'

(9) dan auto is hier (German L2)
'then car is here'

In those cases, the *pragmatic constraint* (P) kicks in. This constraint applies to the distinction between new and given or maintained information. The terms often used in this context are *topic* and *focus*. The focus elements are printed in small caps below.

(10) PR1: Focus expression last, French L2:
a. il ARRIVE
'he comes'
b. arrive OTRA PERSONNE
'comes another person'

The following (made up) example can help us understand the distinction:

(11) The girl scratched the car.

This utterance can answer rather different questions. Depending on the question asked, topic and focus change:

(12) Who scratched the car?—topic: all people/animals or other causes of the scratch, focus: THE GIRL

(13) What is it the girl has scratched?—topic: the objects potentially scratched by the girl, focus: THE CAR

(14) What did the girl do?—topic: the actions the girl potentially carried out, focus: SCRATCH THE CAR

(15) What did the girl do to the car?—topic: the actions the girl potentially carried out that affect the car, focus: SCRATCH

(16) Did the girl scratch the car or did she not?—topic: whether or not the girl carried out the specific action of scratching the car, focus: SHE DID/SHE DIDN'T

The topic refers to the set of alternatives, and the focus identifies the alternative that is validated in discourse. Thus, example (18) answers question (12).

In many languages, the focus is marked via intonation (e.g. the *Verum-Fokus* in German as an answer to (16) in (17)). Other languages, as for instance Japanese, would use a dedicated particle for this function. In BV, the focus is syntactically marked: it comes last (as in the fictitious BV examples (19)–(20); example (20) is from Klein & Perdue 1997: 318).

(17) (das stimmt,) das Mädchen ZERKRÁTZTE das Auto
topic focus topic
'that's right, the girl did indeed scratch the car'

(18) DAS MÄDCHEN zerkratzte das Auto
focus topic
'It was the girl who scratched the car'

(19) gestern ich gehn ZÜRICH (answers the question WHERE)
yesterday I go Zürich
'Yesterday I went to Zürich'

(20) ich gehn Zürich GESTERN (answers the question WHEN)
I go Zürich yesterday
'Yesterday I went to Zürich'

(21) altijd ik wakker OM ACHT UUR (answers the question WHEN)
always I awake at eight o'clock
'always I wake up at eight'

These simple principles may explain a considerable share of utterances at the BV stage, but not all of them, as there are more complicated cases. One complication is that the different simple constraints can be in conflict. For instance, an entity can be the controller (which comes first) and at the same time in the focus of the utterance (which comes last). This is the case in an episode of the film

Modern Times, where a woman steals a loaf of bread and the police officer wants to find out who the thief was (=focus), but this thief is also the controller of the event.

(22) Who has stolen the bread?Focus: girl

(23) stealing bread girl (L1: Punjabi)

(24) mädchen nehme brot (L1: Italian)
girl take bread

(25) [se] la dame qui a volé le pain (L1: Spanish)
it's the woman who has stolen the bread

PR1 (focus last) and SEM1 (highest control first) may suggest different word orders. In such cases, BV utterances are to some extent shaped by the learners' respective L1 grammars (transfer). The learners' L1s may show a preference either for a more pragmatically organized constituent order (corresponding to the pragmatic principle of focus last), or they may stick to a more semantic order (i.e. controller first).

7.2.3 Utterance structure in multilinguals

If the first language of the second language user/learner usually applies pragmatic word order, then the pragmatic constraint is transferred to the second language. If, however, the first language applies the semantic principle, then the semantic constraint applies. This is what examples 23 and 24 show: Punjabi grammar applies the pragmatic constraint, thus that constraint is transferred to English L2 23, whereas Italian applies the semantic constraint 24. This is where instances of grammatical *transfer* can be observed in BV.

Such clashes of constraints show why fully-fledged grammars of languages need to be more complex than the grammar of the BV: it is often necessary to express more than *control* or *topic-focus*, therefore grammatical markers other than syntax alone are needed.[2]

As briefly mentioned above, languages differ with respect to their preferred way of organizing the information flow in coherent texts. In a recent project, we compared Italian, French and German narrations (in more mono- and more multilingual participants) to identify differences between the languages. One of the

[2]"Such contexts of 'competition' provide the language acquisition researcher's contribution to [the] question [...] Why are 'fully fledged' languages more complex than the BV?" (Klein & Perdue 1997: 322)

questions we were interested in was whetherprovided there are cross-linguistic differencesbilinguals in both languages somehow show signs of convergence (Berchio 2023, Bonvin 2023).

The participants in our study had to renarrate a short film (the one developed by Dimroth and used in the VILLA study).[3] The examples below show a situation where the polarity and the entity of an event change:

First event:

(26) il signor X dorm-e
[the] mister X sleep-PRS.3SG
'mister X sleeps'

One possibility in narrating this scene is to focus on the *polarity contrast* in the second event:

Second event:

(27) il signor Y decid-e di andare al-la finestra
DET mister Y decide-PRS.3SG to go.INF to-DET window
'mister Y decides to go to the window'

(28) herr Y entscheide-t sich, zum fenster zu geh-en
mister Y decide-PRS.3SG himself to.DET window to go-INF
'mister Y decides to go to the window'

Another possibility is to focus on the *entity contrast*:

(29) invece il signor Y va al-la finestra
instead DET mister Y go.PRS.3SG to-DET window
'instead, mister Y goes to the window'

(30) stattdessen geh-t herr Y zu-m fenster
instead go-PRS.3SG mister Y to-DEF.DAT.M window
'instead mister Y goes to the window'

Note that the speakers here are (way) beyond a BV stage. Thus, they have many other tools than the syntactically organized principles discussed above at their disposal to mark the focus of the utterance, namely particles (*invece, stattdessen,*

[3]The "Finite Story" (Dimroth 2018).

'instead' ...). In addition to either the marking of the entity or the polarity contrast, there is also the possibility to use *double marking*, where both entity and polarity are marked:

(31) invece il signor Y decide di andare al-la finestra
instead DET mister Y decide.PRS.3SG to go.INF to-DET window
'mister Y decides to go to the window'

(32) stattdessen entscheide-t sich herr Y zu-m fenster zu
instead decide-PRS.3SG himself mister Y to-DEF.DAT.M window to
geh-en
go-INF
'instead, mister Y decides to go to the window'

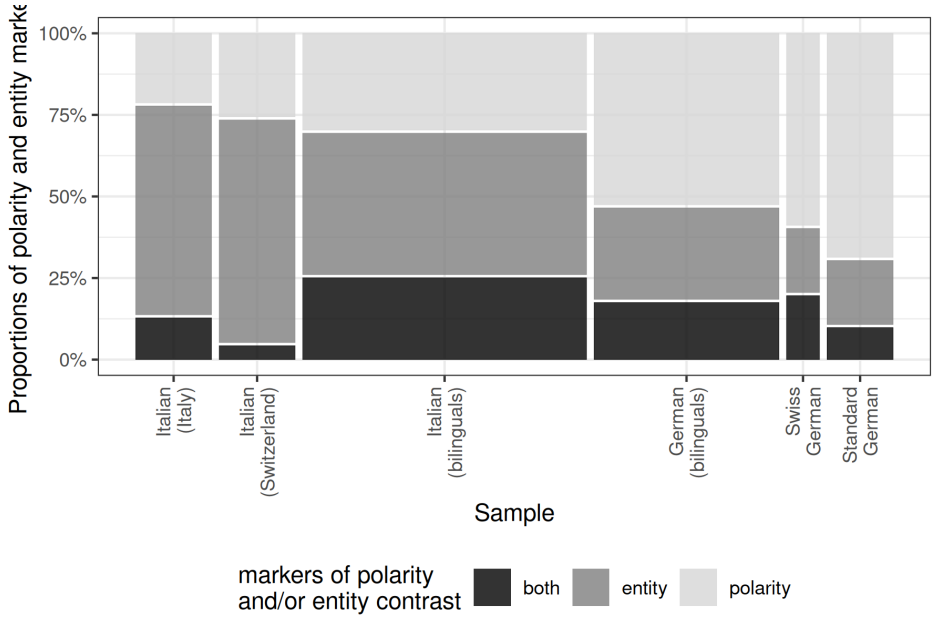


Figure 7.4: Focus marking preferences as found in Berchio (2023: 118)

As Figure 7.4 shows, Italian-speakers show a preference for entity as focus marking; German-speakers for polarity-marking. Bilinguals (in particular when speaking Italian) as a group are somewhat in the middle. This is evidence for gradual convergence within the repertoires of the bilingual speakers. Note that

this applies to the groups (bilinguals vs. monolinguals)individuals may still deviate from these group tendencies.

7.3 The VILLA study

The design of the last study to be discussed is original in that it tries to achieve maximal control over the input, as in artificial language learning experiments, but with a real modern language and in a more naturalistic setting. The input consisted of 15 hours of videotaped classroom interaction and instruction with the same native Polish teacher (10x90' over 2 weeks). Teaching is done mainly orally, but the teacher also uses some visual supporting material (slides). No grammar books or dictionaries were allowed.

The target language corpus analyzed in the paper by Dimroth (2018) was the retelling of a film by L1 speakers of German (two groups age 9–11, N=12 and 19-27, N=20) and Italian (N=17, age 20-32). Table 7.1 provides a summary of some of the findings of the study.

Table 7.1: Findings from the VILLA study as reported in Dimroth (2018)

Criterion	Result
Length	Adults > children; no difference between L1 DE/L1 IT
Lexical diversity	Adults > children; no difference between L1 DE/L1 IT
Syntax: Model Agent-Verb-Patient	A-V-P is the dominant model despite the fact that there were more diverse models in the input; only rarely deviations calqued on German and Italian syntax
Finiteness	Similar proportions to those in input, but form-function associations not acquired
Sentence negation	Preverbal negation; in both groups occasionally alternative constructions
Morpho- syntax	Long form of noun analyzed as plural (actual target language: instrumental case)

The vast majority of clauses in the input were SV(O); occasionally, the OVS constituent order was observed (31-49x), which is also possible in Polish. Italian has relatively strict SVO order, and German, although SVO is also the dominant pattern, also licenses verb-last (e.g. in subordinate clauses) and verb-second syntax (see example 33).

(33) Gestern ging ich …
yesterday went I …

Therefore, it is interesting to investigate a possible influence of the first languages on the emerging learner variety of Polish: do speakers of German L1, for example, transfer alternative syntactic models (e.g. verb last or verb second syntax)?

(34) potem spią pan dżelony i pan czerwony oni
then sleep Mr. Green and Mr. Red they
'Mr. Green and Mr. Red are sleeping'

(35) potem skacze pan czerwony
then jumps Mr. Red
'Finally Mr. Red jumps (out of the house)'

There were exactly two examples of V2-constructions with no subject in front of the verb-constructions that could potentially be transferred from German. However, one of them was produced by a native speaker of Italian (example 35).

Dimroth, as the BV literature does, distinguishes between non-finite (like the BV) and finite (post BV) learner varieties. Varieties that are finite have inflectional information that permits identifying grammatical subjects and objects, which is the case of more advanced learners and the varieties spoken by native speakers (in the case of the VILLA study most obviously the teacher). In BV, given the lack of such markers, only an analysis in terms of the informational (topic vs. focus) or semantic status of the argument (controller/agent vs. patient) is possible.[4]

The Polish input provided to the VILLA learners contains the inversion of verb and subject in presentational contexts: "from Warsaw drives Marta". Both L1 Italian and L1 German speakers clearly prefer XVS for presentational utterances (example 36).

[4] "The two utterances that deviated from the default agent–verb–(patient) order are given in Examples [34] and [35]. Both utterances have a temporal adverbial in initial position. The structure thus resembles German subject–verb inversion, due to the V2 constraint. However, only one of the utterances was produced by a German learner, and a contextual motivation (information structure) does not seem to be plausible in this case." (Dimroth 2018: 879)

(36) da kommt die Feuerwehr
there comes the fire brigade

The same applies to the BV (see PH3 above as well as PR1, the focus last principle).

Despite the input, Dimroth finds that "learners uniformly produced preverbal subjects" (880). They applied a rigid SV(O) syntax:

(37) special samochód czerwone jezi
special car red drives
'A special red car arrives'

(38) strażak arrive
fireman arrives
'A fireman arrives'

The variety that emerges in the VILLA classrooms does not apply all constraints known from the BV utterance structure, but the two share a certain number of features. What is important, however, is that again it is often not straightforward transfer from L1 that can be observed, even where L1 and the target language would share regularities.

The VILLA study provides insights into emerging patterns that bear some resemblance to BV (e.g. in the case of negation). However, there is no resemblance to BV across the board. For example, the pragmatic constraint does not seem to be applied consistently. Dimroth argues that the patterns in the data cannot be explained by unilaterally relying on imitation and learning of input constructions according to purely domain-general processes. She discusses evidence for creative interpretation and processing of the input to fit the learners' L1 grammar by discussing examples from the domain of determiners (articles) and plural marking.

The most important aspect of this study, in my view, is that it argues in favor of an intermediate position between purely domain-general learning and domain-specific acquisition processes.

Undoubtedly, such simple, basic learner varieties allow their users to communicate. They are also highly learnable. Coming back to the 'gunk' accumulated in our modern languages, one can ask the question why these languages are not at least a little bit more like these simple, regular languages.

7.4 Why are languages not simpler?

We have seen that users of BV can fulfill essential communicative needs with these simple and easily acquired varieties. Even though BV might not cover all human expressive and communicative needs, the question arises why natural languages are not (much) simpler.

7.4.1 Basic Variety: Fossilized vs. too simple to live comfortably

> Strikingly absent from the BV are (a) free or bound morphemes with purely grammatical function and (b) complex hierarchical structures, in particular subordination. (Klein & Perdue 1997: 332)

The BV is a likely candidate for an attractor state or *fossilized* state of the learner grammar/interlanguage.[5] Whenever the term "fossilization" is used we should be very careful, as the term implies the absence of (future) learning. However, supposedly fossilized learners might only *appear* to be stuck in their development. They might find themselves temporarily on a flat learning curve, their progress might not be overtly detectable, and the slope of their learning curve can perceptibly change again after some time.

As integration into the second language context progresses, the expressive needs (cf. the second circle in Figure 7.3) may increase and can no longer be met by the grammatical means of the BV. Take the following passage from a newspaper article as an example:

(39) The occupants of a car which crashed, killing three people, had been drinking and inhaling nitrous oxide, a friend told police. (PA Media 2023)

If we 'translate' such a sentence into BV, we end up with something as follows:

(40) friend [tell] police: occupants of car [drink] and [inhale] nitrous oxide, then car [crash], [kill] three people[6]

The BV organization of the passage changes the informational flow and the structure of the text. Narrations following such a strictly linear pattern would be, among other things, rather boring—think of the monotonous way some children retell events as in 'and then X, and then Y, and then Z...'.

[5] cf. Jessner (2008: 41), on "attractor states" also de Bot et al. (2013: 210).

[6] Note that the verbs are inserted in a non-finite form not to mock foreigner speech but to reflect the fact that BV is a language without finiteness.

It seems that one of the driving forces that makes learners transcend the simple BV principles is the desire to represent events in an order that does not strictly follow chronology. As soon as this is the goal, in inflectional languages such as French, German, or Italian, verbal morphology is required for the appropriate tense marking (Klein & Perdue 1997: 331).

7.4.2 How can the Basic Variety be overcome?

The learners in the original research that lead to the concept of the BV were low-literacy adults learning mostly in untutored contexts. More recent research on adult foreign/additional language learning suggests that learner varieties that share important features of the BV also emerge in more literate learners, and also—if task complexity is high enough—in learners in tutored language learning situations (Benazzo et al. 2025: 61).

Learner varieties as potential attractor states are interesting in the context of the question of noticing and the dichotomy of implicit/explicit learning (Chapter 4). Why do some people not learn to inflect their verbs and nouns? How can we help learners notice that the syntax of German is not always SVO?

The research on the BV has shown that communication is possible with relatively simple, regular learner varieties that don't replicate all the complexities and irregularities (including the 'gunk') that characterize native speakers' utterances. Klein and Perdue see these BV regularities as reflecting principles of an innate human potential to create language. This view recalls the idea of innateness—although it is not identical regarding the nature of what is innate—within the generative approach (Chapter 5).

> [The Basic Variety] has definable shortcomings, though, and we assume that the attempts which the human language capacity makes to overcome these are largely responsible for all of this fabric which makes natural languages so opaque and so complex. The universal core is simple. But when it is transgressed, the complications begin. (Klein & Perdue 1997: 343)

Complication, in this view, needs grammatical functions such as tense, aspect, and the marking of categories such as person, number, etc.

We know that adult learners of second/additional languages *can* learn the corresponding (morphological or lexical) markings also in naturalistic situations. But second/foreign language teaching and learning research has taught us that their learning can be accelerated with adequate pedagogical means. For example, implicit focus on form allows the teachers to draw learners' attention to the

linguistic form—this can be done via input modifications such as input floods, or structuration of the input in terms of variation sets (Long 2007, Doughty & Williams 1998). This is far from old-fashioned 'pattern drill', as it still has a content/meaning component. Moreover, explicit instruction of less salient and complicated aspects of target language structure is efficient, as we have seen in Chapters 4 and 6.

In bilingual/CLIL teaching, instead of merely teaching in another language as if it were everybody's first language, occasional focus on form and metalinguistic re-mediation helps learners develop content and language knowledge (Gajo 2007: 568). Strategies by which to process input in a foreign language (*processing instruction*) can have a positive effect on grammar learning (van Patten 2002: 789).

7.5 Concluding remarks

Generativist grammar models grammatical competence as the domain-specific acquisition (parametrization) of abstract universal principles. Usage-based approaches use domain-general (i.e. not specifically language-dedicated) learning mechanisms to model the piecemeal learning of increasingly versatile constructions. The learner variety approach, in its assumptions, is more *linguistic* than the usage-based approach: the authors cited in this chapter assume the existence of a core human language making capacity that is dedicated to language. In this respect, their position is akin to the generativists' quest for language-specific principles discussed in Chapter 5. However, the nature of these principles, as demonstrated in this chapter, is less abstract—on the contrary, the principles are related to how we perceive and structure agency and temporal or physical relationships in real world events, and how we structure information when describing such events in discourse.

The main idea of this approach is thus to uncover such general principles not by theoretically postulating them, but by looking at emerging learner languages such as the BV.

Such varieties can be seen as an attractor state or as a form of fossilization in learners, as ~1/3 of the participants in the study by Klein & Perdue (1997) seem to fossilize at the level of the BV.

The BV is no longer a sufficient means of communication if the narrated events should be described according to other principles than linear chronology. Moreover, the simple constraints can be in conflict, which gives rise to transfer from L1, on the one hand, but also to the obvious need for a symbolic layer beyond

mere syntax in order to express several functional and semantic relations simultaneously.

Modern languages therefore must be more complex than the BV, since we need to express more complex relationships than can be put in a simple, linear order. At the same time, however, modern languages *could* indeed be simpler and much of the accumulated complexity and irregularity is not necessary for this. As soon as languages are used for speaking to strangers (Wray & Grace 2007), some of the complex features and irregularities they have accumulated over hundreds or thousands of years of in-group communication are dropped and regularized, since second language learners, as we have seen in the case of BV, try to keep things simple.

There are other authors who study simple systems to gain insight into the human language faculty. As an example, the creolist Derek Bickerton focused on pidgins and creoles to understand (generativist style) innate features of universal grammar (called a *bioprogram*, cf. Bickerton 1984: 173), whereas the functionalist Talmy Givón has coined the term *pragmatic mode* (Givón 1979: 207) in opposition to *syntactic mode* for relatively simple, oral varieties that fulfill communicative needs in contexts with substantial amounts of shared common ground among speakers.

Basic Variety can be considered as a young language on its way to a mature language, it is in this sense a perfectly respectable language. However, users of BV, also given their social class (which is usually rather low), are potentially stigmatized, as BV to some extent represents stereotypical *foreigner speech*.

Drift towards simpler languages? Why don't languages evolve steadily into simpler systems across time, as most of them are in contact with speakers of other languages?

Think of factors that act against such an evolutionary drift towards simplicity. A possible starting point would be the discussions that arise whenever there are attempts to reform the spelling systems of standardized European languages.

8 Code-switching: Using multiple languages simultaneously

Preview—Key points of this chapter

- Code-switching refers to the use of elements from multiple languages or varieties within a single utterance.
- There are different formal categories of code-switching, for example *insertional*, *alternational*, and *tag-switching*.
- Functions include filling lexical gaps, achieving efficiency, or providing cues as to how speakers position themselves and how the utterance should be interpreted.
- Formal theories propose *grammatical constraints* on switching.
- Certain types of switching involve *cognitive costs*, especially inhibiting the dominant language. Experience, balance, and habitual switching reduce such switching costs.
- There are important challenges to the concept: Dense code-switching blurs language boundaries and scholars advocating the notion of *translanguaging* question the usefulness of named languages.
- Teachers often endorse switching but may still negatively assess learner output involving switches.
- In the study of code-switching, structural, cognitive, and social factors intersect.

The introductory example (1) in Chapter 1 of this book featured instances of language switching: the multilingual child used words from a language other

than the base language of the conversation to refer to a concrete entity (cereals) and to the activity of making a phone call. Instances where two or more different languages or varieties (*codes*) are used in conversation have traditionally been called *code-switching*. Linguists have shown sustained interest in this phenomenon, both from more interactionist and sociolinguistic perspectives (Poplack 1980, Auer 1995), as well as from more theoretical (Myers-Scotton 1993, MacSwan 2009, Deuchar 2020) or psycholinguistic ones (Valdés Kroff et al. 2023, Kootstra 2015).

From the point of view of the methods used, the sociolinguistic tradition predominantly relies on elicited or observed, recorded and transcribed verbal behavior with relatively low control of contextual factors. The psycholinguistic investigation into constraints and cognitive mechanisms (costs, benefits) increases control by implementing experimental, lab-based research paradigms. Lastly, education-oriented research uses a wide range of methods from qualitative to quantitative, depending on the research question (see Gullberg et al. 2009 for more on methods and techniques in code-switching research).

There are different terms used in different scholarly networks to refer to similar behavioral patterns, and the different terms usually transport specific assumptions about and theoretical stances on the nature of multilingual competence and use. Such terms that are related to code-switching are *code-mixing, translanguaging, polylanguaging, code-meshing*, and there are certainly more being proposed as I am writing this chapter. I will stick to the term *code-switching* that is still the most frequently used in bilingualism and SLA research. The phenomenon has typically been observed and described in multilinguals' speech, but it may also be a feature of the written modality (Mbodj-Pouye & Van den Avenne 2007, van den Avenne 2013) .

8.1 Categories and functions

8.1.1 Insertional and alternational switches

Many scholars traditionally distinguish between switching languages above or below the level of sentences (inter- vs. intra-sentential code-switching). *Insertions* are single items (usually words) that are switched within sentences, whereas in *alternations* speakers switch back and forth for somewhat longer stretches—either within or between sentences. The examples (1)–(3) are from a corpus of multilingual speakers of Turkish as a heritage language and Dutch (Backus 2024). They illustrate insertional and alternational switches.

(1) Sonra bi çarşı-ya gid-ek ben para wisselen yap-ıyım
Later one mall-DAT go.FUT.1PL I money change.INF do-OPT.1SG
'After that we'll go to the mall, I need to change money'

(2) mesela okul-da iki tane kız da bana verkering
for.instance school-LOC two piece girl two me.DAT relationship
sor-du
ask-PAST.3SG
'For instance, two girls at school have asked me for a relationship.'

(3) Dus ik dacht van bu-nu bi netjes afmak-en yap-ıyım.
So I thought of this-ACC one nicely finish-INF do-OPT.1SG
'So I thought like I will finish this nicely'

Examples (1)–(3) are all examples of within-sentence code-switching.

Examples (4)–(5) show switching outside and between sentences. Small caps mark the switches from Spanish to English in example (4) and from Italian to German in example (5). Example (4) from Poplack (1980: 600) illustrates *tag-switching*, which is generally categorized as *extra-sentential* switching (602).

(4) Mi mai tuvo que ir a firmar y SHIT pa'
1SG.POSS mom have.PST.3SG that go.INF to sign.INF and shit for
sacarme, YOU KNOW.
take.out-INF.1SG, you know
'My mom had to go sign 'nshit to get me out, you know.'

And finally, example (5) extracted from a corpus of parliamentary speeches in the Swiss national parliament (Zumbach & Gföhler 2026) shows how an Italian-speaking member of parliament uses his minority language (which is one of the three working languages of the parliament) and the majority language German.

(5) È con piacere che mi appresto a difendere questo postulato. MIT DIESEM POSTULAT WIRD DER BUNDESRAT ERSUCHT, EINEN BERICHT ZU ERARBEITEN […]. (Conseiller d'état Abate, 26.11.2012)
'It is my pleasure to defend this postulate. With this postulate, the federal council is asked to prepare a report […].'

8.1.2 Communicative functions

Code-switching in both oral and written language can be a strategy that fills a vocabulary gap in one of the multilingual's languages, as was clearly the case in

example (1). Example (6) from the Swiss learner corpus (Hicks & Studer 2024) illustrates code-switching as an achievement strategy in a writing task in French as a foreign language (see also the discussion of the example from early simultaneous multilingualism (1) in Chapter 1). The unorthodox spellings are deliberately retained in the glossed examples.

(6) a. A la swiss y-a-t-il 8,200,000 de animal a maison ça
in DET.DEF.F *Switzerland* there-is 8200000 of animal at house this
cet une record.
is a record
'In Switzerland there are 8,200,000 pets, that is a record'

b. une chat trouve dans un mois 250,000 Schmetterlinge,
DET.INDEF.F cat find in a month 250000 *butterflies*,
50,000 Reptilien et 400 Mause.
50000 *reptiles* and 400 *mice*
'A cat catches in a month 250,000 butterflies, 50,000 reptiles and 400 mice'

c. ça três três viel.
this very very *much*
'That's very much'

The tokens printed in italics in the glosses are switches, either to English (*Swiss*—the English form might have been chosen as French <Suisse> sounds very similar to English <Swiss>) or to German. This category of code-switching is common in early multilinguals (see Chapter 6.2.1) and in second and foreign language learners. However, code-switching may occur for any other reason that makes access to a given word form in the repertoire faster or easier. I will discuss theoretical models that account for such factors below.

The main conversational functions of code-switching have been debated extensively in sociolinguistics. Broadly speaking, we can distinguish two sociolinguistic views of the phenomenon: an earlier one, often associated with the sociologist of language Joshua Fishman (Fishman 2005), construes the phenomenon as a relatively predictable function of the context of and the participants. Qualitative social and sociolinguistic research criticized such an approach, often pejoratively referring to it as assuming a "bucket theory of context" (Goodwin & Heritage 1990: 286). Such criticism led to the second view, represented for example by sociolinguist John Gumperz. It emphasizes the potential that code-switching bears for conveying conversational meaning, as the following quotation shows:

> Rather than claiming that speakers use language in response to a fixed, predetermined set of prescriptions, it seems more reasonable to assume that they build on their own and their audience's abstract understanding of situational norms, to communicate metaphoric information about how they intend their words to be understood. (Gumperz 1982: 61)

In example (5), the speaker starts out in his L1, a national minority language, as a means of conveying solidarity with his linguistic community. The speech was delivered in the small chamber (Conseil des états/Ständerat) of the Swiss national parliament where no interpretation service is available. All MPs are expected to understand the three working languages, German, French and Italian. Nevertheless, the majority language, German, is preferred for efficient persuasion in this context (Wyss et al. 2015: 644), and the inter-sentential switch can be considered a conversational way of affirming identity and membership of a national minority without compromising political efficiency.

Gumperz's conversational-analytic approach is discussed and expanded in Auer (1995: 123), where code-switching as a conversational *contextualization cue* is considered to fulfill similar functions to gesture, intonation or body posture in the "situated production and interpretation of language".

8.1.3 Code-switching in writing

While research on code-switching originated in the analyses of oral conversations among multilinguals, there is by now also a substantial body of research on writing. Above, we have already discussed examples from additional language learners' written productions that involve insertional switches. Code-switching and related phenomena, however, have been part of epigraphic, administrative, literary and private writing practices for a very long time (see e.g. Johanson 2023: 85, and Sebba et al. 2012 for a book-length discussion of different contexts).

Code-switching was a rather common feature of religious texts written in the vernacular languages, in particular in medieval England. Example (7) may serve as an illustration of the complex patterns found in such texts. I present a simplified discussion based on Critten & Dutton (2021: 20). The example stems from a 13th century text (*Ancrene Wisse*, 'Guide for anchoresses') that was written in English and subsequently translated into Latin and French.

(7) Apostolus: Christus dilexit ecclesiam et dedit semet ipsum pro ea. "Crist," seith Seinte Pawel, "luvede swa his leofmon thet he yef for hire the pris of him-seolven." Neometh nu gode yeme, mine leove sustren, for-hwi me

> ah him to luvien. Earst as a mon the woheth, as a king thet luvede a gentil povre leafdi of feorrene londe, he sende his sonden bivoren - thet weren the patriarches ant te proph[et]es of the alde testament - with leattres i-sealet. On ende he com him-seolven ant brohte the Godspel as leattres i-openet ant wrat with his ahne blod saluz to his leofmon, luve-gretunge, for-te wohin hire with ant hire luve wealden.
>
> 'The apostle: Christ loved the Church and gave himself for her. "Christ," says Saint Paul, "so loved his lover that he gave himself as the price for her." Now pay good attention, my dear sisters, why one ought to love Him. At first, like a man who woos, like a king who loved a noble, poor lady from a faraway land, he sent his messengers before—they were patriarchs and the prophets of the Old Testament—with sealed letters. Finally, He came Himself and brought the Gospel like letters patent and wrote a salutation with His own blood to His lover, a greeting of love to woo her and to possess her love.'

The English version (see example (7)) starts in Latin and switches to English to translate and interpret the Latin quotation from the Vulgate. Moreover, the *leattres i-sealet*, an institutional term of the royal administration, can be considered an insertional switch to French, and its counterpart *leattres i-openet* is linguistically somewhat hybrid as the French head noun is combined with a Germanic modifier while the syntax of the NP is French.

Code-switching and code-blending of this and many other types are observed in literary, scholarly and administrative writing in many European contexts. They are particularly well researched and documented in trilingual medieval England (Schendl 2012).

In literature, code-switching and code-mixing within a text are widely used tools that have different functions—from simply making speech authentic to inducing metaphorical meanings as in the conversationalist analyses discussed above. Many authors use alternational switches between dialects and languages especially in the direct speech of characters in plays, for example the famous literary *lingua franca* spoken by the Turks in Molière's "Le Bourgeois Gentilhomme". The same principle is also used in novels, such as the different languages used by literary characters in South African literature (Bandia 1996) or the different ethnic and regional dialects of English 'spoken' by characters of some of Twain's novels (Fisher Fishkin 1993, Berthele 2000). Such mixed texts either stage what we could refer to as polyglot dialogue (Posner 1991), where a specific literary character is assigned one variety or dialect consistently, or proper code-switching, as in example (8) from Adichie (2013: 80). The example ends with a Yoruba discourse

marker (Unuabonah & Oladipupo 2018: 11), which can be considered a tag-switch or a borrowing into Nigerian English—a decision that is notoriously difficult to make (Matras 2009: 113).

(8) The military hospitals still pay. Not that my pay will be enough for the rent, *sha*.

Purism, borrowing and insertional code-switching: The distinction between insertional switches and borrowings is notoriously difficult to make. Today, in many Languages Other Than English (LOTE), a tendency to integrate English expressions is observed. When switches become habitual, the words are considered to be *borrowed*: English has borrowed many French words at different times, from Old French *'bougette'* (small bag) that became *budget* to Modern French *bon appétit*.

The current tendency to mix in English words is often criticized, as for example in this French example from the newspaper *Le Figaro*:

"Anglicisms abound in our everyday conversations. These expressions are as ridiculous as they are useless." (*Le Figaro*, 14.8.2017, Translation RB)

Linguists disagree whether this is good or bad. While some consider such mixtures dangerous and detrimental (Hagège 2006: 82), most sociolinguists look down on such criticism as a form of conservative linguistic purism (Langer & Nesse 2012).

Among the anglicisms criticized in the article in the Figaro mentioned above are *opportunité* (instead of French *occasion*) or the verb *challenger* (instead of *mettre au défi*).

If French is not part of your multilingual repertoire: Are there similar purist tendencies in your language(s)? Can you describe examples that are clear cases of borrowings and instances that you would consider switches?

If French *is part of your multilingual repertoire:* Are these two items examples of borrowings or of switches? How can we decide? Should we decide at all? In both cases, you will find a detailed discussion of the borrowing—switching continuum in Matras (2009: 110).

Regardless of whether you master French or not: Look up the etymology of the English words *challenge* and *opportunity*. Who borrowed what from whom?

Private writing in many language contact contexts shows switches, not only of languages, but also of scripts (see Mbodj-Pouye & Van den Avenne 2007 for a detailed discussion of private written texts from Mali). An increasingly important written domain that shows high degrees of switching and mixing languages and dialects is private electronic communication via text messages and other messaging services and platforms. In particular in di- and polyglossic minority language situations, multilinguals tend to produce messages with rich and complex patterns of language switching (see the Romansh text messages collected and analyzed by Grünert 2011 and briefly discussed in Chapter 6.2.1).

The use of code-switching in writing can be analyzed following the linguistic and sociolinguistic approaches discussed in this chapter, enriched by the modality-specific possibilities as using different scripts or non-standard spellings.

8.2 The grammar of code-switching

From a more formal theoretical point of view, linguists have been very keen to understand the grammar of code-switching, that is, where and how people switch and what constraints there are on switching behavior.

8.2.1 Formal constraints on code-switching

Early approaches to code-switching formulated principles or constraints, mainly to understand how balanced bilinguals switch languages within clauses (Poplack 1980: 581). Among such theories was the *free morpheme constraint* which states that bound morphemes (such as bound markers of case inflection on nouns) may not be switched. Another example is the *equivalence constraint* that was framed in generativist terms of the time, assuming a difference between deep structure (the abstract grammatical representations, see Chapter 5) and surface structure:

> Code-switches will tend to occur at points in discourse where juxtaposition of L1 and L2 elements does not violate a syntactic rule of either language, i.e. at points around which the surface structures of the two languages map onto each other. (Poplack 1980: 586)

Another rather popular theory was proposed by Myers-Scotton (1993). It presupposes a grammar–vocabulary divide that is particularly important in many versions of generative grammar (see Chapters 5 and 6 for more on this). It furthermore postulates, firstly, that clauses have a *matrix language* that provides

the structure (including the functional morphemes), and secondly, that switches to the *embedded* language typically are insertions of content elements. This is certainly a possible framing of the insertional switches in examples (1) and (2).

Subsequent investigations of the grammar of code-switching tested different sets of grammatical constraints on corpus data (see Parafita Couto & Gullberg 2019 for an example) and analyzed increasingly complex patterns of language switching and mixing (Muysken 2000), while current approaches also involve more than two codes (Parafita Couto et al. 2023). The more data and language combinations were considered, the less categorically the grammatical constraints such as those discussed above seemed to apply (which does not mean that they do not still represent statistical tendencies). Some scholars have suggested *null theories* (Parafita Couto et al. 2023: 407), namely, theories that assume anything goes in code-switching, as long as principles of Universal Grammar (see Chapter 5) or the structures of the participating languages are not violated.

8.3 Code-switching in context

8.3.1 Input and external factors

From a usage-based perspective, no such thing as UG constraints or a strict separation of lexicon and grammar are presupposed, and, as discussed in Chapter 6.2.1, mixed utterances are analyzed within the unified vision of grammar as an emerging system that is initiated in fixed expressions and (mixed or unmixed) slot-and-frame patterns. No strong constraints that are intrinsically grammatical in nature are formulated. If predictions are made within the framework, they are based on frequency distributions in the input as well as on general cognitive processes applied to the input. For example, processing load in conversation may explain why tag-switching (example (4)) occurs regularly also in proficient multilinguals (see e.g. Matras 2009: 137 for a theory that appeals to higher cognitive demands that may trigger switches for utterance-modifying elements).

The exploration of the grammar of code-switching on purely linguistic–structural grounds misses external, situational modulating factors that shape multilinguals' production of mixed utterances. Muysken (2000: 244) discusses switching patterns found in different speech communities and suggests that the phenomena need to be interpreted in an integrated fashion, considering structural factors, linguistic dominance and proficiency, but also norms and attitudes within the communities.

8.3.2 Code-switching and language acquisition in simultaneous early multilingualism

In multilingual families, switching languages has been widely observed, both in parents and in the simultaneously bi- and multilingual children (Lanza 2001, Kremin et al. 2019, 2022, Byers-Heinlein 2013). Within the deficit views of bilingualism, code-switching was commonly considered a marker of lack of competence and thus something parents and children should avoid (see 10.3 for more on this). The idea that one person among the caregivers should use only one language with multilingual children (OPOL strategy, cf. Chapter 6.2.1) is also an attempt to reduce mixed language use in adult-child interactions.

As discussed above, within the domain of bilingualism studies, code-switching is considered a form of language use that is not a symptom of deficits but a sign of (bilingual, multilingual) competence and skill. As the examples from simultaneous multilinguals and multilingual learners of an additional language above have shown, code-switching can be both: a very skilled use of more than one language, but also an achievement strategy in the case of lexical gaps.

Investigations into early simultaneous bi- and multilingualism have shown that code-switching is a frequently used strategy in parents' interactions with their offspring. A study of 21 families in Montreal (Canada) has shown that parents mostly use alternations, that is, they switch between sentences. The main function of the switches was to ensure comprehension and to foster vocabulary learning (Kremin et al. 2022: 730).

While observational data is probably the most valid source of evidence, it is very time-consuming and rather intrusive to collect. Therefore, scholars have also used parental questionnaires to operationalize the amount of code-switching to which children are exposed. Questionnaire responses may then be associated with measurements of the linguistic repertoire, for example vocabulary assessments. This allows scholars to answer the question, very relevant for parents who are sometimes insecure about whether switching is good or bad, of the extent to which parental switching leads to better and faster multilingual acquisition. The evidence on the matter is inconclusive. Based on a sample of 181 bilingual parents who filled in a questionnaire on their language behavior, and vocabulary tests of the children, Byers-Heinlein (2013: 41) conclude that receptive vocabulary at the age of 1;5 years and productive vocabulary at the age of 2 years is smaller if parental switching is intense.

On the other hand, Kaushanskaya & Crespo (2019) published results from an investigation into 174 older (school-age) children. The scholars tested the linear associations of parents' responses to questions about switching behaviour and

standardized tests of core, receptive and productive language skills in both of the bilinguals' languages (English and Spanish, in an English-speaking environment). While English production was positively affected by parental switching, Spanish skills (core language, reception, and production) were shaped by an interaction of code-switching with working memory (see Chapter 14 for more on the importance of working memory in multilingual acquisition): in children with low working memory capacities, more code-switching coincides with lower language abilities, while in children with high working memory capacities, code-switching is positively associated with Spanish skills.

There are not enough studies from different linguistic, cultural and social contexts to answer the question about the influence of switching on learning. It is rather likely that the answer to the question as to whether parental switching is a problem or not is once again "It depends!"—it depends on the context, on the way switching is used, and on individual differences between mutlilingual children.

8.4 Code-switching and cognition

Even though many patterns of code-switching are ubiquitous in multilingual communities, there is evidence that code-switching remains cognitively costly in terms of processing. These switch costs can be modulated by linguistic and extralinguistic factors related to proficiency, experience, and social norms. In the next section I discuss studies that consider such individual differences in switching behavior as moderating factors when investigating the relationship between bilingualism and cognitive control (see also Valdés Kroff et al. 2023).

8.4.1 Switching costs

From a psycholinguistic point of view, investigating code-switching behavior adds to our understanding of the mechanics of multilingual language use. Scholars have investigated the cognitive correlates of switching behavior. Experimental investigations, where participants in a laboratory setting do tasks involving several languages (for example in a picture naming task, see e.g. Costa & Santesteban 2004) have yielded converging evidence that it is more costly (that is, reaction times are slower) to inhibit a dominant language (usually the L1 of multilinguals) than a non-dominant language (Meuter & Allport 1999). This effect tends to decrease if the repertoire is balanced, and there is also evidence that habitually engaging in conversations in more than two languages also decreases the switching cost (Meuter 2009: 27).

A classic paradigm investigating effects of bilingualism on cognitive functions is the Simon task, as used for example in Bialystok et al. (2004): participants need to respond to the color of a stimulus (e.g. a red vs. a blue rectangle) by pressing one of two buttons (left vs. right). In congruent trials, the stimuli are aligned with the button; in incongruent trials, the stimuli are closer to the wrong button that corresponds to the other color.

As I will discuss in more detail in Chapter 15, the analysis-and-control framework in bilingualism research suggests that bilinguals outperform monolinguals in the conflict condition as they are used to resolving the selection conflict between semantically or functionally equivalent elements of their two (or more) languages in the repertoire. In the context of code-switching, it is interesting to highlight the fact that some scholars who investigate this type of bilingual advantages argue that such effects are moderated by multilinguals' code-switching behavior and the balance between the languages in the repertoires.

As an example, in a study in the Algerian context, Kheder & Kaan (2021: 7) investigated the effects of language proficiency (in French) and self-reported code-switching behavior in the Simon task, and they found that if participants were highly proficient and habitually code-switched, they were better at conflict resolution in the incongruent trials. Another study of cognitive control tested participants in a monolingual and in several bilingual conditions which were induced via monolingual verbal stimuli or stimuli involving different types of switches. Hofweber et al. (2020) tested bilinguals' executive control functions by using the Flanker task (see Section 15.2 for an illustration and discussion). The findings of this study also suggest that code-switching experience, together with language dominance of bilinguals, affects performance in executive control tasks in a differentiated way.

> Balanced bilingualism may enhance proactive forms of control [i.e. involving latent co-activation of both languages/tasks/codes, RB] because balanced bilinguals favor complex intra-sentential codeswitches and exhibit greater consistency of codeswitching occurrences, whilst unbalanced bilinguals tend to limit switching to freely movable constituents […], and show less voluntary control of their switching behavior […]. (Hofweber et al. 2020: 19)

The quotation suggests that the interaction of proficiency and habitual switching types yields different effects on cognitive control. It is important to point out that – as is often the case in the bilingual advantage literature, see Chapter 15 – not all scholars agree and find the same effects of code-switching on executive control (cf., e.g., Kang & Lust 2019 on bilingual children).

8.5 Challenging the notion of code-switching

8.5.1 Dense code-switching

We have seen in example (1) that it is sometimes difficult to identify the language(s) to which specific words (or morphemes or multiword passages) belong. Muysken (2000: 5) uses the term *congruent lexicalization* or *dense code-switching* for mixed utterances in which it is difficult or even impossible to decide which code/language provides structure at all. This is particularly important for multilingualism involving closely-related languages or dialects (Chapter 12).

(9) Weet jij [whaar] Jenny is?
know.2SG you where Jenny is?
'Do you know where Jenny is?' (Dutch: *waar Jenny is*)

In example (9) (discussed in Muysken 2000: 5), Dutch and English share syntax, and key words such as the finite verb (*is*) are homphones in the two languages. Such difficulties tie in well with the critique formulated by scholars embracing the *translanguaging* approach (see also the discussion in Section 3.1.1).

8.5.2 Questioning the notion of code: Translanguaging

Using more than one code in teaching and learning languages is currently a rather fashionable topic in the field of language teaching. The current movement often uses the term *pedagogical translanguaging* to refer to the practice of using more than one code—or even the whole repertoire at the individuals' disposal.

> It is precisely because translanguaging takes up this heteroglossic and dynamic perspective centered on the linguistic use of bilingual speakers themselves, rather than starting from the perspective of named languages (usually national or state languages), that it is a much more useful theory for bilingual education than code switching. (García & Lin 2017: 4)

The translanguaging approach comes in weak and strong versions, the weaker one being less radically opposed to naming and identifying languages than the stronger one (Treffers-Daller 2024: 5). As I have argued in Chapter 3 and more extensively in Berthele (2021b), I believe that named languages and lects, even though it is sometimes admittedly difficult to identify and attribute them to specific linguistic manifestations, are still useful categories and reference points both in everyday language use and in scholarly work – provided they are not essentialized as absolute 'scientific' categories.

8.5.3 Code-blending in bimodal bilingualism

Another interesting challenge to the sequential analysis of bilingual speech as carried out in code-switching research comes from bimodal bilingualism. Bilinguals with sign languages and oral languages also use both languages in conversation, but due to their difference in modality, elements of the two languages do not need to be put in a sequential order: rather, they are uttered simultaneously. For example, Pyers & Emmorey (2008: 532) observed bilinguals speaking English and ASL at the same time, using facial expressions to encode grammatical information of ASL while also producing English orally. Various other scholars have described the simultaneous production of lexical items orally and in sign language, in particular in children of deaf adults (see Frederiksen & Kroll 2022: 3). Such bimodal bilingual behavior is called *code-blending*.

8.5.4 Evaluating code-switching

We have seen that code-switching characterizes the language use of both emergent and highly proficient multilinguals. From the point of view of *pedagogical translanguaging*, it is normal and valuable to draw on the whole repertoire in educational contexts (Cenoz & Gorter 2021: 14).

Even before the rapid rise in popularity of the term translanguaging, scholars engaged in the development of good language teaching advocated plurilingual practices in teaching. Such practices are deemed to overcome monolingual ideologies such as prohibiting the use of anything but the target language in foreign language teaching (Gajo 2007: 566). There is indeed evidence that switching languages in teaching, together with other multilingual strategies, not only does not harm target language learning, but can even have beneficial effects in particular on early-stage learners (Brown 2023: 1634; see also the discussion on vocabulary teaching in Chapter 11).

Many teachers seem to have acquired positive views of drawing on the multilingual repertoires in the (foreign) language classroom (see e.g. Haukås 2016). However, teachers seem to be in two minds about how to assess mixed utterances in the foreign language classroom:

> [W]hile teachers'attitudes toward code-mixing seem generally positive in the abstract, the attitudes tend to be negative when code-mixing pertains specifically to student performance and academic potential. (Park-Johnson 2020: 138)

This finding resonates with the results of an experimental study I conducted in the Swiss context where the multilingual teaching paradigm was already the

norm (Berthele 2012c): future primary school teachers (who are expected to teach English and French as foreign languages) in German-speaking Switzerland were presented with oral learner productions in French (as a foreign language), some of which contained insertional code-switches of the type illustrated in example (1) and some of which did not. In addition, the stimuli were attributed either to a immigrant boy ("Goran", L1 Serbian) or a Swiss boy ("Tim", L1 German). The results showed an interaction of the two conditions of presentation: while the immigrant boy with the Balkan name was assessed to have better French than the boy with the Swiss name as long as no code-switches were present, the insertional switches led to a significantly more negative assessment of the skills and the academic potential of the learner if the boy's name was "Goran" compared to "Tim".

8.6 Concluding remarks

Code-switching is a cover term for a variety of different verbal behaviors that all involve the integration of elements from at least two codes (languages, varieties) into utterances. This chapter can only give a rather superficial overview of the decade-long sociolinguistic, psycholinguistic and pedagogical investigations into the phenomenon. The domain of code-switching is one of the prime sites where descriptive-ethnographic and experimental research on the multilingual repertoire in use converge: as we have seen, the psycholinguistic correlates of switching behavior can be better understood if contextual and individual factors fostering or inhibiting mixing behavior are taken into account.

The tension between generally held positive views of mixing and multilingual repertoires and the actual assessment of mixed utterances is a good example of a paradox that many of us have to live with. As a multilingual professor in multilingualism, cross-linguistic influence and language mixing are my daily bread both in practice and as an object of study. But I realize that when writing texts such as this chapter in Academic English, I do not code-switch unless I want to give examples from other languages than English and, more generally, I am trying to inhibit interferences from my other languages and dialects as much as I can.

9 Vocabulary: Basic notions and metrics

Preview—Key points of this chapter

- Vocabulary is a core domain in L1/L2 learning and teaching. How can we count the *breadth* of vocabulary, that is the words in languages/speakers/texts and why do these estimates vary?
- Common problems, tools and formats of evaluating and testing vocabulary size are discussed for several languages:
  - What counts as a "word"? Units of analysis: Scholars distinguish between *tokens*, *types*, *lemmas*, *flemmas*, and *word families*.
  - *Lexical diversity* (LD) is measured via type-token-based metrics, some of which correlate well with human assessments (e.g. Guiraud's R).
  - *Lexical sophistication* (rarity) is operationalized via corpus frequency. It is often shown to develop rather slowly in young multilingual learners.
  - Lexical metrics and tests generally correlate with broader multilingual profile measures.
- There is a wealth of possibilities to describe learners' vocabulary, but the literature gives useful recommendations. Many free automatic tools can assist generating these metrics.

As Chapters 5, 6, and 7 have shown, there is fundamental disagreement in the field about the nature of grammatical competence and about the basic acquisitional mechanisms in the domain of grammar. Regarding vocabulary acquisition, we find strong claims about the innateness of concepts in early versions of

generative theory development (see Section 5.1). Assuming that many concepts[1] are already available in the child's mind, the meanings of words do not need to be learned, and all that remains to be done is learning of the names or labels for these concepts. This rationale feeds into the widely held belief that first language acquisition proceeds with breathtaking speed.

However, such views on first language acquisition can no longer be considered uncontroversial. As demonstrated in Chapter 3.2.2, word meanings, even in the case of unsuspicious words such as English *put* or German *legen*, are by no means universally shared across all languages. Today, regardless of the theoretical view on language acquisition/learning, nobody doubts that words need to be learned also in L1 acquisition, and that normally aging people continue learning words throughout the lifespan.

For second and foreign languages, surveys carried out with teachers systematically yield vocabulary learning/acquisition as *the* most useful topic—or one of the most useful—that should be addressed by research (see e.g. Macaro 2003 for such a survey). At our institute, we regularly probe teachers, learners, and parents regarding which aspects of language learning and teaching they would like to know more about. Vocabulary learning is consistently one of the top priorities in those surveys.

Moreover, when modern pedagogical ideologies ban vocabulary tests from the teachers' toolboxes, as is currently the case in some areas in French-speaking Switzerland, teachers complain about their lack of control over this crucial aspect of language learning:

> LP02: alors honnêtement (-) depuis que je fais plus ces évaluations euh de vocabulaire le niveau de vocabulaire il pfiou (-) il a descendu (–) MAIS (-) depuis qu'il y a Genial Click (1.5) et le quizlet (1.3) le quizlet ils adorent ça (-)
> 'so honestly, since I no longer do these vocabulary tests the level of vocabulary, it's just pff, it went downhill, *but* since there is Genial Click [refers to digital online learning materials] and Quizlet [the name of a widely used platform with online study tools], Quizlet—they love it'

The example quoted is a statement from a lower secondary school teacher of German as a foreign language in French-speaking Switzerland.[2]

[1] Scholars often consider conceptual representations in long-term memory and word meanings (lexical semantics) to be identical. This is problematic, as we will see in this chapter.

[2] See Peyer et al. (2023) for details.

Before addressing questions of learning/acquisition, this chapter first discusses fundamental notions in the vocabulary domain. Notions such as *word form, lemma*, *flemma*, and *word family* are clarified. Moreover, I give estimates of the size of vocabularies—both in languages and specific genres or use contexts. Finally, I discuss metrics of lexical diversity and sophistication that may be useful for research as well as for pedagogical purposes.

Donald Trump reportedly said "I know words. I have the best words."[3] Even though we may disagree with the author of this quotation in many ways, it is rather uncontroversial that knowing words is important, both in first and second/foreign/additional languages. But how many words are *many* words? How many words does a specific language have? When does a word *belong* to a language? Is *Computer* a German word, and is *email* a French word, or can only *courriel* be considered French? Do all languages have an equal number of words? And even worse: since some of us enjoy counting words, what is the basic unit we should be counting?

9.1 Vocabulary size of languages

9.1.1 Who has the most and the best words?

Some people hold strong convictions about the vocabulary size of certain languages:

> [English] certainly has the largest vocabulary [...] by a long, long, long long, way. Rather as China is to the rest of the world in population, English is in the population of its words. (Fry 2005)

Table 9.1 gives an overview of figures on the vocabulary size of languages, text genres, and speakers taken from Bogaards (1994), Aitchison (1993), Wikipedia (2026).

9.1.2 Word counts and typology

Obviously, for something to be countable, it needs to be identifiable as a distinct unit. As you probably knew or guessed, that is not an easy thing to do in the domain of words: What is a *word*?

[3] He said this at a campaign rally in South Carolina, 30.12.2015.

Table 9.1: Estimated number of words of languages, speakers, corpora

who/what	language	subset	value	no. words
L1 speakers	Dutch	receptive vocabulary of an adult	min	55,000
L1 speakers	Dutch	receptive vocabulary of an adult	max	70,000
L1 speakers	English	needed to understand 75% of spoken everyday language	count	800
L1 speakers	English	understand dialogues in film	count	3,000
L1 speakers	English	educated speaker	min	4,000
L1 speakers	English	educated speaker	max	10,000
L1 speakers	English	receptive vocabulary of students	count	37,000
L1 speakers	English	receptive vocabulary of an educated adult	count	150,000
L1 speakers	French	the whole works (Racine, Baudelaire)	count	4,000
L1 speakers	general	informal conversation	min	400
L1 speakers	general	informal conversation	max	800
L1 speakers	general	typical knowledge in native speakers	min	15,000
L1 speakers	general	typical knowledge in native speakers	max	20,000
L2 speakers	French	Français fondamental	count	1,000
L2 speakers	German	Zertifikat Deutsch (B1)	count	2,000
L2 speakers	general	waystage level (A2): word lists	count	1,000
L2 speakers	general	threshold level (B1): word lists	count	2,000
L2 speakers	general	words after 5 years of instruction	min	2,000
L2 speakers	general	words after 5 years of instruction	max	3,000
L2 speakers	general	advanced learners	min	5,000
L2 speakers	general	advanced learners	max	10,000
dictionaries	Chinese	Hanyu Da Cidian	count	370,000
dictionaries	English	Merriam Webster Basic English	count	33,000
dictionaries	English	Webster's	count	470,000
dictionaries	English	OED	count	600,000
dictionaries	Esperanto	Plena Ilustrita Vortaro de Esperanto	count	16,780
dictionaries	Finnish	Finnish: RedFox Pro	count	800,000
dictionaries	French	Littré	count	132,000
dictionaries	French	Larousse	count	135,000
dictionaries	French	Petit Robert	count	300,000
dictionaries	French	Grand Robert	count	500,000
dictionaries	German	DaF Wörterbuch (DUDEN)	count	20,000
dictionaries	German	DUDEN das grosse Wörterbuch	max	200,000
dictionaries	Korean	Online dictionary (Urimalsaem)	count	1,149,538
dictionaries	Tamil	Online dictionary (Sorkuvai)	count	1,533,669
dictionaries	Quechua	Quechua dictionary	count	20,000
dictionaries	general	large dictionaries	min	50,000
dictionaries	general	large dictionaries	max	70,000
languages	English	estimate of total	min	450,000
languages	English	estimate of total	max	600,000
languages	French	estimate of total	min	100,000
languages	French	estimate of total	max	700,000
languages	German	estimate of total	min	300,000
languages	German	estimate of total	max	500,000

(1) Hesch-u-s scho khör-t?
have-you-it.ACC already hear-PTCP
'Have you already heard it?'
(in Sensler Swiss German)
3, 4 or 5 words?

(2) Y'en a marre!
Il y en a marre!
it there of-it has enough
'It is enough!'
3, 4 or 5 words?

(3) Vas-y!
go-there
'Go for it!'
1 or 2 words?

These examples show that spoken (often colloquial and dialectal) language can be particularly complicated to analyze, unless one 'standardizes' it following the rules of the corresponding written norms. Examples (4)–(5) from Mapudungun, a language spoken in Chile and Argentina, show how difficult it becomes to distinguish between words and clauses or sentences in polysynthetic languages:[4]

(4) Ina-yaw-l-ke-rke-la-a-fu-i.
follow-PERAMB-APPL-HAB-REP-NEG-FUT-RI-IND.3SBJ
'[He] would not be used to going around following [her], they say.'

(5) Ütrüf-naküm-kunu-rke-i epeko.
throw-descend.CAUS-leave-REP-IND.3.SBJ mirror
'S/he threw the mirror down and left it there, they say.'

In such polysynthetic languages, a word is often the same as a clause. Remember the usage-based view of language stored in long-term memory in the form of a constructicon (see Section 6.1): unlike the words-and-rules approach, the usage-based assumption is that there is no categorical line between words and grammar. But even if we accept this view, the question of how to define, find, and count the basic units of language remains tricky.

I will not discuss the many rather variable definitions of words in different linguistic traditions. An influential definition by Bloomfield is the following:

[4] See Zúñiga (2019: 3) for more details on this and other polysynthetic languages.

> A free form which consists entirely of two or more lesser free forms, as, for instance, *poor John* or *John ran away* or *yes, sir*, is a *phrase*. A free form which is not a phrase, is *a word*. A word, then, is a free form which does not consist entirely of (two or more) lesser free forms; in brief, a word is a *minimum free form*. (Bloomfield 1935: 178)

Of course, the field has evolved since Bloomfield, but it is interesting that even the most recent attempts to define the word share important conceptual structure with Bloomfield's classical definition (see e.g. Haspelmath 2023: 290).

In modern written languages, the words are often identifiable as characters between spaces, but we have to keep in mind that typographic conventions do not necessarily reflect scholarly definitions, and many dialects and languages are hardly ever written at all. As there is no universally accepted definition of the category *word*, all figures in this chapter must be taken with a pinch of salt.

9.2 Estimating the vocabulary size of individuals

9.2.1 Different subsets of words

Vocabulary studies generally distinguish between productive and receptive vocabulary. Moreover, we can distinguish between words that are already learnt and used at the time of testing and words that can be spontaneously understood (and also produced). This latter category is the *potential* vocabulary (Bogaards 1994: 101).

1. *Receptive vocabulary*: The set of words a speaker is familiar with; she/he can assign at least one correct meaning to the elements of the set.
2. *Potential vocabulary*: An additional set of words whose items a speaker may not have encountered yet but that can be inferred (from context, via other elements in the same language, via elements in another language).

Although the literature normally just mentions potential vocabulary from the receptive point of view, I would argue that we can also create (real or newly invented) words based on our morphological knowledge of the target language. As a simple example, compound nouns in German can be easily created on the spot, based on knowledge of the two words that are glued together, and applying the rule that the second part gives the lexical profile to the new entity:

(6) Leser
'reader(s)'

(7) Wunsch
'wish, desire'

(8) Leserwunsch
reader-wish
'A wish from the reader(s)'

As I was preparing this chapter I made up the word in (8) as an example of an *ad hoc* creation. When checking later, I discovered that the word actually exists, according to a widely used dictionary (Duden Wörterbuch 2026). Either way, such morphologically transparent 'new' words can be considered items of a speakers' potential *productive* vocabulary.

Table 9.2 illustrates the two orthogonal dimensions of *reception/production* and *potential/observed* word knowledge. Figure 9.1 schematically shows the difference in size of the different kinds of word knowledge in a multilingual speaker.

Knowing derivational patterns in a language allows users to expand their vocabulary knowledge without having to learn words item-by-item.

However, as often in natural languages, the rules apply systematically (9) except for when they don't (10):

(9) buvable, mangeable, aimable (French)
drink-able, ed-ible, love-able

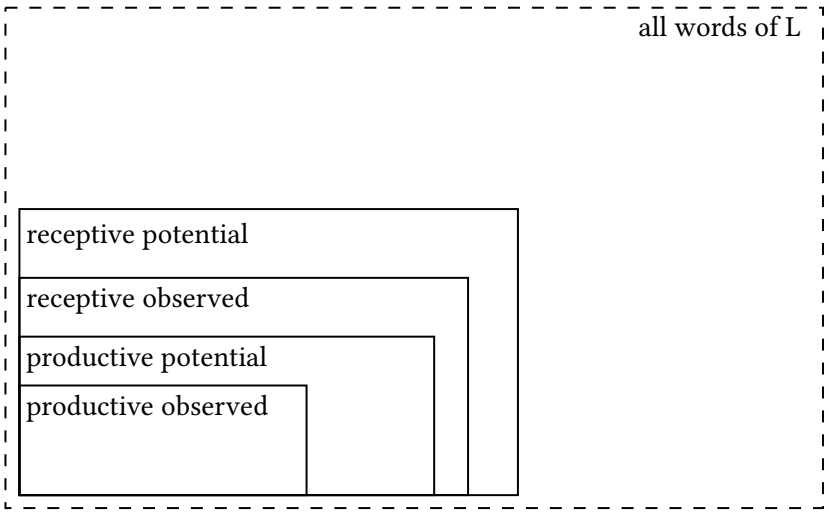


Figure 9.1: Subsets of vocabulary of a model speaker of a language L

Example (10) shows that the equivalent morphological rule with the suffix {-bar} only partially applies to German. German equivalents to French *aimable* would be *liebenswert* or *liebenswürdig*.

(10) trinkbar, essbar, *liebbar (German)
drink-able, ed-ible, love-able

Table 9.2: Different kinds of word knowledge

mode	potential	observed
reception	inferrable words (e.g. via context, interlingual links)	familiar words (one correct meaning known)
production	*ad hoc* creations using regular morphological patterns	familiar words used correctly in oral/written texts

As a pedagogically relevant example of potential receptive vocabulary, we can focus on cognate words that are formally similar (or identical) across languages. This is one of the reasons closely related languages may be understood without (much) learning (*receptive multilingualism* or *intercomprehension*). Example (11) is from one of our studies of spontaneous interlingual inferencing in multilinguals who do not speak the target language (here, the Sursilvan variety of Romansh) but who master other, related languages (here, Italian and French):

(11) What is the meaning of the Romansh word *liug*?
→ "lieu" ('place')
interlingual pathway: via *luogo* (Italian) – *liug*[5]

9.2.2 The word gap: Input and social stratification

There is no doubt that the quality and quantity of input is associated with individuals' vocabulary sizes—both in their first and additional languages. A seminal (and controversial) study of input, exposure and vocabulary size is Hart & Risley (1995).[6]

This study was criticized on various grounds (method, constructs, etc.). The jury is still out (Sperry et al. 2019, Purpura 2019), but in my view there is rather

[5]Berthele (2011), Berthele & Lambelet (2009), see also Chapter 12.

[6]"By kindergarten, a child from a welfare family could have heard 32 million words fewer than a classmate from a professional family" (Hart & Risley 1995: 198).

Table 9.3: Words in the input according to Hart & Risley (1995: 197)

social class	words/hour	words/year
professional families	2153	11 million
working class	1251	6 million
welfare families	616	3 million

convincing evidence that, first, the composition of the vocabulary across different social classes is *different* and, second, that vocabulary also differs in size as suggested by Hart and Risley.[7] In a study on Turkish-German bilingual children from both higher and lower socio-economic backgrounds, Korecky-Kröll et al. (2016: 83) report once again different lexical richness of input in higher status families, but also more parental recasts and other forms of corrective feedback (see Chapter 4.5.1).

9.2.3 Testing vocabulary size

There are (more or less standardized) tests available to assess the vocabulary size of children and adults. A widely used tool to test children is the *Peabody Picture Vocabulary Test* (PPVT, currently in its fifth edition for French and in its fourth edition for English and German; Dunn et al. 2007).[8] The PPVT tests receptive vocabulary, not production. It is normed for children aged 2;5 years to adults in English and in many other languages. The test is very easy to administer: the examiner says a target word and the test-takers are asked to identify the picture that represents a target word among four alternatives (e.g. 'baby').

Other relatively simple ways to test vocabulary size are lexical decision tests, as used for example in the first section of the DIALANG language assessment system (Alderson & Huhta 2005). There are tests available for English, German, and Dutch (Lemhöfer & Broersma 2011), for French (Brysbaert 2013), and probably for more languages.

In these tests, the test taker has to decide whether a target item is a word of the language in question or not.

We have used such tests (and designed a similar one for Italian) in different research projects, and we have found that the scores correlate well with other assessments of the multilingual repertoire, such as the bilingual language profile (BLP; Bonvin et al. 2023).

[7] See e.g. Willingham (2018) and the references cited therein and Table 9.1.

[8] Lenhard et al. (2015) is the German version, Dunn (2020) the (Canadian) French one.

9.3 What is the appropriate unit of analysis?

When describing words of a language, a text, or the words an individual knows, the unit of analysis needs to be spelled out in a more unambiguous way than the simple reference to *words*.

> We need to know, for example, whether different inflected forms (*reads, reading, read*) or derived forms (*reader, readability, unreadable*, etc.) are counted as different tokens of one type or as different types. Under the first approach the unit of analysis is the lemma and under the second approach, it is the word family. (Treffers-Daller et al. 2018: 2)

The units the literature in applied linguistics and SLA research commonly uses are the word form (or token), the lemma, the flemma, and the word family:

(12) word form, token *[he] runs*
run, *runs* → two word forms

(13) lemma *to run*: includes *run, runs, ran, …*
to run (verb), *the run* (noun) → two lemmas

(14) flemma *run*: verb or noun
but *the run*, *the forerun* → two flemmas

(15) word family *run*: *run, runs, ran, …, running, the run, runner, outrun, forerun, …*

As we will see below, these different categories are useful when describing the number of words one needs to know to read a text in a target language (termed *text coverage*) or to formulate pedagogical goals.[9]

The *flemma* is similar to the *lemma*, but it does not distinguish different parts of speech (the term stands for 'form-equivalent lemma'):

> Flemmas are a more recent classification type and are similar to lemmas but do not take part of speech into consideration (record and records would make up one lemma as a noun, and record, records, recorded, and recording would make up another lemma as a verb. However, the items in both of these lemmas would be included in one flemma. (Webb 2021: 941, see also Laufer 2021)

[9] For example statements such as this one: "After the first year of target language instructions, learners should be able to recognize the 1,000 most frequent word families."

There is a long-standing debate about the best way to describe vocabulary requirements: should we enumerate and quantify the word families learners need to know to be, for example, 'independent language users'? Or should we list the lemmas? Or the flemmas? In a talk in 2022, Cobb (2022) concludes that word families are pedagogically the most valuable category, as they relate well to commonly used tests and make relatively good predictions of the readability of texts for second language learners. On the other hand, some people have argued that word families contain also rather uncommon and rare words that might confuse learners (*boyish* in the family *boy*). Regarding this argument, Cobb's analysis shows these words are rarely used and do not cause any trouble for learners. He suggests that family-based word lists are useful but should only be presented to the learners after some processing (i.e. filtering out the low-frequency members of the family).

9.3.1 Lexical diversity and sophistication

Scholars and teachers often want to assess written or oral productions (texts) as regards vocabulary. For instance, a metric is needed to describe the number of different words (lemmas, maybe also word families) used by a language user. Moreover, the kind of words selected by the user may be of interest for research or assessment purposes. The following two texts can serve to illustrate differences regarding both analytical dimensions. We will take a look at lexical diversity first.

Lexical diversity: Intuitions and metrics

1. Read the example texts (16) and (17). Which one is richer in terms of the vocabulary used?
2. When you try to assess the lexical richness/diversity of the texts, what kind of words are useful indicators of high/low richness?
3. Analyze the two texts with the frequency tool on the lextutor and/or on the lognostics page (Cobb & Ball n.d. webpage: https://www.lextutor.ca/freq/eng/ and Meara 2018, webpage: http://www.lognostics.co.uk/tools/V_Words/V_Words.htm)
4. Compare the results. Do you recognize any problems in the way the words (in particular the types) are counted by these tools?

Figures 9.2 and 9.3 show each lemma as a dot, plotted according to the frequency in the text (y-axis) and the rank of the word in the list of words used (x-axis). Looking at the right-hand tail of the distribution in the two figures 9.2 and 9.3, you will notice that there is not an equal number of lemmas used: the right tail in Figure 9.3 is shorter, even though the text is slightly longer. This means that many lemmas in this text tend to be repeated (a lot, compared to the other text). The lexical diversity of this text is considerably lower than that of the first text.

Example text 'A song of opposites' 179 tokens

(16) Welcome joy, and welcome sorrow, Lethe's weed and Hermes' feather; Come to-day, and come to-morrow, I do love you both together! I love to mark sad faces in fair weather; And hear a merry laugh amid the thunder; Fair and foul I love together. Meadows sweet where flames are under, And a giggle at a wonder; Visage sage at pantomime; Funeral, and steeple-chime; Infant playing with a skull; Morning fair, and shipwreck'd hull; Nightshade with the woodbine kissing; Serpents in red roses hissing; Cleopatra regal-dress'd With the aspic at her breast; Dancing music, music sad, Both together, sane and mad; Muses bright, and muses pale; Sombre Saturn, Momus hale; Laugh and sigh, and laugh again; Oh, the sweetness of the pain! Muses bright and muses pale, Bare your faces of the veil; Let me see; and let me write Of the day, and of the night Both together: let me slake All my thirst for sweet heart-ache! Let my bower be of yew, Interwreath'd with myrtles new: Pines and lime-trees full in bloom, And my couch a low grass-tomb.

Example text 'I have a dream' 183 tokens

(17) I Have a Dream, a song to sing; To help me cope, with anything; If you see the wonder, of a fairy tale; You can take the future, even if you fail; I believe in angels; Something good in everything I see; I believe in angels; When I know the time is right for me; I'll cross the stream, I Have a Dream; I Have a Dream, a fantasy; To help me through, reality; And my destination, makes it worth the while; Pushin' through the darkness, still another mile; I believe in angels; Something good in everything I see; I believe in angels; When I know the time is right for me; I'll cross the stream,; I Have a Dream; I Have a Dream, a song to sing; To help me cope, with anything; If you see the wonder, of a fairy tale; You can take the future, even if you fail; I believe in angels; Something good in everything I see; I believe in angels; When I know the time is right for me; I'll cross the stream, I Have a Dream

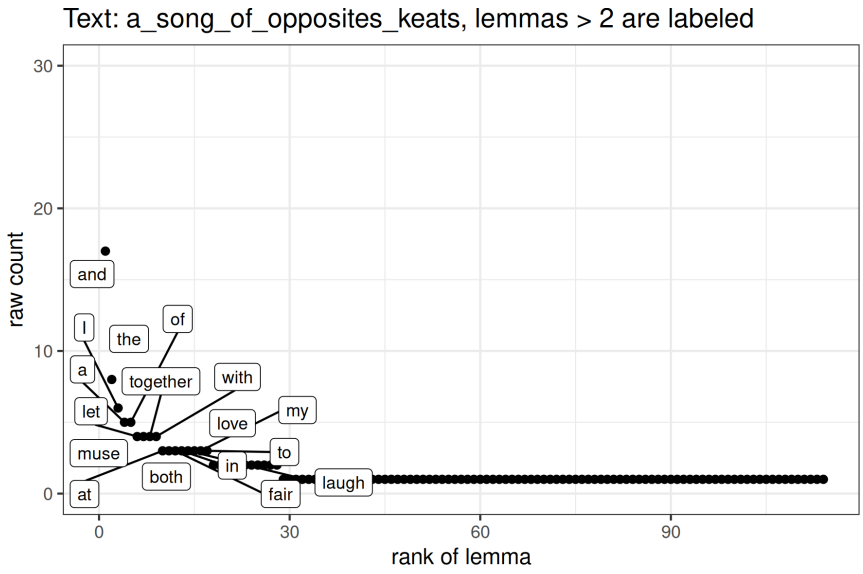


Figure 9.2: Rank and frequency of the words of 'A song of opposites'(John Keats)

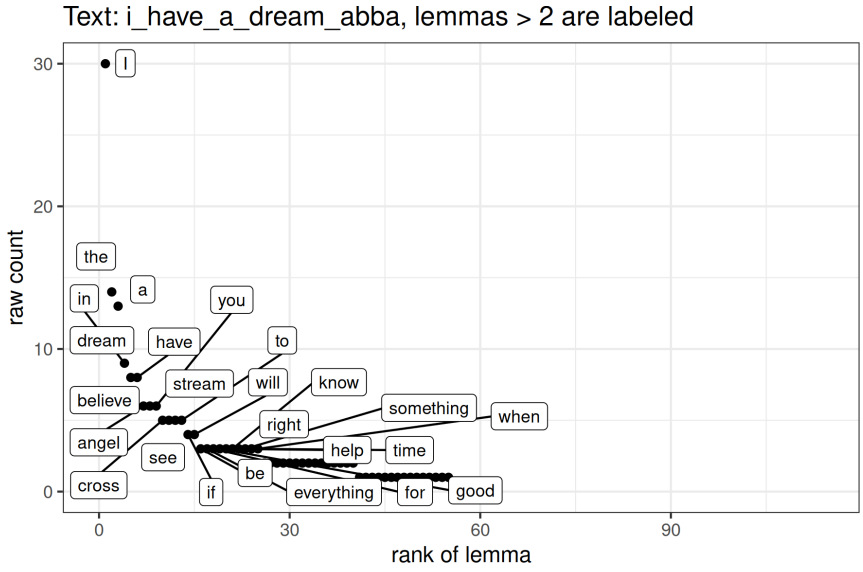


Figure 9.3: Rank and frequency of the words of 'I have a dream' (Benny Andersson, Bjoern K Ulvaeus)

9.3.2 Zipf's Law

We have already encountered a law discovered by Zipf in Chapter 6. Here is another observation that was popularized by the same statistician: words in a natural human language show a characteristic frequency distribution that can also be found elsewhere in environments shaped by humans (e.g. income distributions). The law describes an inverse relation between rank and frequency: there are a few very high frequency words that account for a large proportion of the tokens in most texts (words such as "a", "the", etc.), and there are many low frequency words (the right-hand tail of the distribution). The law can be mathematically formulated as in Equation 18.

(18)
$$p(word) = \frac{1}{rank}$$

We can use this function to predict word frequency based on the rank order in a given corpus of lemmas (the words printed in red in Figures 9.4 and 9.5). The words printed in black in the figures show the actual measured corpus frequencies. Especially in very large corpora the distribution matches the prediction rather well.

9.3.3 Comparing vocabulary metrics across authentic texts

In the following sections, I provide examples for vocabulary analyses of authentic texts. I use texts from the HELASCOT[10] corpus. We elicited these texts in an investigation of the development of literacy skills of primary school children in German- and French-speaking Switzerland (Berthele & Lambelet 2017). A particular focus was on the Portuguese children in the samples, for sociological and linguistic reasons: sociologically, the majority of Portuguese immigrants in other Western European countries are often described as less educated and more return-oriented than other groups (Fibbi et al. 2010: 98). Educational family background is robustly associated with educational success, including the acquisition and learning of literacy (remember Table 9.3) not only but also in the local language. From the acquisitional point of view, we were interested in testing the hypothesis that acquiring French literacy should be easier for speakers of a Romance L1 than learning German (including Swiss German).

[10]Heritage and School Language Literacy Development in Migrant Children; available from the SWIKO corpus (Institute of Multilingualism 2017, write to the administrator to get a user account if interested), https://ifm-swiko.unifr.ch/.

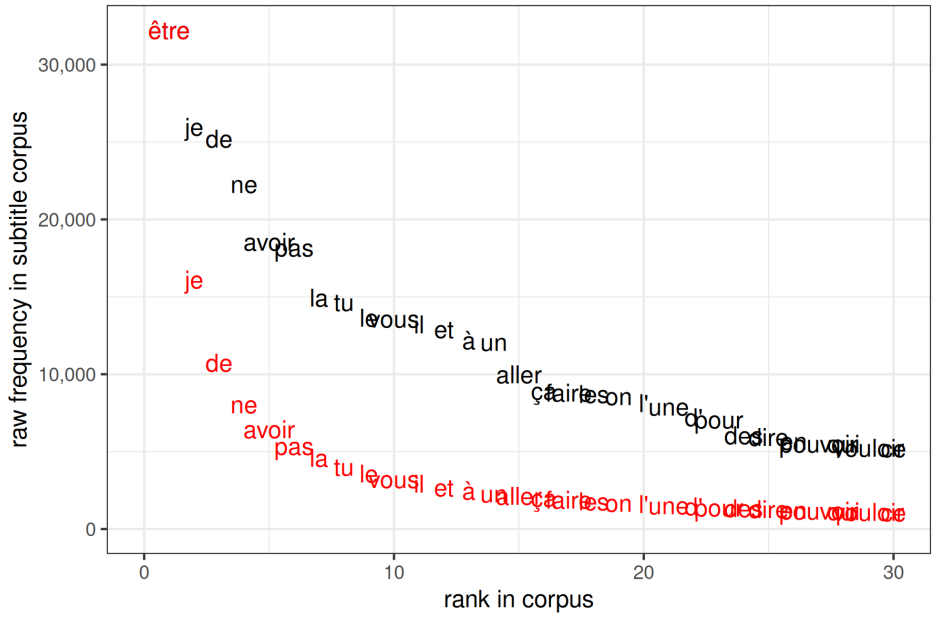


Figure 9.4: Spoken French: Lexique3 corpus (film subtitles)

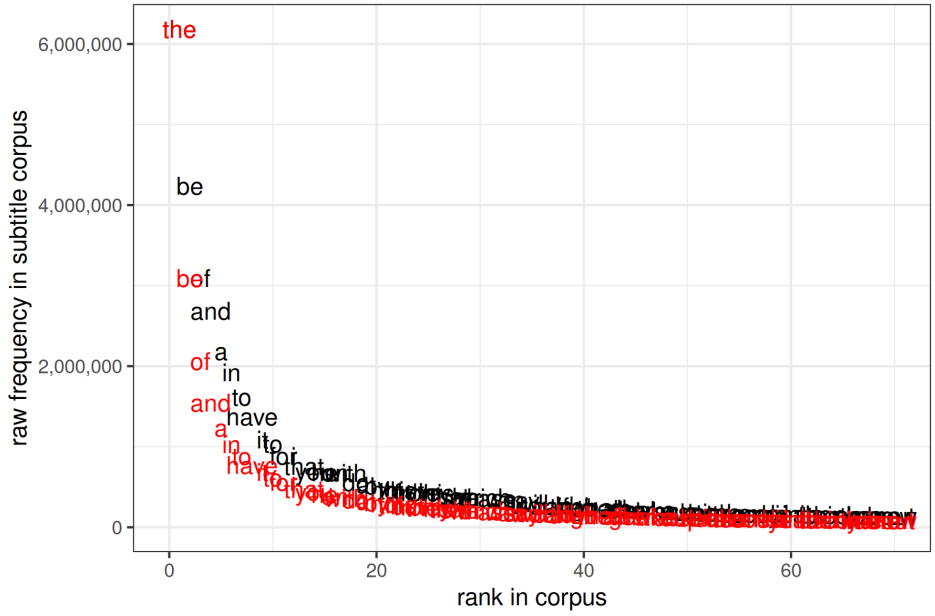


Figure 9.5: English: BNC corpus

The language proficiency in this longitudinal study (roughly 2 years, between Autumn 2012 and Spring 2014) was tested via C-Tests, reading comprehension tests, and two essay writing tasks. All tests were designed to match the learning outcomes formulated in the Swiss curricula. We measured the pupils three times; T1 was at the beginning of 3rd grade, T2 at the beginning of 4th grade, and T3 at the end of 4th grade. The participants were aged between 8 and 10; there were 108 Portuguese children in French-speaking Switzerland, 88 Portuguese children in German-speaking Switzerland, and three comparison groups (N=75 in French-speaking Switzerland, N=79 in German-speaking Switzerland, and N=75 in Portugal).

Texts A and B are two examples produced by two different children in this sample.[11] Below I calculate different lexical diversity metrics for these texts.

Text A: Liebe Tante, ich reise lieber mit dem Flugzeug, weil ich dann in der Luft bin. Und mit dem Flugzeug kommt man auch schneller vorwärts als mit dem Auto. Wenn man in einem Flugzeug sitzt, geht es zum Beispiel Stunden und wenn man im Auto sitzt, dauert es etwa Stunden. Im Flugzeug kann man über das Meer fliegen kann. Und mit dem Auto kann man nur überLand fahren. Liebe Grüsse, Daniel.

Text B: Liebe Tante, ich gehe lieber mit dem Flugzeug, weil es schneller geht, weil es mehr Spass macht, es ist bequemer. Liebe Grüsse, Daniel.

9.3.4 Type-token based lexical diversity metrics

Most diversity metrics distinguish between tokens (the individual word forms one can count in a text, whether repeated verbatim or as instances of a lemma/flemma/family) and types (groups of word forms, e.g. lemmas, flemmas or word families). The following examples show how different variants of type-token based metrics yield different rankings for the two example texts. If you need to

[11] Note that all children in this corpus are called 'Daniel'. I don't translate the example texts in this chapter, as the counts discussed do not require actual comprehension of the texts. If you do not master the languages, I am sure you are familiar with online tools that help translating them.

know more about how to assess lexical diversity, you can find interesting analyses and further references in the work by Jeanine Treffers-Daller and colleagues (Treffers-Daller et al. 2018, Daller et al. 2003).

The type-token ratio (TTR; see Table 9.4 for the values based on our example texts) is the most basic way of calculating a text's lexical diversity. The formula is given in Equation 19.

(19)

$$\frac{\text{number of types (n.typ)}}{\text{number of tokens (n.tok)}}$$

The *type-token ratio* (TTR) is based on two counts: the tokens (*n.tok* in 9.4) are the number of words (strings between blanks and/or punctuation), and the types *n.typ* are the number of *different* forms of these words. If a word form is repeated, it counts as one type: *es* in Text B is one type, repeated three times, i.e. three tokens.

If TTR is taken as a measure for lexical diversity, the analysis suggests that text B is richer than text A. As we will see, this is not a good analysis.

Scholars in the field generally recommend lemmatizing the texts before lexical diversity measures are generated. Lemmatization refers to a process of "grouping together different forms of a word by erasing affixes" (Treffers-Daller et al. 2018: 2). This 'grouping' is often rather complicated, e.g. when these forms are very different and do not share a common root:

(20) French lemma *aller*: contains inflected forms such as *allons, vais, irai*, ...

Moreover, as we have seen above, tokens found in a text can be grouped on the level of the lemma (*n.tok* in Table 9.4) or flemma (e.g. the lemma *aller*) or on the level of whole *word families*.

The lemmatization of the two texts can be done manually or automatically. For the following analyses, the lemmatization was done using the software TreeTagger (Schmid 1995, n.d.).

The following measures of lexical diversity all try to account for the problem that with increasing text length, the pure type-token ratio is lowered—because some words will unavoidably be repeated (remember Zipf's law...). Thus, when comparing texts of different lengths, the pure TTR is not a good metric as it punishes those who write longer texts.

A simple index that is often used to describe the lexical diversity while taking into account the effect of variable text length is *Guiraud's R* or *Guiraud index* (*Guir* in Table 9.4). It is calculated as follows:

(21)

$$R = \frac{\text{number of lemmas (n.lem)}}{\sqrt{\text{number of tokens (n.tok)}}}$$

This index suggests—in contrast to the uncorrected TTR—that text B is more lexically diverse than text A.

HD-D is a metric that is sometimes used instead of TTR or Guiraud index. It also assesses how repetitive words are used in a text by calculating the probability for each word type in the text to be among 42 randomly sampled word forms of the text. This metric is not independent of text length; it increases with longer texts (see Treffers-Daller et al. 2018: 3 for more on this and other metrics).

The *Measure of Textual Lexical Diversity* (MTLD) is also a type-token based metric of lexical diversity (LD) in texts. It calculates the average length of groups of words in the text whose TTR remains above a certain threshold (typically 0.72). Imagine you're reading the text word by word and calculating the TTR each time a word is added:

> For example, …of (1.00) the (1.00) people (1.00) by (1.00) the (.800) people (.667) for (.714) the (.625) people (.556) …and so forth. However, when the default TTR factor size value (here, .720) is reached, the factor count increases by a value of 1, and the TTR evaluations are reset. (McCarthy & Jarvis 2010: 384)

So, for the example given, MTLD would count words until it reaches the threshold and then start counting a new group. This process continues throughout the text. At the end, the total number of words of the text is divided by the count of these bundles of words. Then, the whole procedure is repeated backwards, and the mean of the two values is calculated. The higher the final value, the more diverse the text. This may sound very complicated, but there are computer programs that do the work for you, e.g. the koRpus package (Michalke 2020).

The MTLD, interestingly, decreases with increasing text length, and the method is generally not recommended for texts that are shorter than 100 tokens (Koizumi 2012).

Another metric of lexical diversity is Malvern and Richards' *vocd-D*, a method that uses increasingly long random samples of words from a given text (McCarthy & Jarvis 2010: 383).[12]

[12]Note that you can directly feed text into a vocd-D analysis on the lognostics page: Meara & Miralpeix (2018), http://www.lognostics.co.uk/tools/D_Tools/D_Tools.htm.

Table 9.4: Different metrics of lexical diversity for texts A and B

text	n.typ	n.tok	n.lem	TTR	TTR.lem	Guir	HDD	MTLD
A	42	74	39	0.57	0.53	4.53	27.11	26.88
B	19	23	17	0.83	0.74	3.54	17.00	23.84

The values produced by Guiraud index, HD-D, and MTLD suggest a higher lexical diversity in text A than text B, in contrast to the simple TTR (lemmatized or not). When calculated for many texts, metrics such as Guiraud index, HD-D, MTLD, etc. are highly correlated, and there is not a single metric that is the best one. I have developed a preference for Guiraud index, as it is relatively simple to calculate and it seems to correspond well to human ratings of the lexical richness of texts (Vanhove et al. 2019).

9.3.5 Lexical sophistication

Describing the variability of vocabulary use just by counting different lemmas misses some important distinctions. Take a look at the following examples that have the same diversity scores:

(22) a. the barge glides over the chasms
b. the boat travels on the water

Despite having the same type-token ratio, the examples are clearly not equally *lexically sophisticated*.

The TTR-based measures discussed above all are measures of lexical diversity. The second important aspect of a quantitative description of lexical choices is the relative *rarity* or *sophistication* of words used in texts.

In the aforementioned study of school children in French- and German-speaking Switzerland, the focus was on examining lexical diversity and lexical sophistication in the children's written production—both in their language of instruction (French or German) and in their L1 (here: Portuguese). As we have seen, lexical diversity refers to the number of different words used in the text, while lexical sophistication relates to the type of words chosen by the multilingual authors. The latter is typically operationalized by looking up the frequency of the words used by the participants in a reference corpus: a comparatively high percentage of rarer words suggests a more sophisticated, elaborate word choice.

Therefore, in the following, we use corpus frequency to operationalize the level of sophistication (Bonvin et al. 2018: 136).

Lexical sophistication involves "simple counts of the number of rare types and the number of rare families" (Treffers-Daller et al. 2018: 4). Let us look at two more texts from the corpus of our HELASCOT project to examine differences in sophistication.

Text C: Je préfère aller en avion, comme ça, je me sens pas malade. Et aussi, je peux voir le ciel. Et aussi, je peux voir les maisons et les immeubles et les nuages. Je te promets que je vais te faire un dessin. Bisous Daniel

Total number of tokens: 44; Total number of types: 30; Total number of lemmas: 30; type-token ratio (TTR): 0.68

Text D: Chère tante, je préfère la voiture pour quatre raisons : d'abord, on peut partir quand on veut et on peut s'arrêter pour se dégourdir les jambes, et puis en voiture, on peut parler librement, et c'est plus convivial. J'espère t'avoir convaincue. Daniel

Total number of tokens: 45; Total number of types: 36; Total number of lemmas: 34; type-token ratio (TTR): 0.80

Take a look at Texts C and D. They are of (almost) equal length (44 and 45 tokens). Their TTR differs, which suggests differences in lexical diversity. We don't need to worry about text length here as the two texts are matched for length. However, beyond the difference in the number of different lemmas used, there might be additional differences—precisely in terms of the rarity or lexical sophistication of the words used by the two pupils.

To find out whether such a difference exists, we compare the texts as regards the respective number of rare words used. Good teachers are sensitive to this and can assess texts as more or less sophisticated based on their intuitions. Thus, for Francophone raters, the verb *se dégourdir* ('stretch') stands out as a candidate for a relatively rare word. If we want to answer this question in a systematic and corpus-based (which also means potentially automatic) fashion, we need to define what *rarity* means. This can be done via its frequency in a relevant corpus.

As an interesting resource, if the *tertium comparationis* is spoken French, I suggest using the film subtitle corpora (in the following analyses I used "Lexique3", the currently available version is 4. See New & Pallier n.d.). Film subtitles are considered a good approximation to spoken language (Levshina 2017).

There are different ways of comparing the lexical sophistication of the two texts. One way is to map the lemmas found in the learners' productions onto the Zipfian distribution discussed above. The more high frequency words a person uses, the less sophisticated his/her production might be.

Table 9.5 shows the corpus frequencies and ranks for the unique lemmas found in the two texts. Table 9.6 shows that simply using the mean corpus frequency as a metric may not be optimal: the text that intuitively contains more sophisticated words has a higher mean frequency than the other text. However, the median frequency (i.e. the number which divides all the words in the respective text in two equally sized groups of high and low frequency) is clearly lower for text D, which confirms our intuition that it contains a higher proportion of relatively rare words.

However, when assessing sophistication, several problems need to be kept in mind. First, sometimes the use of low-frequency words is contextually driven, for example words used by children may turn out to be low-frequency: the word *cache-cache* ('hide and seek') in French is common in many children's vocabulary, but not frequent when a corpus of mainly adult language is analyzed. Second, it is not necessarily always better to use rare words in a text—on the contrary, keeping it simple can also be a sign of text quality. Hence, unsurprisingly, the way lexical sophistication can and should be measured is a matter of debate.

9.3.6 Lexical diversity and sophistication in the HELASCOT corpus

All these measures can be used to describe the words produced by (L1, L2, Lx) language users. As a concrete example, I use again data points from our project on heritage language speakers. In one part of the project, we analyzed the longitudinal development of the young language users' vocabulary in two text productions (narrative and argumentative writing).[13]

Figure 9.8 shows the MTLD metric of lexical diversity of different groups of speakers for the three measurement times. It allows us to draw comparisons between the development of the different groups. The groups are speakers of Portuguese going to school in a (1) French-, a (2) German- or (3) a Portuguese-speaking context, and comparison groups in the (4) French- and (5) German-speaking context.

[13]For more details cf. Bonvin et al. (2018).

Table 9.5: Corpus frequencies (Lexique3 subtitle corpus) and ranks of the lemmas of texts C and D

Text C			Text D		
lemma	frequency	rank.films	lemma	frequency	rank.films
pas	18188.15	6	être	32236.50	1
le	13652.76	9	de	25220.86	3
et	12909.08	12	avoir	18559.22	5
un	12087.62	14	le	13652.76	9
aller	9992.77	15	et	12909.08	12
ça	8933.66	16	on	8586.40	19
faire	8813.48	17	pour	7078.55	23
en	5689.68	26	en	5689.68	26
pouvoir	5524.47	27	pouvoir	5524.47	27
voir	4119.43	41	vouloir	5249.30	29
que	4100.90	42	ce	5219.10	30
moi	3675.68	49	plus	4062.45	43
toi	2519.50	57	moi	3675.68	49
comme	2326.08	62	toi	2519.50	57
aussi	1402.33	87	parler	1970.55	68
maison	605.75	171	quand	1827.92	72
sentir	535.40	186	partir	1111.97	103
promettre	185.26	425	arrêter	993.79	117
préférer	179.44	436	raison	467.94	210
malade	158.27	484	voiture	429.40	221
ciel	142.32	526	espérer	301.08	285
avion	128.35	568	puis	256.19	325
nuage	30.27	1755	cher	205.75	394
immeuble	30.03	1767	préférer	179.44	436
dessin	29.60	1787	quatre	150.93	501
bisou	18.40	2496	jambe	113.82	642
			tante	76.62	855
			convaincre	56.71	1106
			soi	28.23	1846
			librement	6.80	4620
			abord	2.22	8446
			dégourdir	1.65	9818
			convivial	0.67	14711

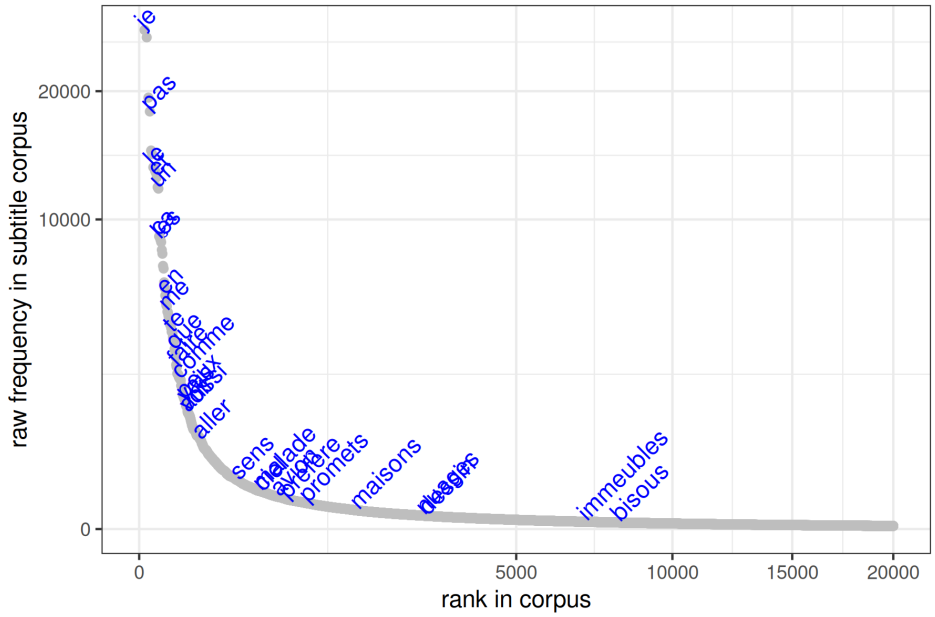


Figure 9.6: Text C, both axes exponentially transformed

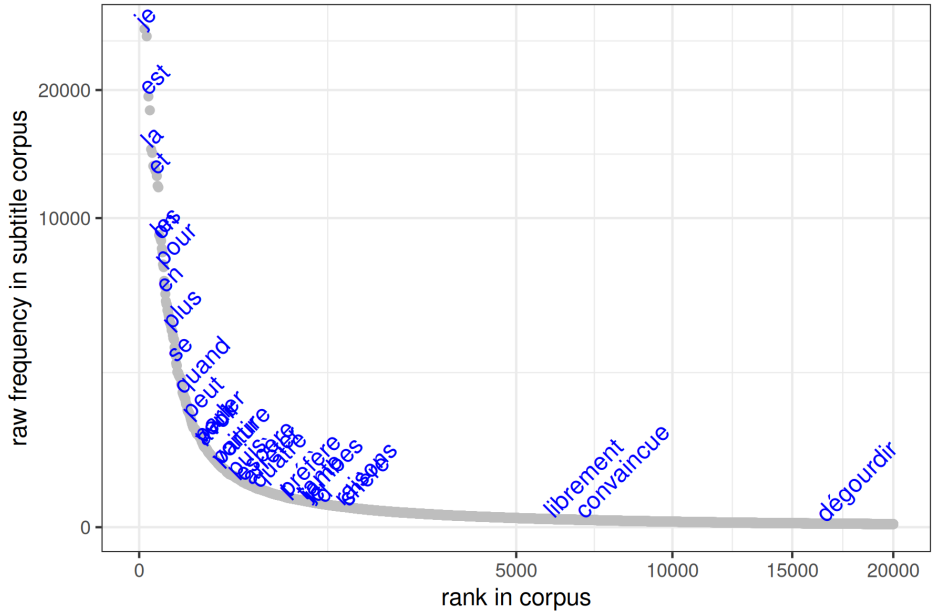


Figure 9.7: Text D, both axes exponentially transformed

Table 9.6: Frequency comparison of the words used in the two texts

text	mean frequency	median frequency
Text C	4460.72	2422.79
Text D	4798.95	1111.97

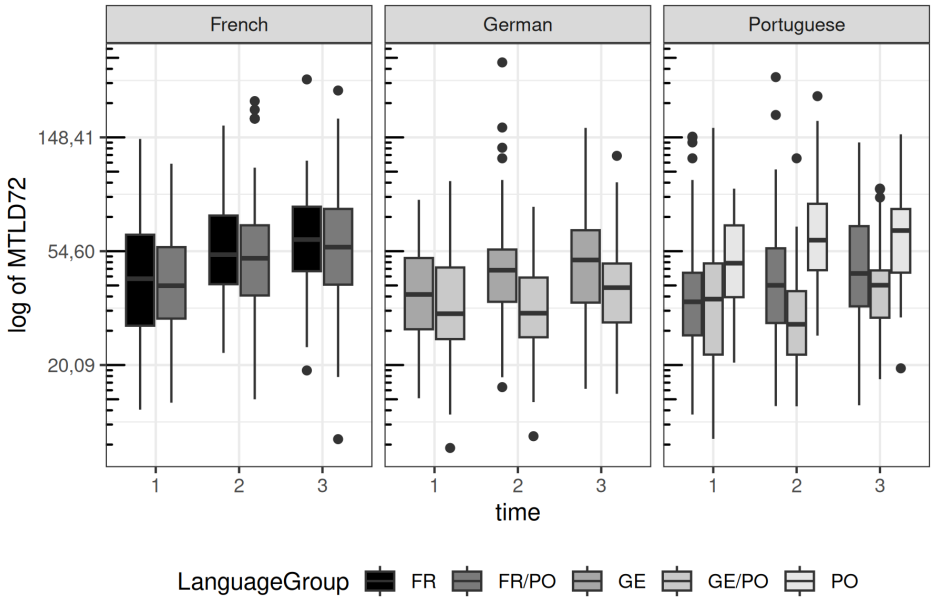


Figure 9.8: Lexical diversity of the texts in three languages produced in an argumentative task; FR: French comparison group, GE: German comparison group, PO: Portuguese comparison group, FR/PO and GE/PO bilingual groups

Figure 9.9 is from the same data set, and it shows the development of lexical sophistication or rarity using the frequency of the lemmas extracted from subtitle corpora of French, German and Portuguese.

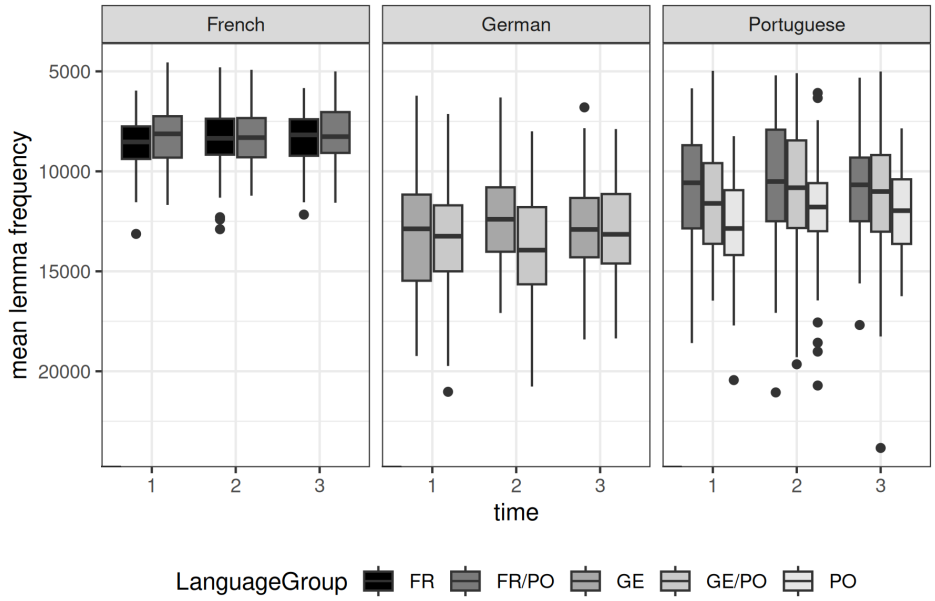


Figure 9.9: Lexical sophistication of the texts in three languages produced in an argumentative task; FR: French comparison group, GE: German comparison group, PO: Portuguese comparison group, FR/PO and GE/PO bilingual groups

There are more analyses and more discussions regarding lexical features of the HELASCOT corpus in several articles that are all open access (Bonvin et al. 2018, Vanhove et al. 2019).

9.3.7 Resources for automatic vocabulary analyses

There is a great number of computer programs that help with vocabulary analyses. Many of them are freely available online. For example, Meara & Miralpeix (2016) is still a useful overview of software and platforms for vocabulary analyses (but you will find more by searching the internet as the field evolves rapidly). Other resources I am aware of are:

- The "Lextutor" website (Cobb n.d.) allows simple analyses (e.g. freqencies, lemmatization) for English, sometimes also for French

- Voyant tools (Sinclair & Rockwell 2016) is a nice web interface for different tools (concordancer, word cloud, automatically generated indices, etc.)
- More software, also to download, can be found on the Lognostics webpage (Meara & Miralpeix n.d.)
- There are useful, freely available software packages to automatically annotate, lemmatize, and analyze texts:
  - Stanza (Qi et al. 2020, for the Python environment)
  - UDPipe (for the R environment; Wijffels 2018)
  - koRpus (for the R environment; Michalke 2020)
  - TreeTagger (Schmid n.d. works well together with koRpus)

9.4 Concluding remarks

As further analyses of multilingual speakers will show, it is useful to distinguish different sets of words that learners know: vocabulary knowledge can be receptive or productive, and it can be described in terms of potential words or actually observed or observable words. There is a considerable difference between the estimated total words of 'a language' and the number of words needed and used by actual speakers, e.g. in informal conversation.

Words are distributed following a characteristic function in the input and in language corpora, a *Zipfian distribution*: there is a relatively small set of high-frequency items and a very large group of low-frequency items. This is an important feature of verbal input in first and second/additional language acquisition, and it has consequences for word learning: given that frequency of occurrence is a predictor of learning (see Chapter 6), most of the words are potentially not learned by many because they are infrequent.

There are different levels on which one can count words in texts: word forms, lemmas, flemmas, and word families. In particular for reception, word families are important since they represent groups of *potential vocabulary*, i.e. words that are more or less part of the learner's competence provided one member of the family is learnt.

Most scholars in the field recommend that type-token based measures should be generated based on lemmatized texts. As there are different ways of grouping word forms together, we have to decide what is most appropriate for the research question at hand, or alternatively what suits our pedagogical purposes best: Treffers-Daller et al. (2018: 320) recommend that it should be done at the

level of a word and its inflected forms (lemma), but not at the level of word families. According to these authors, therefore, lemmatization should not erase derivational affixes (which we would do if word families were the unit of analysis).

There is software that helps doing the lemmatization automatically, but the output of such processing needs to be carefully checked to eliminate errors.

There are many different proposals as to how to measure lexical diversity. Some of the metrics are relatively complicated. In our analyses, it turned out that simple measures (Guiraud index) are fairly good predictors of human perception of lexical diversity, not worse than sophisticated measures (MTLD, etc.).

The assessment of rarity or lexical sophistication requires information about corpus frequencies of words. In the HELASCOT study, there is no measurable development in sophistication in the sample of primary school children analyzed. This finding can be interpreted as evidence for the rather slow learning of sophisticated (relatively speaking) vocabulary in the language of schooling.

10 Vocabulary: Development in monolinguals and multilinguals

Preview—Key points of this chapter

- Vocabulary development in monolingual and multilingual learners may focus on breadth (Chapter 9.3.1) or *depth*.
  - Depth reflects associations, connotations, and emotional resonance of words.
  - It can be assessed through scales of *word familiarity*, *semantic accuracy*, *contextual use*, and *definition* tasks.
- Vocabulary acquisition in L1:
  - Early development shows a *noun bias*, often involving a phase of rapid growth (*vocabulary spurt*) between 18–24 months.
  - Studies suggest that this acceleration may result from learning dynamics rather than domain-specific endowment.
- Bilingual and multilingual development:
  - Bilingual children's vocabulary per language is typically smaller than monolinguals', but their overall *conceptual vocabulary* is comparable.
  - *Input quantity* and *quality* are key determinants of vocabulary size and distribution.
  - Research and educational practice should consider the whole repertoire and avoid deficit perspectives.

In the previous chapter we examined different ways of counting words (in languages, in speakers, in corpora). We identified several problems that arise when

questions about vocabulary breadth are posed. In this chapter, we will see how such metrics can be used to describe bi- and multilinguals' vocabularies. We will also discuss how the size of the vocabulary in monolinguals and multilinguals develops. Lastly, we will see that the question of what it actually means *to know a word* involves additional nuances and distinctions. Questions of semantics, and in particular the interlingual correspondences of lexical meaning or lack thereof will be discussed. Finally, the notion of (varying) *depth* of vocabulary knowledge is needed to describe vocabulary development adequately.

10.1 Vocabulary depth

Difference in vocabulary depth is something many multilinguals consciously report. The following testimony describes how, for this individual, the depth of knowledge of specific words is considerably higher in the first language:

> The words I learn now don't stand for things in the same unquestioned way they did in my native tongue. 'River' in Polish was a vital sound, energized with the essence of riverhood, of my rivers, of my being immersed in rivers. 'River' in English is cold – a word without an aura. It has no accumulated associations for me, and it does not give off the radiating haze of connotation. It does not evoke. (Hoffman 1989: 106)

Even multilinguals who use their L2 or L3 frequently report similar self-observation. On the other hand, if a new word in a second/additional language is learned in the context of particularly memorable events (e.g. related to love, fear, trauma, etc.), that word may gain depth quickly and be even more evocative than corresponding L1 words.

10.1.1 Swear words

Swearing is a lexical domain in which we have numerous studies about variability in vocabulary depth.[1] There are some interesting findings on multilinguals' reactions and preferences when it comes to emotionally loaded words and utterances. For instance, there seems to be a tendency towards stronger physiological reactions in multilinguals' first languages in lie-detector sessions (Harris et al. 2003). Questionnaire-based research has shown that people overwhelmingly

[1]For an overview from a cognitive linguistics perspective see Bergen (2016).

swear in their respective first languages. Swear words can also be used in languages other than the first if the proficiency is rather high and similar in both/all languages. However, even then there seems to be a strong tendency in favor of L1:

> The 386 multilinguals who are equally proficient in their L1 and L2, and use both languages constantly, use the L1 significantly more for swearing. (Dewaele 2010: 609)

The evidence suggests—unsurprisingly—that the deep entrenchment of first or dominant languages makes them the preferred choice for swearing. Using swear words in other languages, even where the speakers are highly proficient, is risky.[2]

A frequently reported effect, the *foreign language effect* in moral reasoning (see e.g. Costa et al. 2014), is related to differences in the way language forms are associated with meanings. To investigate this effect, scholars have used moral dilemmas. For example, imagined situations are presented in which the participants are asked to take difficult decisions. Would they rather actively kill one person to save the lives of four people (this is called *utilitarian reasoning*), or would they rather do nothing, knowing that applying the principle "thou shalt not kill" will lead to the death of four people. When asked to make a choice in such hypothetical situations, people tend to make more utilitarian decisions if the task is carried out in an L2.

Measuring physiological responses as in Harris et al. (2003) would only work for a limited set of lexical items that trigger very strong responses. There are other methods of assessing the depth of knowledge of words.

10.1.2 Components of vocabulary knowledge

If we want to measure multilinguals' vocabulary, we have to have a model of what it means to *know* a word. Figure 10.1 is an example of such a model.

The literature discussed in this chapter also uses the term *lemma*. Its meaning here is not exactly the same as in Chapter 9. In the present chapter, the focus lies on the content side of the linguistic sign, whereas the corpus linguistic term lemma refers to the group of word forms covered by a lexical entry. The two are not contradictory, as normally all items grouped together under a lemma share an invariant core meaning (in the sense of de Saussure's *signifié*).

[2] Think of the overuse of the f*** word by speakers with other L1s than English. If you were not aware of this overuse, ask a native speaker about it.

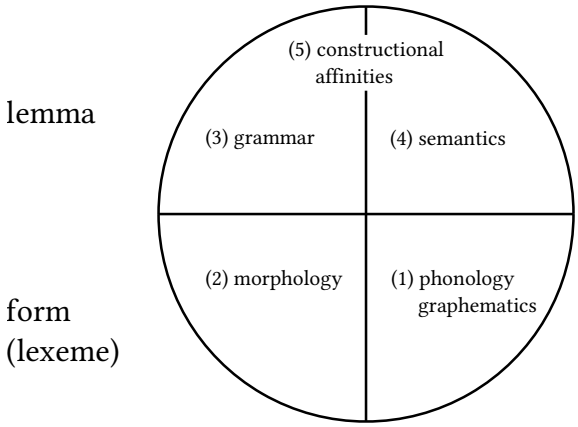


Figure 10.1: Schematic model of an entry in the mental lexicon

Word knowledge involves at least the five components depicted in Figure 10.1. I did not add other possible components that are related to the semantic part, for example cultural or biographic representations or associations. On the form or *lexeme* side (de Saussure's term *signifiant*), we distinguish between the phonological or graphematic materiality of a word on the one hand, and the morphological component on the other hand. The latter refers to the word root and potential changes in form according to the grammatical constructions in which a word is used. On the *lemma* side we distinguish between semantic and syntactic specifications. Here I suggest including constructional affinities, that is, knowledge about co-occurrence preferences and restrictions of words. For example, in French it is common to use the lemma *laver* to refer to the brushing of the teeth; *nettoyer* can be found but it sounds rather awkward or refers to what a dentist does with their equipment. In German, on the other hand, the verb is *putzen* and *waschen* is even more awkward (at least in the varieties of German with which I am familiar).

(1) Zähne putzen
teeth clean
'to brush the teeth'

(2) ?Zähne waschen
teeth wash

(3) laver les dents
wash the teeth

(4) ?nettoyer les dents
clean the teeth

Lemma *bucket*

1. bʊkɪt–<bucket>
2. {bucket}; {bucket}{s}
3. 'cylindrical vessel'
4. noun
5. occurs with specific words/constructions (*empty, full, carry, metal, kick the bucket, …*)

10.1.3 Measuring vocabulary depth in adults

There are different ways of probing the depth of vocabulary representations (for a useful overview see Nation 2022: 469). A widely used approach is rather elaborate: the following criteria were proposed by Wesche & Paribakht (1996: 30). They allow both learners and researchers to assess the depth of knowledge of entries in the mental lexicon:

I: I don't remember having seen this word before

II: I have seen this word before but I don't know what it means

III: I have seen this word before and I think it means XXX (synonym or translation)

IV: I know this word. It means XXX (synonym or translation)

V: I can use this word in a sentence. e.g.: XXX (if you do this section, please also do section IV)

The authors give detailed explanations on how to process responses to a test based on these different levels of knowledge (Wesche & Paribakht 1996: 30):

'Yes' responses to the items on the levels I and II lead to scores of 1 and 2, respectively. In Category III, a score of 2 is given if the synonym or translation is incorrect, and a score of 3 if it is correct. For Categories IV and V, incorrect answers also result in a score of 2. If a Category V response shows that the word's meaning is understood but is used incorrectly in the sentence, a score of 3 is given. A score of 4 is awarded if the word is used correctly in context but with the wrong grammatical form (a noun used as a verb), or if a word form is incorrectly

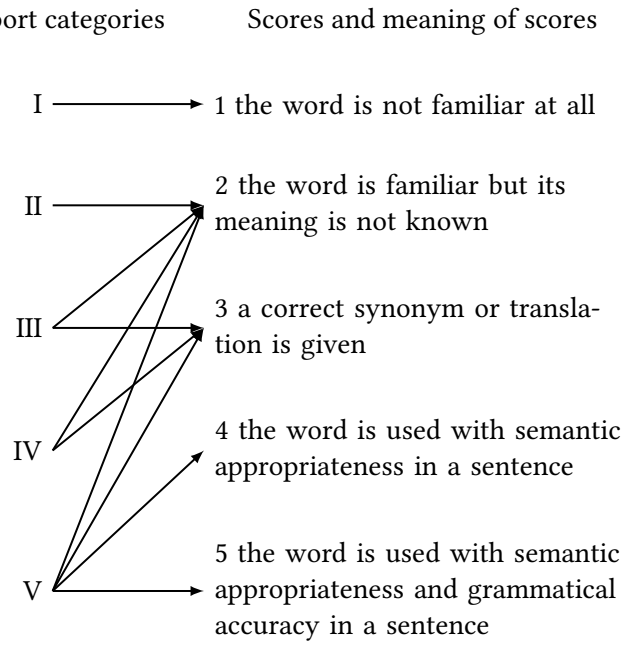


Figure 10.2: Scoring grid for a lexical item's vocabulary depth

conjugated or derived. A score of 5 is given when the word is used correctly in both meaning and grammar, even if there are other mistakes in the sentence.

These items can be administered in the form of self-assessment or—from level III on—they can be used in the form of a test. Figure 10.2 illustrates the scoring rules spelled out above.

10.1.4 Measuring vocabulary depth in children

Juska-Bacher & Jakob (2014) discuss alternative ways of tapping into vocabulary depth and are more suitable for younger learners (e.g. ask questions about meaning, elicit semantic associations of words, but also use standardized test instruments). A method that works particularly well with young learners is to ask them to define the meaning of a word. The authors applied an adaptation of a rating scale developed in the context of the Wechsler IQ test for children (Petermann & Petermann 2007).

The following examples show the definition of the German verb *zwingen* ('to force sb. to do something'). Responses (5) to (8) (translated from Swiss German)

were given by Swiss primary school children between 6;0 and 7;6. The quality of knowledge increases from (5) to (9), with (9) being a decontextualized description of the meaning of the verb.[3]

(5) If for example dad says now you need to get dressed.

(6) If somebody tells you you have to do this.

(7) That someone else does not want but he nevertheless has to do.

(8) To force is to blackmail.

(9) Put pressure on somebody and coerce him to do something he does not want to do.

The authors use these scores to describe the primary-school children's developing metalinguistic abilities towards more decontextualized meaning descriptions, which can also be interpreted as evidence for increasing vocabulary depth.

10.2 Vocabulary acquisition

Scholars do not necessarily agree on the exact mechanisms and on what should be considered normal or typical in L1 word learning. For instance, in standard textbooks on L1 acquisition there is usually a reference to the *vocabulary spurt*, a steep acceleration of word learning in infants. But as we will see, this concept is questioned by certain scholars.

10.2.1 First words in L1 acquisition

The first words in the first language(s) of a child are usually identifiable at an age between 9 and 18 months. The typical learning rate seems to be about three new words per week. The very first items are often social and pragmatic words (*mama*, *hi* or *bye-bye*). Nouns, in particular nouns referring to concrete entities, precede closed class words (i.e. grammatical words such as articles, particles, connectors, prepositions, etc.). Only then the first verbs will be added to the mental lexicon.

This noun bias or noun prevalence seems a robust tendency across many languages:

[3] For more information on the rating criteria see Juska-Bacher et al. (2021).

> Mothers independently reported that their young children said more nouns than verbs in Spanish, Dutch, French, Hebrew, Italian, Korean, and American English. In addition, children in every language community said a larger proportion of nouns than adjectives, and a larger proportion of nouns than closed-class words. (Bornstein et al. 2004: 1129, see also Bates et al. 2017)

10.2.2 Vocabulary spurt vs. linear development

The *vocabulary spurt* is generally considered to take place at an age of around 18–24 months. The literature reports that in this period about 20 or more new words can be learned per month, and the overall number of learnt items increases steeply. At an age of about 16 months, a total of 50 words are learnt on average. Note that these figures are averages, and there is considerable variability: some normally developing children attain the 50-words stage at 12 months, others at 25 months. At about 18-20 months, in total 100 words are typically mastered (with a variability between 13-27 months).

However, there is disagreement in the literature about the nature and universality of such a vocabulary spurt. As in the case of grammar, some generativist acquisitionists, inspired by Chomsky's ideas (cf. Section 5.1), have argued that this explosion is a consequence of a specific biological endowment of the child that makes the young child a radically different, more efficient language learner than older children or adults. The early preference for nouns and the slow emergence of verbs and of grammatical morphology has been attributed to biology and to maturation of the cognitive system by generativist aquisitionists (see for example the 'less is more hypothesis' put forward by Newport 1990: 22). The underlying idea is that the language module, in its domain-specific way and if triggered by the input within the critical period, provides rapid and effortless domain-specific acquisition (see Snedeker et al. 2007: 79 for details).

Other scholars think that a vocabulary spurt only occurs in children who adopt the strategy to eagerly learn names for objects. Out of the 18 children investigated by (Goldfield & Reznick 1990), 13 indeed exhibited learning that resembles a spurt, while five had a more steady learning rate:

> Thirteen children evidenced a prolonged period of up to three months during which rate of acquisition markedly increased. Almost three quarters of the words learned during this period were nouns. Five children evidenced more gradual word-learning, and acquired a balance of nouns and other word classes. These results suggest that the terms 'vocabulary spurt' and 'naming explosion' best describe children who focus their early linguistic efforts on a single strategy: learning names for things. (Goldfield & Reznick 1990: 171)

For the acquisition of L1 German, Szagun (2006: 118) also argues that some children's vocabulary in fact shows a linear development, while in other cases the development is exponential. Lastly, some authors argue that the fact that the learning rate increases is a normal by-product of learning and does not indicate that some special mechanism is triggered in the brain (McMurray 2007).

10.2.3 Vocabulary development: Biological maturation or other mechanisms?

As we have seen (cf. the discussion of the *poverty of the stimulus* argument in Chapter 5.1.1), generativist scholars view child L1 acquisition as something special and fundamentally different from other types of learning. It is fast and effortless, and it arguably relies on domain-specific predispositions of the brain that undergo maturational changes with increasing age. However, other scholars (such as McMurray cited above) have offered different explanations for the observed development.

An interesting study is that of Snedeker et al. (2007). The authors compared the development of adopted Chinese children of 27 families in the US and control children who were not adopted. The age at time of adoption varied between 2;7 and 5;6.

Snedeker observed that the expressive (productive) vocabulary of the adopted preschoolers grew four times as fast as the vocabulary of the controls, but that it followed exactly the same path from a bias to learn nouns at the beginning to an increasing number of closed-class (grammatical) words and verbs.

Snedeker et al. argue that their data show that the interdependence of grammar and vocabulary development and the shift in vocabulary composition, both generally attributed to maturational changes by generativists, may be simply due to inherent features of language learning rather than biologically timed constraints within the *language acquisition device* (see Chapter 5.1).

> There is no need to invoke immaturity to explain why 1-year-olds learn few verbs or fail to use grammatical morphemes. Older and wiser learners show similar lapses when they are placed in the same epistemic situation as infants. (Snedeker et al. 2007: 86)

Thus, we see that both the characteristic change in distribution of parts of speech in the early stages of vocabulary development and the speed of vocabulary acquisition can be explained without any need to postulate innate, specific mechanisms. As McMurray puts it,

> [t]hese mundane structural features of the organism-environment complex, not specialized learning processes, determine the form of growth. Specialized processes are not causally necessary to explain acceleration. (McMurray 2007: 631)

10.3 Bilingual development

There are many studies on vocabulary in bilingual development. The converging evidence, also instantiated in the two studies referred to below, is that healthy bilingual children mostly develop within the range of what is considered typical (compared to monolingual development) in terms of vocabulary size, but that their average vocabulary *per language* is somewhat smaller than the average vocabulary of matched monolingual samples.

This robust finding is in line with the insight that bilinguals are "competent but specific" language users (Grosjean 1985: 467). Sometimes, bi- and multilingualism activists think that we should not state this fact, either because they truly believe that bilingual education can yield 'native-like' competences in two languages that are indistinguishable from monolinguals, or because they think it is strategically unwise to point out these differences in the light of the past ideology that bilingualism is a form of mental disorder.[4] I personally think that ignoring or hiding the robust finding on relative vocabulary sizes is neither necessary nor ethically defendable.

An important notion in vocabulary studies with bi- and multilinguals is the *conceptual vocabulary*. As illustrated by the example below (from our work on motion events in French-German bilinguals Stocker & Berthele 2020, Berthele & Stocker 2017), bilinguals often have only one label for a concept (here: *the slide*. Code-switched insertions (see Chapter 8) are printed in small caps in the examples), most often in their dominant language or in the language that is generally used for a specific semantic domain.

Participant 123

(10) il monte les escaliers d'=un toboggan (123-K7)
he ascends the stairs of=a slide
'he goes up the ladder of a slide'

[4] See Tabouret-Keller (2011) for a historiography of the stigmatization of bilingualism. Such pathologization of bilingualism was common up until the 1960s, as illustrated in Weisgerber (1966).

(11) er steigt, er steigt die treppe ein-es TOBOGGAN (123-K7)
he ascends, he ascends the stairs a-GEN slide
'he goes up the ladder of a slide'

Participant 161

(12) er stiigt d rutschbahn duruf (161-K7)
he ascends the slide up
'he goes up the slide'

(13) il monte le RUTSCHBAHN (161-K7)
he ascends the slide
'he goes up the slide'

Thus, when assessing the vocabulary size of bi- and multilinguals, one has to distinguish between the size of the conceptual vocabulary across all languages in the repertoire and the (smaller) size of the expressive vocabulary per language.

10.3.1 Bilingual development in Norwegian and different L1s

The study of Monsrud et al. (2022) used adaptations of a test we have encountered in Chapter 9.2.3. The researchers measured the vocabulary size and depth of mono- and multilingual children in Norway. Some of the tests mentioned below are similar to the methods used for measuring vocabulary depth described above.

The receptive vocabulary was measured with the British Picture Vocabulary Scale (BPVS-II, Dunn et al. 1997), translated and adapted to Norwegian and to the test-takers' first languages. The test consists of 144 items of increasing difficulty. Productive vocabulary was tested with a Norwegian test that was adapted to the test-takers' home languages. Two subtests were administered, one measuring the knowledge of antonyms (14 items, e.g. "What is the opposite of *pretty*?") and another testing word definitions (12 items, e.g. "What is a *reward*?"), as in the examples from the Swiss study shown above.

When counting words in multilinguals, it is important to keep in mind that not all concepts (roughly the lemma side of 10.1) are linked to a lexeme in all languages of the speakers. Therefore, the notion of *conceptual vocabulary* is important. As in the study by Hoff et al. (2012), Monsrud et al. (2022) consider that in bilingual children,

> vocabulary (semantic knowledge) is distributed across two languages […]. Researchers have called for a monitoring of vocabulary development in both

> languages to improve the understanding of bilingual children's vocabulary trajectories […]. (Monsrud et al. 2022: 3)

This study illustrates different vocabulary categories discussed in Chapter 9 (receptive vs. productive vocabulary), and it shows that the conceptual vocabulary in reception is on average of the same size in bilingual speakers of heritage languages and in monolinguals. In production, the researchers find that the number of concepts expressed is smaller. The development of vocabulary breadth in this study shows a similar pattern as the study discussed in the next section (see e.g. Figure 10.3).

An alternative to vocabulary scores generated via vocabulary tests is data gathered from multilingual children's parents. An instrument that may be used for this is the Q-BEx online tool (de Cat et al. 2026) that provides a multilingual modular template for questionnaires. Research based on data gathered with this tool once again highlights the importance of word learning: the age at which the first word is produced, together with three other predictors, predicts risks for problems regarding language development in multilingual children (heritage language speakers).

10.3.2 Bilingual development English-Spanish

Hoff et al. (2012) investigated the development of vocabulary size in mono- and bilingual children in the US. One of their goals was to assess the effect of input in one or two languages on vocabulary development.

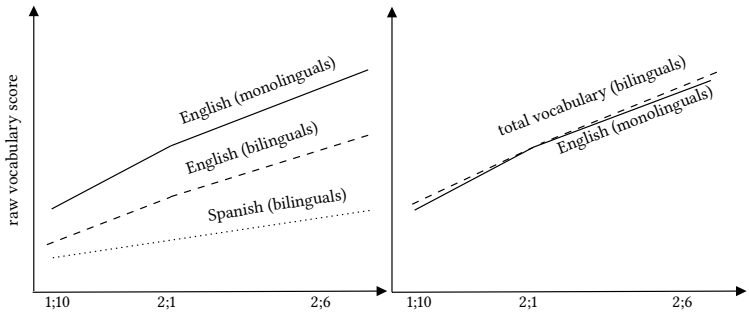


Figure 10.3: English vocabulary scores for monolingually developing children and English and Spanish vocabulary scores for bilingually developing children at 1;10, 2;1 and 2;6. The right panel shows total vocabulary scores (English+Spanish) for bilingually developing children at 1;10, 2;1 and 2;6. Figures based on Hoff et al. (2012: 7)

This study also shows that the total number of concepts (the conceptual vocabulary) in bilinguals is comparable to the number of concepts (i.e. conceptual vocabulary size) of the monolinguals, while the vocabulary breadth *per language* is inferior to that of monolingual children.

Factoring in operationalizations of language input per language the children received, Hoff concludes that "the effect of dual language input on vocabulary size was large" (Hoff et al. 2012: 12). The importance of input quantity and quality is confirmed by studies across different contexts, including more complex multilingual settings such as Singapore (Sun et al. 2020).

Even though the strong claims made by early generativists have been watered down considerably, findings emphasizing the role of exposure and input are still occasionally questioned by scholars from the generativist tradition. As we have seen in both the grammar and the vocabulary sections above, generativists tend to question the role of input as the sole or main determining factor shaping language development (see for example Carroll 2015).

10.3.3 Trilingual development

Many of the studies discussed above measured vocabulary size with standardized tests such as the PPVT (see Chapter 9). These tests estimate the size of vocabulary by testing which word forms can be retrieved based on visual cues. In her PhD thesis, Elisabeth Reiser used a different way of measuring lexical development: she followed six trilingual children over three years and had them renarrate video clips (Reiser & Berthele 2023). Some of the video stimuli varied at each data elicitation time, but one story always remained the same, permitting a direct comparison of the linguistic repertoire available for the description of identical events across languages and over time (see examples below).

This method allowed her to describe vocabulary use in coherent narratives, as opposed to the single items tested in discrete-point vocabulary tests.

Four children go to French-speaking schools, while two (Ana and Elsa) go to a German-speaking school. In Figure 10.4, Guiraud's R was used to describe lexical diversity in the children's narrations in a developmental perspective. Moreover, sophistication was assessed via corpus frequencies as described in Chapter 9.

The analyses show first and foremost considerable individual variation—even if children live in the same family (siblings), the development is surprisingly individual. Other scholars have found similar intra-family variability (for example Silva-Corvalán 2014).

Overall, the sophistication increases between the first and third measurement for most children, but only in their respective language of schooling.

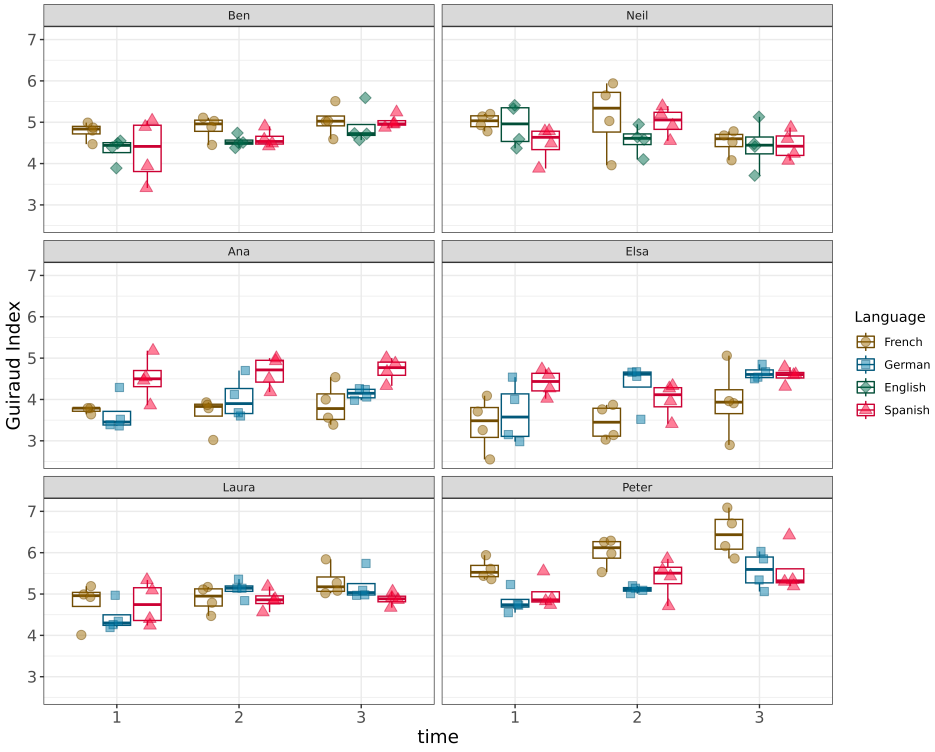


Figure 10.4: Guiraud's index for the six children over two years; Reiser & Berthele (2023: 8)

LAURA T1 5;0–5;6

(14) Und isch er i sini Schuäl gangä
and is he in his school gone
'and he went to his school'

(15) Y después se fue Pingu así (raises her arms) deslizando a la
and then REFL was Pingu like this (raises her arms) sliding to the
escuela.
school

(16) Il a glissé et HOPS là sur son siège
he has slid and hops there on his seat

Laura T2 6;4–6;6

(17) Isch er chu i-d Schuäl
is he come into-the school
'he has come to school'

(18) Y saltó sobre su mesa
and jumped onto his table

(19) Il est arrivé sur son bureau
he is arrived onto his desk
'he arrived at his desk'

Laura T3 7;3–7;6

(20) Und nachher gumpt er a sinä Platz
and after jumps he at his place

(21) Y salta sobre su silla
and jumps onto his chair

(22) Et il saute à son pupitre
and he jumps at his desk

Examples (17)–(22) are from Laura's corpus of narrations. Laura goes to a French-speaking school. The examples all refer to the endstate of a complex motion event in the video stimulus, an event in which the main protagonist is running late for school, slides on the ice and jumps directly onto his chair at his desk in the classroom. As the examples show, Laura often omits the motion description and only refers to the end state, and this is done with varying lexical sophistication: at T1, he sits on his *siège* (an awkward lexical choice for a chair in the classroom), whereas he sits at his *pupitre* (the perfectly adequate dedicated word) at T3. This is a good example of increasing lexical sophistication.

Lexical diversity (Figure 10.4) may equally increase over time, but in this sample it does so predominantly in the school language. In the other languages, it remains mostly stable or it decreases. The patterns are again rather individual, but across the children no massive gains in languages other than the school language are observed. This confirms results from other studies on trilinguals that showed gains predominantly in the language of education (for example Hoffmann 1985, Stavans & Swisher 2006).

10.4 Bi- and multilingual models of the mental lexicon

There are different theoretical models of the bi- and multilingual mental lexicon. One of their aims is to capture cross-linguistic influence (as discussed in Chapter 3) on the lexical level in multilingual language learning and use.

10.4.1 The Revised Hierarchical Model

Many different models can be found in the literature, and I will not engage in a comprehensive discussion of them here. For our purposes, a brief discussion of a small selection of models will suffice.

An influential model of the bilingual lexicon was proposed by Kroll & Stewart (1994). The model attempts to capture the strength of connections between word forms and concepts (see the notion of *lemma* above) in two languages. The initially proposed model was revised by the authors, which is why today it is usually called the *Revised Hierarchical Model* or RHM.

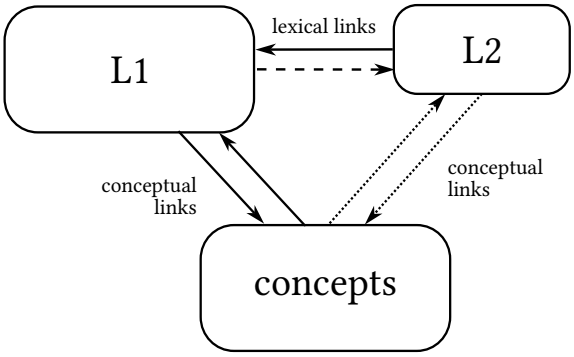


Figure 10.5: Revised Hierarchical Model (RHM), based on Kroll & Stewart (1994)

This model is the result of different psycholinguistic studies that attempted to measure the pathways of activation from word forms to concepts/semantics and the other way around. The scholars who work within this framework are interested in the way words in a new language are integrated into the mental lexicon.

The dominant view within this framework is that new words are first integrated by creating associations among the L1 and L2 forms and not lemmas (here termed *concepts*). The links betweeen the L2 forms and the lemmas arguably emerge gradually (and at different paces for different classes of words).

This model inspired many studies of bilingual and second-language vocabulary learning. For example, Poarch et al. (2015) investigate Dutch fifth-graders who are learners of L2 English. The participants performed translation tasks (production and recognition) in both directions, English to Dutch and Dutch to English. They showed

> longer RTs [reaction times] and lower accuracies for semantically related than semantically unrelated word pairs. In translation production, they were faster in backward than forward direction as predicted by the RHM. (Poarch et al. 2015: 357)

The authors conclude that even in early stages of language learning, given the multimodal nature of word learning in the Dutch curriculum, certain L2 lexemes (forms) are mapped to concepts.

10.4.2 Criticism and alternatives to the RHM

The RHM model has been criticized by scholars who work within connectionist frameworks. Brysbaert & Duyck (2010) criticize several assumptions of the RHM, some of which are directly relevant to the investigation of cross-linguistic influence.

For example, they argue, based on psycholinguistic experimentation, that the words in a multilinguals' mental lexicon are not separable along the lines of the different languages, but are fully integrated in form-related and lemma-related networks. So-called interlingual homographs[5] activate all formally identical or similar words regardless of their language affiliation. Thus, words are not accessed and processed language-selectively because we cannot simply switch off our languages even if they are irrelevant to the task at hand. The case for such non-selective access to the mental lexicon is indeed backed up by a wealth of experimental evidence the authors list in their paper.

There is also supporting evidence from bimodal bilinguals. In an experimental study, Villameriel et al. (2022: 2) show that Spanish words that bear formal resemblance to the Spanish equivalent of the Sign Language target word are cross-modally activated: for example, the Spanish Sign Language lexical item *estrella* (Engl. 'star') activated Spanish lexemes that share the onset, as *espada* (Engl. 'sword').

[5]They give the example of experiments with interlingual homographs of the type *room* in Dutch-English bilinguals which could also be 'cream' if the selected language is Dutch.

A central claim of the RHM is the weak association between L2 word forms and their corresponding lemmas/meanings. This claim is questioned by Brysbaert & Duyck (2010) who argue for a stronger link. They also criticize that RHM somewhat simplistically implies translation equivalence of words across the multilinguals' languages. This last point means that an adequate model of the mental lexicon distinguishes between meanings that are related to specific items in specific languages and language-independent meanings.

Brysbaert and Duyck discuss different alternative psycholinguistic models of the bilingual mental lexicon that do not suffer from such shortcomings. For example, the BIA+ model proposed by Dijkstra & van Heuven (2002) is more strongly influenced by neural-network ideas on how cognitive representations are connected across different layers. In the meantime, further developments of such models have been proposed, for example also the multilink model (Dijkstra et al. 2019) that integrates features from models such as BIA+ with aspects of the RHM.

10.4.3 Multilingualism and the semantic-conceptual space

From a teaching and learning point of view, questioning the problematic assumption that (all?) concepts across two languages are shared is important. Scholars early on noted that learning the words of a new language does not simply mean sticking new labels onto recycled meanings:

> And yet one soon comes to realize, in learning a foreign language, that there are distinctions of meaning made in one language that are not made in another; that learning the vocabulary of another language is not simply a matter of acquiring a fresh set of labels to attach to familiar meanings. (Lyons 1968: 55)

Therefore, some authors have tried to modify the RHM in order to accommodate different semantics across languages. An example of this is shown in Figure 10.6

Another model that tries to capture the development of L2 word acquisition was proposed by Jiang (2000). This model (cf. Figure 10.7) has a concept of a lexical item similar to that presented in Figure 10.1.

This model captures the phenomenon of semantic convergence in Romansh-German bilinguals discussed in Section 3.2.2:

(23) ella metta giu in cup cul=la bucca sin meisa
she puts down a cup with=the mouth onto.the table

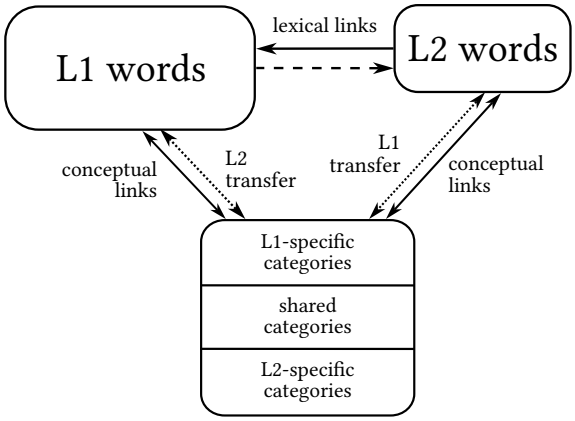


Figure 10.6: A proposal of an RHM-inspired model that acknowledges the absence of equivalence on the conceptual level, Figure based on Pavlenko (2009: 147)

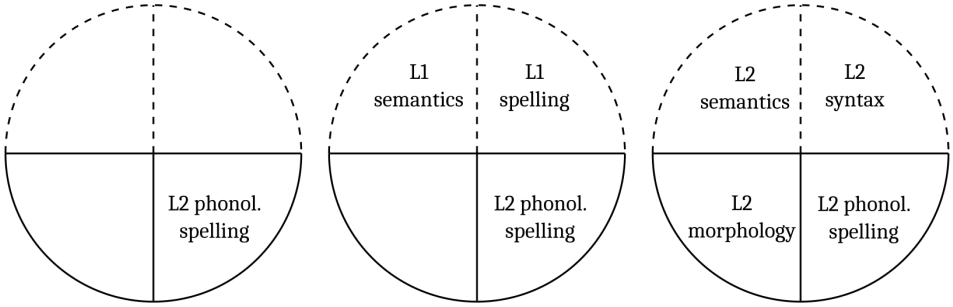


Figure 10.7: L2 acquisition model, based on Figure in Jiang (2000)

(24) di frau laid de becher uf em tisch
this woman lays the cup on the.DAT table

(25) di frau stellt en becher uf de tisch
this woman stands a.ACC cup on the.ACC table

Remember: German *stellen* overlaps with Romansh *metter*, but the two verbs are not semantically equivalent. The Romansh-German bilinguals tested show a tendency to make the concepts mapped onto the two word forms *metter* and *legen* equivalent (examples (23) and (24) from the same bilingual speaker), whereas the monolinguals use different verbs (example (25)). In terms of Jiang's model one could argue that certain German vocabulary forms of these bilinguals are mapped onto L1 (Romansh) concepts. The term *fossilization* is sometimes used for what

can be considered *incomplete acquistion* in bilingualism (Montrul 2008). However, as we are dealing with perfectly functional bilinguals, it seems preferable to use the less evaluative term *convergence* for this example—the two systems within the bilinguals converge, and lead to specific but competent language use.

According to Cook et al. (2006), acquiring a second (or third) language with different concepts can lead to the following outcomes:

1. L2 concepts are not acquired.
2. The two sets of concepts exist in separate compartments: "Thought-switching"
3. The two sets of concepts are integrated to some extent.
4. A new conceptual system has been created.

Creole languages: Some contact languages such as for example Haitian Creole, according to some scholars, emerge as a product of massive relexification (Lefebvre 1998). Simply speaking, in the emerging Creole language, lemmas of the slaves' African languages are associated with a signifier replicating the European language (in this case French). Although this theory remains controversial, there is no doubt that what could be considered, from a normative point of view, incomplete learning plays a role in language contact.

Are there other such cases where approximative or incomplete learning might have led to language change in contact situations?[a]

[a]You will most certainly find various examples by asking AI, but still an excellent read on this is Thomason (2001: chapter 4)

Below I give some more examples of incongruent concepts across languages and how speakers in contact situations converge.

10.4.4 Incongruent concepts, language contact and change

There is an interesting difference between German and French with respect to the way the spatial relation of vertical support of a figure (the object being located)

to the ground (the spatial environement) is expressed. Take Figure 10.8 and the descriptions thereof.

The line drawings are part of the "BowPed" set of stimuli (Bowerman & Pederson 1992).

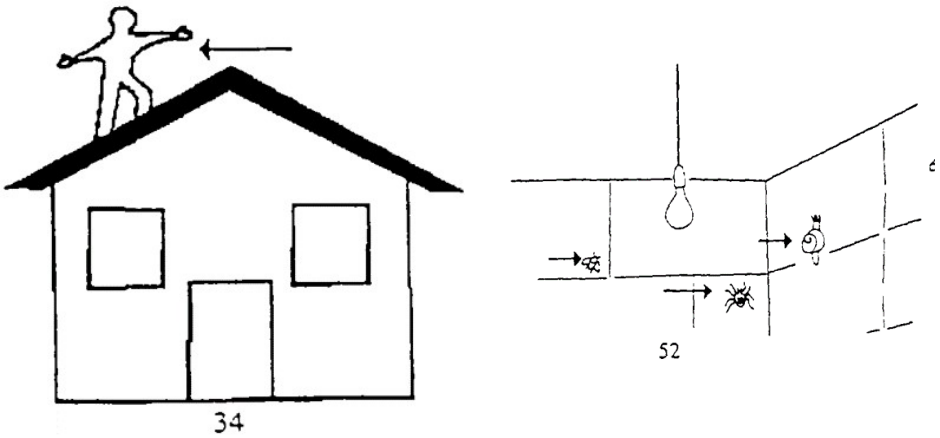


Figure 10.8: Two stimuli, cf. Bowerman & Pederson (1992)

(26) l'homme est **sur** le toit
the man is on the roof

(27) der Mann steht **auf** dem Dach
the man stands on the roof

(28) les insectes sont **sur** le mur
the insects are on the wall

(29) die Insekten sind **an** der Wand
the insects are on the wall

A thorough description of such spatial relations in French is Vandeloise (1986), and a cross-linguistic comparison of French, German and other languages can be found in Becker (1994).

Figure 10.9 shows how French, Italian, Romansh and German speakers exhibit different patterns when carving up the semantic space covered by spatial prepositions such as French *sur* and *à*: whereas French and Italian have a semantically light preposition *a/à*, they use *su/sur* for various configurations where the figure is located, stuck, or attached to the ground object. German and Romansh, on the other hand, have a multipurpose preposition *an/vid(a)* that covers even more configurations, whereas the preposition *auf/sin* is used only for configurations in which the figure is supported by a more or less horizontal ground object.

Table 10.1: Different configurations of figure and ground across three languages, cf. Berthele (2007, 2006)

relation	French	Romansh	German
horizontal support	la tasse est sur la table	la tazza sta sülla maisa	die Tasse steht auf dem Tisch
vertical support with adhesive activity of figure	les insectes sont sur le mur	ils insects sun vi da la paraid	die Insekten sind an der Wand
vertically aligned figure and ground, with attachment	le tableau est sur le mur	il purtret picha vi da la paraid	das Bild hängt an der Wand
vertical support with attachment	la lampe est au plafond	la glüm picha vi dal plafuond	die Lampe hängt an der Decke

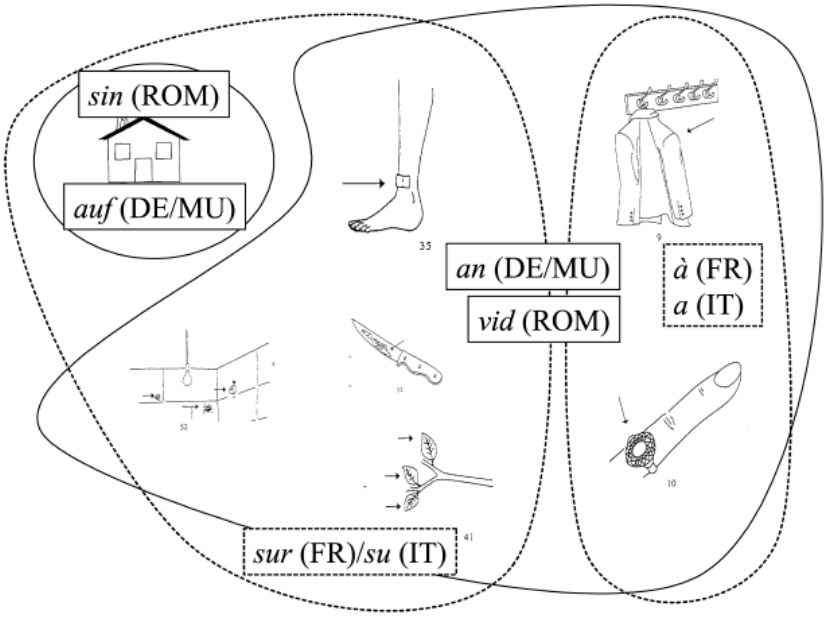


Figure 10.9: Different ways of carving up the semantic space: Romansh, German, French, and Italian *an-auf/à-sur*; line drawings from Bowerman & Pederson (1992), cf. Berthele (2007: 63)

The case of the spatial prepositions *vid(a)* and *sin*,[6] in my view, shows how language contact in the long run leads to convergence on the conceptual level: it is cognitively costly to maintain subtle semantic differences like those illustrated in Figure 10.9. Therefore, especially if the distinction has low pragmatic or communicative relevance and saliency, the semantic systems are expected to converge in a contact situation. In this case, the concepts of the stronger adstratum language (German) seem to leak into the Romansh semantic system. Older Romansh texts suggest that this convergence is not a recent phenomenon in the Romansh varieties (see the Sursilvan example (30) from 1821).

(30) Jesus ei morts **vid** la crusch.
Jesus is dead on the cross.
'Jesus died on the cross' (Hausen 1821: 73)

10.5 Concluding remarks

To sum up this chapter we can conclude that vocabulary knowledge in mono- and multilingual speakers has different dimensions, two of which are breadth (or diversity) and depth. For both dimensions there are tools to investigate, describe and test variability in knowledge. Speakers vary considerably in vocabulary knowledge, but all scholars assume that vocabulary size increases across the lifespan in normally ageing, healthy individuals.

Vocabulary depth involves knowledge of a lexeme's semantics, but also its grammatical features as well as collocational aspects. The depth of vocabulary items—their rootedness in episodic memory and their connection to a person's emotions—is often highest in the first or native language, but again things can vary considerably as a function of the individuals' linguistic biographies.

In L1 acquisition, certainly for the well documented Indo-European languages, there seem to be specific constraints on word acquisition. For example, nouns come before verbs—even in adoptees' later L2 acquisition (that often comes with L1 attrition). This latter finding suggests that vocabulary development is not tied to a narrowly, biologically defined maturational period in infancy. The concept of a vocabulary explosion in early L1 acquisition refers to a rapid increase in the number of words learnt. To what extent this increase is a universal characteristic of L1 learning is controversial, as once again there is considerable inter-individual variability.

[6] In Vallader Ladin it would be *sün*.

The Zipfian distribution we encountered in Chapter 9 does not directly predict L1 word acquisition, as the highly frequent grammatical words are learnt later than the first concrete nouns. There is thus more to L1 acquisition than the simple replication of statistical patterns in the input, even though the first words learnt by an infant are undoubtedly frequent in the child's input.

In multilingual vocabulary acquisition, we find robust evidence for smaller vocabulary inventories per language, while the number of conceptual words, that is the total of the words of all languages, is more or less equivalent to monolingual controls' vocabulary. Many studies of word learning emphasize the importance of quantity and quality of input for word learning.

When focussing on the lemma in multilinguals, it becomes clear that a simplistic view of interlingual equivalence in lexical semantics and word grammar does not account for the difficulties multilinguals have to cope with: the meanings of words are often not equivalent across languages, and learners, in particular if they want or need to match a native speaker norm, need to figure out language-specific semantic nuances in their second or additional languages. This is cognitively and acquisitionally costly, which means it is a domain prone to cross-linguistic influence. If such nuances are not salient and are irrelevant to smooth communication, the lemma side can converge as is often the case in bilingual contexts, for example in Romansh-German bilingualism.

A long-term consequence of such bilingualism is language change, as illustrated by the converged semantics of the Romansh and German spatial prepositions *vid(a)* and *an*. In language contact situations, it is quite typical to observe cases of language shift away from an L1 (often a minority language) to a majority language. If imperfect learning of this new language is involved, as in the relexification account of Creole genesis (see e.g. Lefebvre 1998), large portions of the lexical representations in the shifted population's long-term memory consist of words that formally replicate the new language but semantically represent the first language.

11 Vocabulary: Pedagogical considerations

Preview—Key points of this chapter

- Practitioners and learners often struggle with selecting lexical items in foreign-language teaching contexts.
- Units of learning: Vocabulary extends beyond single words to *collocations*, *idioms*, and *constructions*.
- *Frequency* and *coverage*: High-frequency items are crucial for beginners, as a small group of very frequent words already provides good text coverage.
- Learning processes: Vocabulary growth depends on both *incidental exposure* (through reading, listening) and *explicit instruction* (word lists, flashcards, translation).
- Engagement and retention: Cognitive *involvement* (need, search, evaluation) predicts depth of learning; repetition and distribution of input are key.
- Combination of *learning strands*: Effective teaching/learning integrates *input, output, explicit focus on form*, and *fluency* practice.

In this chapter, I summarize evidence about vocabulary teaching and learning. I also discuss some problems that emerge in the context of current ideas about the role of out-of-school exposure and of authentic material in (early) foreign-language teaching.

The main questions for pedagogy are

1. What is the level on which words should be learnt/taught (word form, lemma, flemma, family, collocations)?

2. How do we identify and select the vocabulary we want learners to study?
3. How should these units then be learnt/taught?

As we saw in the last chapter, vocabulary knowledge has several dimensions. Words not only stand for concepts/meanings that can be more or less evocative, but are also part of larger units (idioms, collocations, etc.). Several questions arise when we want to select items that should be learnt.[1]

When we determine the target vocabulary for (a group of) learners, we select items based on more or less explicitly formulated criteria. But what items exactly?

- single lemmas (*bucket, cacahouète, Apfel*)
- word forms in frequently occurring contexts (*I filled the bucket*)
- constructional patterns with variable lexical slots (*I am looking forward to x.ing*)
- phrasal verbs (*put on*)
- set phrases, idioms (*kick the bucket*)

Moreover, the question arises which type of information in Figure 10.1 should be prioritized or can be backgrounded/neglected.

The components thus involve elements of word forms (including derivational and other morphological information) and meaning (including the word's grammatical/constructional affinities).

Regarding question (1) above, scholars agree that vocabulary knowledge also means mastering typical collocations and idioms in the target-language (see Wood 2019 on how to identify formulaic language). There are studies that investigate specifically how such *lexical bundles* can be learnt efficiently (see Northbrook et al. 2022 on English and Forsberg Lundell et al. 2018 on French as a foreign language).

[1]See the review by Schmitt (2008) that addresses this problem on p. 332 (Table 2).

11.1 What should be learnt (first)?

Remember the Zipfian distribution that is typical for the frequency distribution of words in natural languages (Section 9.3.2). This distribution has important consequences for the selection of words in pedagogical settings: words vary greatly when it comes to their usefulness for learners.[2]

Except for the small set of extremely highly frequent words in each language, general usefulness of a lemma is difficult to establish: there are many factors that potentially influence the likelihood of use of a given item in a specific situation. The English word *lemma* is very useful in the context of linguistics, but car mechanics or nurses may well live happy and lexically rich lives without ever encountering it. However, as already mentioned, we know that a relatively small set of words (scoring highest in corpus-based frequency counts) is very likely to cover a high proportion of words in a randomly selected text in the target-language.

> Although the language makes use of a large number of words, not all of these words are equally useful. One measure of usefulness is word frequency, that is, how often the word occurs in normal use of the language. From the point of view of frequency, the word *the* is a very useful word in English. It occurs so frequently that about 7% of the words on a page of written English and the same proportion of the words in a conversation are repetitions of the word *the*. Look back over this paragraph and you will find an occurrence of *the* in almost every line. (Nation et al. 1997: 8)

11.1.1 Understanding lexical coverage: Authentic French texts and oral language use

In order to estimate learners' needs, it is useful to estimate which words they are likely to encounter in relevant communicative situations.

In a second step, we can estimate how well the input that learners receive (from teacher talk, from peers, or from other sources) provides the lexical material required to cope with these situations.

For a concrete example let us assume that we are interested in building up the skill of being able to participate in everyday oral interaction among Francophones. Our goal is thus to teach/learn rapidly a maximum of words that may be used in informal spoken language. Of course it is impossible to know which

[2] See Vilkaitė-Lozdienė & Schmitt (2019) for a thorough discussion of frequency and usefulness of vocabulary items.

words exactly will be used, but based on spoken language corpora we can at least guess which words will be more or less likely to occur.

If we assume that speakers produce about 100 tokens per minute, the number of tokens in 30 minutes of talk would correspond to about 3000 tokens/word forms.

Let us first look at these words: how many *different* words will the learner encounter? And is it possible to predict *which* words these will be?

To answer this question, we can draw a weighted sample of 3000 words from the French subtitle corpus (New & Pallier n.d. "Lexique3") as shown in Table 11.1.

Table 11.1: Words occurring at least 10 times in our toy sample of spoken French.

Lemma	count	Lemma	count	Lemma	count
le	281	en	35	y	15
il	276	on	31	non	14
de	153	aller	30	plus	14
être	129	tout	27	savoir	14
à	87	soi	25	vouloir	14
avoir	66	se	24	dire	13
ne	63	pour	22	avec	12
pas	60	que	21	oui	12
un	60	qui	19	venir	12
son	57	bien	16	voir	12
ce	47	dans	16	sur	11
et	47	pouvoir	16	fait	10
ça	35	faire	15		

The sample weights are based on the frequencies of the corresponding lemmas in the Lexique3 corpus. This means that high-frequency words (that are grouped in lemmas) are proportionally more likely to be chosen in our sample than low-frequency words. The specific instance of a sampling event like that used here produced a total of 798 different lemmas, of which 243 occur more than once in the 30 minutes and 555 only once.

Table 11.1 lists the words that occur at least 10 times and their number of occurrences. Once again, we discover a Zipfian distribution of these words (cf. Figure 11.1).

Note that all the words that occur only once are represented by the overlapping points on the very right-hand side of the graph. If we sample once again

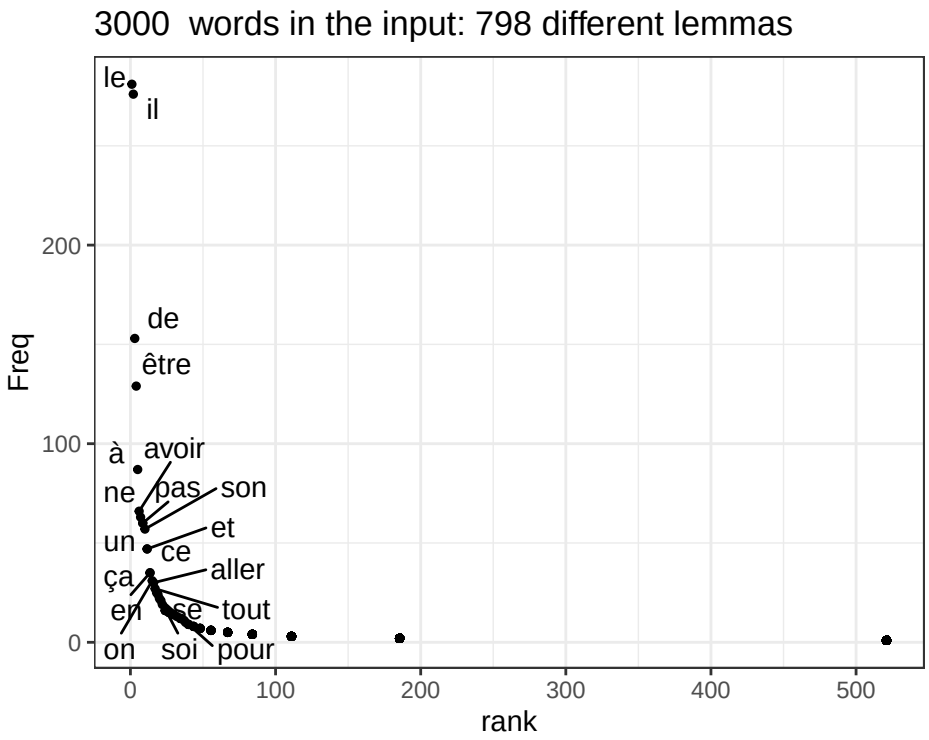


Figure 11.1: Frequency and rank of a sample of spoken French

applying the same procedure, this latter set of rare words in particular changes considerably. Repeated sampling from the oral corpus simulates the fact that we may encounter relatively different low-frequency words in different conversational events.

Let us assume that an important source of a learner's vocabulary is extensive reading, for example of newspaper articles. Let us further assume that each word in an article read will be known to our learner—either because it is already mastered or because they look it up when reading and then remember it. Keep in mind that this idealized language learner who systematically notes all unknown words and then learns them efficiently is a rare specimen.

How does vocabulary growth based on new words from authentic texts increase the lexical coverage of the target sample of (spoken) French?—For our pedagogical purposes I have sampled 10 recent articles from French newspapers (mostly Libération (n.d.)) on totally different topics. Here is the lexical overlap of the first, randomly chosen, article with our target sample of 30 minutes of

spoken French:

86 lemmas that are present both in the newspaper article and in the spoken sample

à, agir, ailleurs, aller, an, aussi, autre, avec, avoir, bon, ce, cela, celui, comme, croire, dans, de, début, demande, déplacer, deux, devoir, dire, donc, droite, en, ensemble, entre, espace, et, être, falloir, fin, fois, gens, gros, heure, ici, il, juste, le, lui, maintenant, mais, même, moins, monde, moyen, ne, nom, nouveau, or, ou, où, par, pas, passer, permettre, plus, pour, pouvoir, premier, prendre, problème, proche, produire, propre, que, quelque, qui, rester, revenir, sans, se, soir, son, sortir, texte, tout, train, transport, un, ville, voir, voiture, vouloir

Now we can add more and more texts to the database, and check how many additional lemmas are shared between the new text (and the previously added texts) and the target sample. Table 11.2 shows how this lexical overlap changes for a total of 10 authentic texts in our toy example. It also shows how the first and second sets of each of the most frequently used 1000 lemmas in French (the K-columns on the right) increase coverage.

Table 11.2: Text coverage of spoken French with sample texts

	1	2	3	4	5	6	7	8	9	10	1K	2K
tokens	599	1,265	585	691	553	1,223	1,244	812	852	617	1,000	2,000
unique lemmas	255	467	228	278	228	476	408	343	309	204	999	1,988
lemma coverage	86	125	73	84	71	127	135	97	90	64	357	487
token coverage	1,771	1,987	1,675	1,764	1,703	1,952	1,995	1,845	1,850	1,701	2,356	2,640
cum. lemma coverage	86	159	181	202	213	251	285	300	311	314	450	526
cum. token coverage	1,771	2,094	2,125	2,180	2,198	2,265	2,316	2,348	2,369	2,376	2,612	2,699
% lemma	11	20	23	25	27	31	36	38	39	39	56	66
% token	59	70	71	73	73	76	77	78	79	79	87	90

What the table shows is an increase in the number of lemmas and, obviously, word forms covered. However, this increase is rather small, despite the fact that new texts each provide a long list of lemmas. The likelihood of encountering most of these new lemmas from the newspaper texts in our sample of spoken input is relatively small.

The second important lesson to be learnt from the table is that the frequency-based word lists (the 'K' columns on the right-hand side) provide a higher coverage of the oral text. Figure 11.2 shows the lexical coverage graphically.

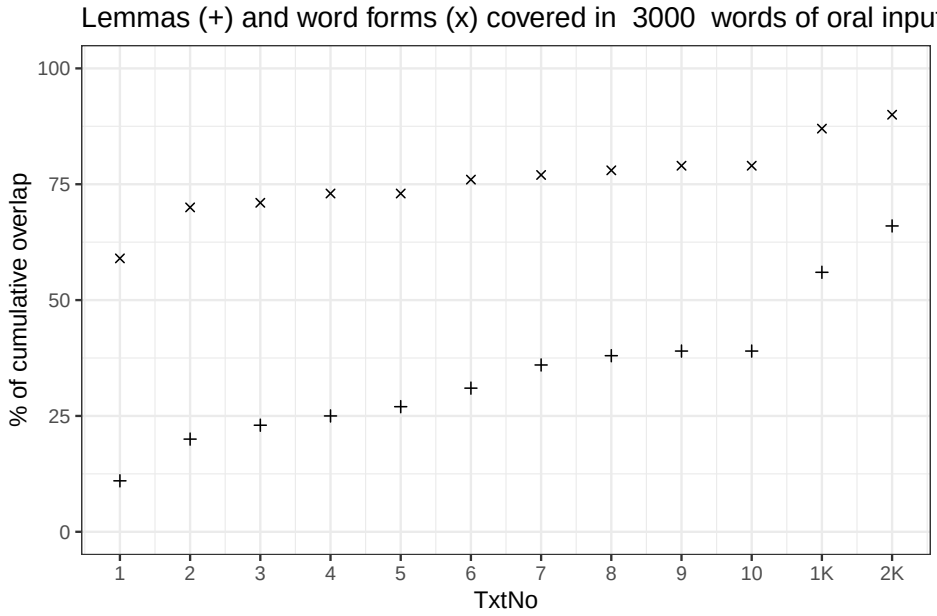


Figure 11.2: Increase in overlap of more written input with a sample of spoken French

In this toy example, we have considered a weighted sample of words from the subtitle corpus and the lexical overlap that an idealized learner could attain by systematically learning from input. The goal was to get a feeling for the likelihood that words found in one (authentic) text will also be used in another comparable text. We have seen that learning from frequency-based word lists (1K, 2K, …) would provide right away a much higher text coverage than words that could be learnt from authentic or other input.

This is relevant for the selection of words to learn (and hence also for the texts to be used) in foreign/second-language classes. It is frustrating if a lot of time is spent learning words that are highly unlikely to be useful in the future. Above we have considered the overlap of written input and an oral target sample. Written and oral language have different properties, and obviously we could also take into account the topics of the texts and many other features when we try to predict words that may be encountered by learners. Even if we did this, the

fundamental problem of the unpredictability of low-frequency vocabulary in the input remains.

11.1.2 Frequent words and text coverage

The specific distributional characteristics of words in texts lead to a non-linear increase in text coverage if we add words on our word lists based on their corpus frequency.

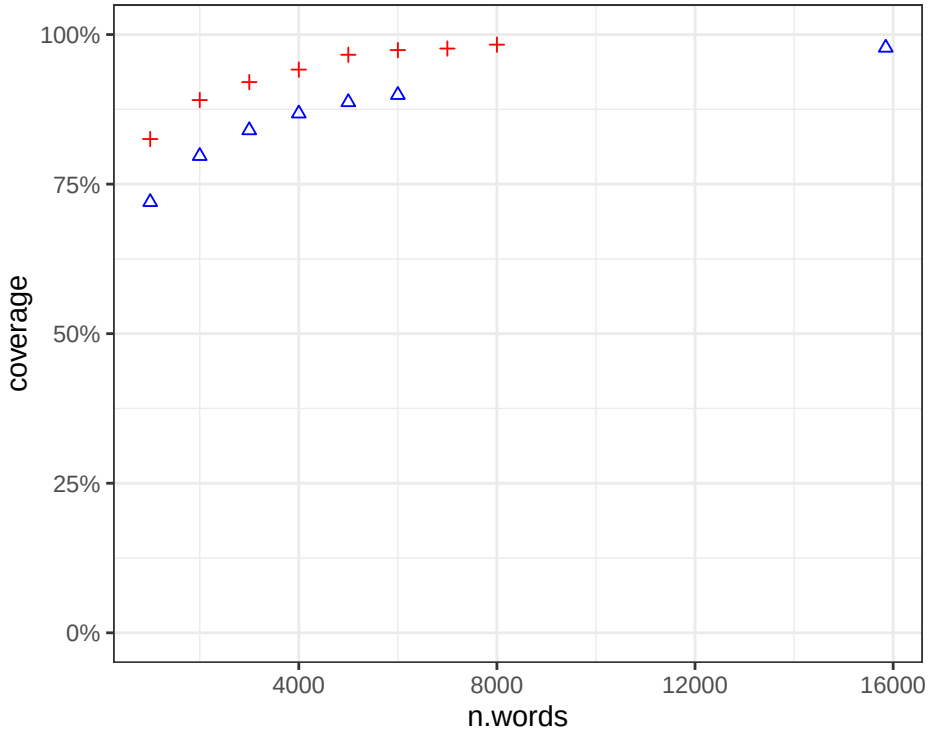


Figure 11.3: Text coverage and lexical breadth according to Nation & Waring 1997 (triangles) and in the study of Peters (2019) discussed below (plus signs)

In English, 2,000 lemmas cover about 80% of the text tokens in authentic texts (Nation et al. 1997, Nation 2016). Hu & Nation (2000) investigated the question of how high the text coverage needs to be to completely understand a text in reading. The result obtained (based on 66 L2 university learners of English) suggested that 98% of the words need to be known to fully understand the text. This

means that 1 word in 50 may be unknown. Applying this 98% threshold, very many lemmas (≈16,000) and word families need to be learned (6,000–7,000).

This study was highly influential and the value of 98% is now used in many other publications. However, more recent work suggests that the 98% threshold may be set too high: replication studies (e.g. Kremmel et al. 2023, Webb et al. 2025) question the idea of a clear threshold. A very good text comprehension may already be possible with lower levels of coverage, e.g. 90%. However, even if we lower the threshold considerably, the vocabulary size for good comprehension is still considerable. For example, Newton (2019: 255) argues that reading academic texts in English without struggling to grasp the main content requires a vocabulary of about 8,000 to 9,000 lemmas.

Based on the influential paper by Hu & Nation (2000), just mentioned scholars have claimed that learning new words from simply reading (authentic) texts equally requires knowledge of 98% (or only slightly fewer) of the words. The red plus signs in Figure 11.3 show to what extent the most frequent English words cover the words used in a 12 minute TV segment. This segment was used in the study by Peters (2019) that will be discussed below.

Numbers that show text coverage obviously vary as a function of what is counted: in his more recent work, Nation (2016: 34) shows how many words of a 14-million-word corpus are known if the most frequent 1,000 words are learnt: the 1,000 most frequent word types cover about 76.5% of these words, 1,000 flemmas about 81%, and 1,000 word families 81.7%.[3]

11.1.3 Authentic texts as teaching material

All these considerations are relevant for the selection of written and oral input and word lists in foreign-language teaching. What words should learners encounter and (ideally) learn? The answers vary considerably. Modern teaching materials sometimes advertise that they use mainly or even exclusively authentic materials:

> Viele der französischen und englischen Hör- und Lesetexte sind *authentisch*, d.h. sie sind nicht eigens für das Sprachenlernen verfasst worden.
> Many of the French and English listening and reading texts are *authentic*, that is, they were not written specifically for language learning.
> (Translation RB. This example is from the Swiss German context, from an information leaflet on the teaching materials *Mille-Feuilles*, cf. Bertschy 2010).

[3] There are different types of families; in this case Nation groups a word root, and all its inflected forms and affixes such as *-ly, -er, un-, -th.*

An analysis of this French-as-a-foreign language textbook reveals that about 14% of the 1,000 most frequent words in French are not used and are therefore unlikely to be encountered by the children in the first years of French language learning.

These teaching materials were not received very favorably by the teachers.[4] Interviews with teachers who were expected to work with the materials (Pozníček 2023: 18) show that they were aware of the somewhat exotic vocabulary used:

> Da können sie vielleicht *der Mauersegler* und *das Chamäleon*, aber *die Kuh* hatten sie noch nie. (p. 17)
> 'Then they know maybe *the swift* and *the chameleon*, but *the cow* they've never heard'

At the same time, we have to keep in mind that even a repeated occurrence of a word in the input does not mean the word is automatically learnt. And, finally, the above examples do not include teacher input and other *ad hoc* materials that enrich the pupils' vocabulary input.

11.1.4 Frequency: Skewed or balanced input?

We have already mentioned the—somewhat trivial—relationship between the frequency of a word (or a construction) and learning. The literature, in particular if the usage-based perspective is adopted, is in broad agreement that, as Ortega (2015: 362) puts it, "iterative experience of […] highly frequent form-meaning mappings, […] meaningful chunks in rich […] and varying contexts" is conducive to learning in communicative language teaching.

If we study learning of collocations and constructional entities, the question arises how the fillers, that is the variable elements in a construction, should be distributed in the input. Such slot-fillers in the frame-and-slot view (see Chapter 6) could be adjectives that are frequently associated with verbs (as in the Spanish examples (1) where typical adjectives are associated with the semantically very similar verbs *poner* and *quedar*), or past participles that are combined with the verb *sein* 'to be' in German (2).

(1) a. ella se pone nerviosa cuando habla en público
she REFL become nervous when speaks in public
'she gets nervous when she speaks in public'

[4] See e.g. Singh & Elmiger (2017).

b. al ver al perro, el gato se quedó quieto de repente
at-the sight of-the dog, the cat REFL became still suddenly
'when it saw the dog, the cat suddenly became still'

(2) a. das war spannend
this was exciting

b. das war überraschend
this was surprising

Similar to the lexico-statistical regularity in the domain of individual words (remember the Zipfian distribution in Figure 11.1), such constructions also show rather skewed frequencies: a handful of adjectives are frequently (and prototypically) associated with specific verbs (the examples (1) are inspired by Pulido 2024), while others only rarely occur in large corpora. Moreover, learners might learn a construction such as *sein* + present participle more easily if they take in many occurrences of only a few variants of the construction (skewed input) as opposed to a great variety of combinations (balanced input, examples (2) a and b from Madlener 2015: 105).

There is a growing body of experimental studies that test how different lexical types should be varied in their constructional frames so that constructions and collocations may be learned efficiently. For example, Pulido (2024) carried out a study where he compared learning efficiency of the collocational patterns of Spanish verbs as illustrated in (1). The study compared a condition in which the semantic rule is briefly explained to another condition where learning is purely input-driven. The results suggest that in the condition with rule explanation learners with relatively small working memory benefit greatly from skewed input where the typical collocates (here, typical adjectives as those used in the examples above) are frequently co-occurring with their verbs. For learners with high working memory capacity on the other hand, more balanced input was better to generalize to constructional affinities of semantically related adjectives with specific verb types.

Moreover, the study by Madlener (2015) shows that in particular in initial states of learning the new German construction (see examples (2) a and b), exposing learners to fewer types of present participles led to better learning than using more different lexical types in the input.

Since such skewed (or Zipfian) collocational frequencies are what exposure to language normally involves, it seems indeed that this feature of natural language is also positively associated with learning in second/foreign-language settings, in particular in early stages and with weaker learners (see Chapter 14 for more on the latter).

11.2 How can and should words be learnt?

An influential approach to vocabulary teaching/learning are the four learning strands for frequent words (Nation 2003). These four strands are:

1. Learning from meaning-focused input – learning through listening and reading
2. Deliberate language-focused learning – learning from being taught sounds, vocabulary, grammar, and discourse
3. Learning from meaning-focused output – learning by having to produce language in speaking and writing
4. Developing fluency – becoming quick and confident at listening, speaking, reading and writing

In the following we examine evidence about learning in the different strands enumerated above. But first we have to introduce the notion of *involvement load*, which seems crucial for (vocabulary) learning.

11.2.1 Learning from meaning-focused input

As Laufer & Hulstijn (2001) argue, in communicative foreign/second-language learning, the degree of involvement is crucial for vocabulary learning (and probably for learning in general):

> Other factors being equal […]
>
> words which are processed with higher involvement load will be retained better than words which are processed with lower involvement load (15) […]
>
> teacher/researcher-designed tasks with a higher involvement load will be more effective for vocabulary retention than tasks with a lower involvement load. (Laufer & Hulstijn 2001: 17)

Unless specific vocabulary learning sessions are implemented,[5] communicative activities *can* lead to vocabulary learning provided they foster involvement along the three dimensions of *need*, *search*, and *evaluation*:

[5] See Section 11.2.4 for more details on these learning activities that are *not* communicative tasks.

- need—for a word, construction to express concept/message
- search—consult dictionary, authority, DeepL
- evaluation—assess fitness of word to co-text, context

Laufer & Hulstijn (2001: 18) argue, for example, that simply reading a text for comprehension with glossed words in the text is low on all three dimensions, need, search, and evaluation. At the other end of the continuum, writing an essay in which new words need to be looked up and integrated into the text would be high on all three dimensions—and thus arguably more beneficial for word learning (see Yanagisawa & Webb 2022 for a recent update of the framework).

As we have seen in Chapter 6, in particular theories that do not assume that there is a strong interface between explicit and implicit knowledge emphasize the importance of 'natural' learning based on meaningful, comprehensible input.

This view of (second, third) language learning in part motivated changes in foreign-language teaching practices: authentic materials and more generally input in the target-language were seen as the best basis for language learning. In the meantime, based on research, we know under what conditions words can be learnt in this learning strand:

> For vocabulary learning to occur in this strand, learners need to know 98 percent of the running words already. That means that, at most, there should be only one unknown word in every fifty running words. (Nation 2003: 133)

Today, as discussed above, lower numbers are assumed for good comprehension, which also lowers the requirements for learning. In the literature, lower thresholds such as 90% are now discussed (cf. Schmitt 2008: 330).

According to Schmitt (2008: 331), learners need to know about 8,000 to 9,000 word families for English reading comprehension, and about 5,000 to 7,000 word families for efficient speaking and listening. To what extent is attending to *teacher talk* an efficient strategy for acquiring these word families?

Horst (2010) investigated teacher talk based on a 121,000-word corpus of teacher talk from an adult English teaching/learning context (advanced learners).

The examination of the teacher input corpus showed that knowing 4,000 frequent English words covered about 98% of the words (tokens) in the teacher input. Teacher input, however, also "contained hundreds of words likely to have been unfamiliar to the learners" (161), most of which were not repeated enough to foster retention in the learners. The author concludes that simply attending to teacher or other input is not efficient.

> Attending to teacher speech is an inefficient method for acquiring knowledge of the many frequent words learners need to know, especially since many words used frequently in writing are unlikely to be encountered at all. (Horst 2010: 161)

From other studies we can gather that if comprehension, i.e. the content, and not the linguistic form is the focus of teaching, students need many repetitions of new words in order to learn them. The figures vary, but Horst reports the figure of "30 times or more" (Horst 2010: 162).

Exclusively exposing learners to teacher talk input is thus insufficient as the frequency of useful words is too low and the involvement of the recipient is not high enough.[6]

One of the questions that currently gets a lot of attention is the use of videos with and without subtitles in the target-language (captions) or in the learners' first languages. Suter et al. (2024) investigated 97 beginner learners of French in a Swiss lower secondary school who watched several episodes of a French sitcom. She compared word learning of items used in the series across several conditions. The results show that whereas some learning occurred in all conditions, it was in particular the words that were also taught explicitly in class (before or after the corresponding episode was watched) that were retained by the learners—which can be taken as evidence for the importance of the combination of the different learning strands mentioned above.

The investigation of effects of captions and subtitles in audiovisual input is currently a prolific field of research (see Montero-Perez et al. 2013, 2014, Perez et al. 2018, Pujadas & Muñoz 2019, Pattemore & Gesa 2025). The study by Peters (2019) has already been mentioned in Figure 11.3 above. Peters investigated 118 lower secondary school learners of English with Dutch/Flemish as a first language (5th and 6th grades, mean age 16;4, proficiency level B1). Different groups were presented with a short film in different experimental conditions: without any written text, with captions (in the language of the film, i.e. English), and with L1 subtitles (Dutch). The film was a 12-minute segment of the BBC series *Planet Earth*. There were 36 target items, of which 15 were synchronously depicted in the film. These items were tested before and after the film was shown. The tests tapped into the recognition of the word forms and into meaning recall of the words (lemmas) by asking for synonyms, translations, etc.

[6] Northbrook et al. (2022: 457) also argue in a similar vein that vocabulary learning in the domain of lexical bundles/collocations requires sufficient repetition and noticing on the side of the learners.

Table 11.3: Text coverage in the 12-minute long video used by Peters (2019)

Frequency band	Tokens	Cumulative tokens
1K	82.00%	82.53%
2K	6.52%	89.05%
3K	3.00%	92.05%
4K	2.09%	94.14%
5K	2.48%	96.62%
6K	0.78%	97.4%
7K	0.86%	97.66%
8K	0.65%	98.31%
>8K and off-list words	1.69%	100%

The captions group (subtitles in L2 English) showed 2.5 times better form recall and two times better meaning recall than the group without any text. The captions group also learnt significantly more than the L1 subtitle group. On-screen imagery enhanced word learning considerably, as it was three times more likely that a word would be retained if it was visually supported. Moreover, cognate words were more likely to be learnt than non-cognate words.

Thus, it seems that for learners with a certain (B1) level of target-language proficiency, using captioned video material is an efficient way to develop learners' vocabulary.

The evidence discussed in this section suggests that the idea that learners simply and efficiently pick up words when presented with target-language input needs to be revised. According to a study by Mondria (2007: 66), there are measurable differences in vocabulary retention as a function of the learners' activities and the mode of presentation (cf. Table 11.4).

Table 11.4: Learning method and receptive retention in % (Mondria 2007: 66)

Inferring	6
Inferring + verifying	15
Inferring + verifying + memorizing ('Meaning-inferred method')	47
Memorizing ('Meaning-given method')	50

Some of the figures in Table 11.4 challenge still widely held ideas about the exclusive use of the target-language in foreign/second-language teaching, as they show that using the L1 (or other languages) can be very efficient, as compared to teaching the words and their meaning in the target-language only.

The evidence shows that providing learners with the meaning of words (by drawing on other languages, by paraphrasing them in the target-language), if the involvement load instantiated in learners' need, search, and evaluation is high enough, can lead to efficient vocabulary learning. This confirms Schmitt's conclusion about incidental learning of vocabulary:

> [I]t can no longer be assumed that an adequate lexis will simply be 'picked up' from exposure to language tasks focusing either on other linguistic aspects or on communication. Rather, a more proactive, principled approach needs to be taken in promoting vocabulary learning, which will require contributions from four learning 'partners'. Remember, the four learning partners are: learners, teachers, researchers, material writers (Schmitt 2008: 333).

11.2.2 Learning from meaning-focused output

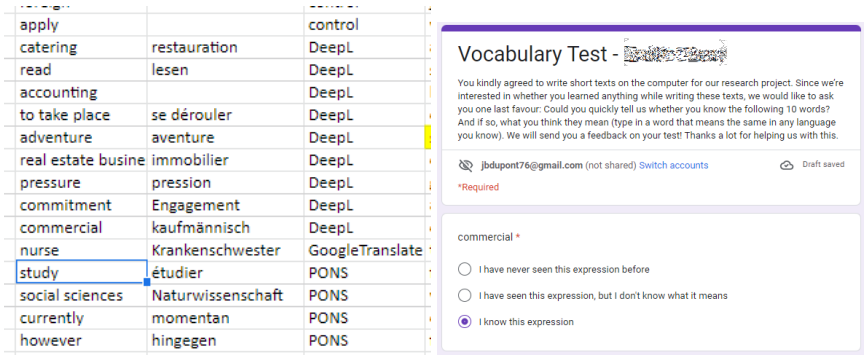
Words may also be learnt in the context of writing tasks. Silva et al. (2024) investigated the learning of new academic words by young adults in different writing conditions, in unconnected sentences containing the new words and in coherent compositions. The study also drew on the involvement load hypothesis mentioned above and analyzed both breadth and depth of vocabulary learning. The researchers found that using the words in isolated sentences was more efficient for learning than in coherent compositions, which is not predicted by the involvement load hypothesis (the results should be more or less identical in both conditions). This study shows that the cognitive load of a writing task, which is arguably higher when a coherent text is to be written, may influence vocabulary learning.

In an investigation of the effects of digital tool use on foreign-language learning,[7] we tried to find out whether looking up words online (in dictionaries or in DeepL, GoogleTranslate, etc.) when writing a text in a foreign language leads to vocabulary learning. We tested a total of 46 learners of English in vocational training who were asked to write an application letter for an internship in an English-speaking country. We logged their activities with software (InputLog,

[7] See Udry et al. (2022) for more information on the project.

Leijten & Van Waes 2013), which allowed us to identify which words they had been looking up online when writing, and we also knew which tool they used when looking them up.

We prepared customized tests (Figure 11.4) for each participant's distractors and with five of the words they had looked up. The tests were administered two weeks after the writing phase, and the learners had to answer items based on a simplified version of the vocabulary depth scale discussed in Chapter 10.



apply		control
catering	restauration	DeepL
read	lesen	DeepL
accounting		DeepL
to take place	se dérouler	DeepL
adventure	aventure	DeepL
real estate busine	immobilier	DeepL
pressure	pression	DeepL
commitment	Engagement	DeepL
commercial	kaufmännisch	DeepL
nurse	Krankenschwester	GoogleTranslate
study	étudier	PONS
social sciences	Naturwissenschaft	PONS
currently	momentan	PONS
however	hingegen	PONS

Figure 11.4: An example from the customized vocabulary test

We wanted to know whether the students who looked up words remembered them two weeks later, and whether there is a difference in retention depending on the tool used. The students had not been notified that they would be tested on words. Figure 11.5 shows that the percentage of retention was higher if an online dictionary was used, compared to a translator.

Our explanation for this difference is that looking up a word in a dictionary requires more involvement, in particular regarding the evaluation component: the dictionary provides information on the lemma that needs to be processed before the word (form) can be inserted in the written text, which will arguably lead to a better retention of the item looked up. As we don't know whether the words looked up were really unknown or whether looking them up was just a matter of checking spelling or any other uncertainty, the result needs to be confirmed by more controlled additional data, which we are currently in the process of gathering.

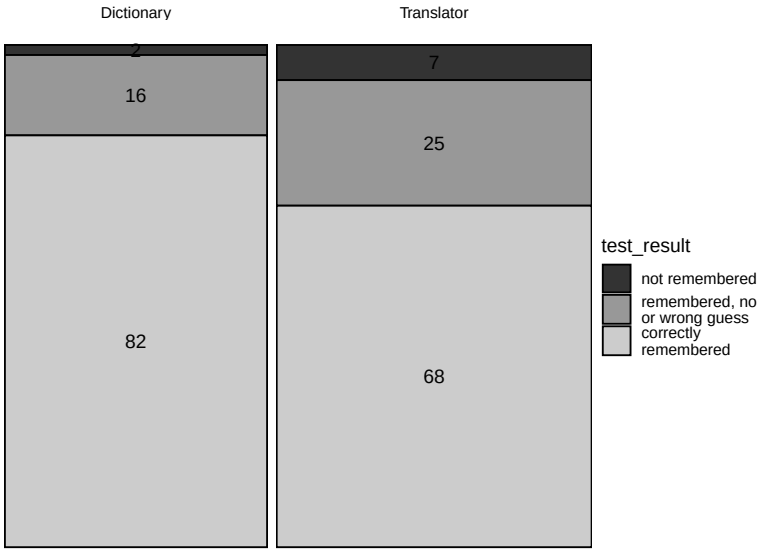


Figure 11.5: Percentage of remembered words that had been looked up online

What is going on in Lx users' minds? As argued here, it is difficult to infer learners' thoughts even if we can observe and record their keystrokes and clicks on a computer. How could we get a better grip on their vocabulary knowledge in the kind of task described above? Try to come up with a research design to investigate such use of digital tools that would allow us to make stronger claims on word learning.

11.2.3 Other noteworthy use contexts involving input and output

An interesting example that shows how the exposure to the target (foreign) languages in school has a limited impact on vocabulary learning is Peters et al. (2019). The study investigated the vocabulary of Flemish (Dutch) learners of French (L2) and English (L3). In Flemish schools French, the other large national language, is taught first. English only starts at lower secondary level. Despite the curricular privilege attributed to French, English vocabulary is larger and grows faster. One of the few statistically significant predictors in the analysis is out-of-school exposure to English, and here in particular the amount of time spent in online activities, mainly gaming.

There is an increasing body of evidence that underscores the importance of extramural, that is out of school, engagement with target-languages (Sylvén & Sundqvist 2012, Sundqvist 2009, Kaatari et al. 2023, Gyllstad et al. 2025).

In the previous sections I did not address *bilingual education* or *Content and Language Integrated Learning* (CLIL) settings specifically. Such didactic paradigms are often presented as preferable alternatives to more traditional classroom teaching of foreign languages, as the results of the latter, specifically for young learners, are often considered to be somewhat disappointing (Pfenninger & Singleton 2017). There are some studies on bilingual education in the school contexts that specifically target vocabulary teaching and learning.

For example, the study by Imgrund (2008) reports on vocabulary skills in 9th graders in a CLIL setting (history taught in the foreign language French).

Based on evidence from retrospective interviews with CLIL learners, among other things, Imgrund argues that CLIL can lead to a restricted vocabulary in the main language of schooling:

> Increased schooling in the target-language may lead to a reduction in German vocabulary. (Imgrund 2008: 26, translation RB)

Even though in many contexts CLIL teaching paradigms seem to yield good results both on the linguistic and the subject-matter levels, the success of the approach is not guaranteed and depends on a multitude of pedagogical and environmental factors (see Uhl et al. 2023, Roussel et al. 2017, Rumlich 2017 for more on the effects of CLIL and immersion programs).

As we have seen earlier, there is more to target-language vocabulary learning than simply picking it up from input, also in CLIL or immersion settings with a lot more input than in the more traditional communicative foreign-language classroom. The findings and problems described above suggest that a) using the learners' first languages in vocabulary teaching is not *per se* a bad idea and that b) learners do not simply and quickly pick up words from teaching materials or teacher talk. Therefore, scholars have argued that language-focused techniques can and should be used in bilingual/immersion/CLIL settings. One such proposition was made by Gajo (2007).

They argued that successful CLIL teaching is not simply teaching the subject-matter in another language, but teaching that involves the systematic clarification and explanation of both the conceptual and the linguistic/semantic levels.

The examples from studies on CLIL classroom interactions are another illustration of the necessity of increasing the involvement load for vocabulary learning—or for language learning more generally.

11.2.4 Explicit learning of vocabulary

Let us finish the chapter by looking at the second learning strand mentioned above, the deliberate and focused learning of vocabulary items.

Flashcards, either as actual paper cards or on a digital device, turn out to be an efficient and time-saving way to develop vocabulary. As discussed by Nation (2003: 138), teachers whose pedagogical ideas are shaped by the communicative approach sometimes regard such learning with contempt. But the evidence is rather clear that deliberate learning is efficient. For example, the meta-analysis by Webb et al. (2020) of explicit vocabulary learning shows differential effects of different methods. Flashcards and—perhaps more surprisingly—word lists seem to be relatively efficient.

Note that this does not imply that vocabulary learning should be the only learning fostered by teachers and learners:

> This should not be interpreted as saying that deliberate learning should replace incidental learning, but it does show that deliberate learning should be part of a well-balanced course. (Nation 2003: 138)

Moreover, the evidence is also quite clear that trying to exclude completely any reference to first or other previously learnt languages in word learning is not only psycholinguistically impossible, but also inefficient:

> [G]iven the ubiquitous nature of L1 influence, it seems perfectly sensible to exploit it when it is to our advantage. One case where there is a clear advantage is in establishing the initial form-meaning link. […] [U]sing L1 translations was much more effective than providing L2-based meanings […]. (Schmitt 2008: 337)

A mnemotechnic method that is often cited as efficient in creating memory traces of new word forms is the *keyword method*:

> Consider, for example, the Spanish word *carta* meaning *(postal) letter*. Using the keyword *cart*, a learner might generate either an image of a shopping cart transporting a letter, or a sentence such as *The cart carries the letter*. (Pressley et al. 1982: 50)

There are experimental studies, often with words from artificial languages (e.g. Stork 2003) that suggest that this method is indeed rather efficient. However, as

always, the better the empirical methodology controls for other intervening factors, the less impressive the gains of this specific mnemotechnic method become compared to alternative ways of memorizing words. For example, it seems important to control for the impact of an immediate post-test (for which the keyword condition may show superior benefits than for instance rote learning) on a delayed post-test: the keyword method may turn out to be less efficient in the longer run than for example simple rote learning of the words. Moreover, some studies suggest that the keyword method is suitable for certain learner groups (e.g. beginners) but not for others (e.g. more advanced learners).[8]

There are not many studies on explicit learning activities using more than two languages. In an experiment with flashcards, Deuber & Berthele (2024) tested whether learning completely unknown and non-cognate (Estonian) words in multilinguals works better if the flashcards come with translations into two of the participants' languages rather than just one (usually L1). The results do not show any advantage for the multilingual condition in vocabulary retention; on the contrary, the monolingual learning condition seems to lead to the best retention of items. In keeping with Barcroft (2015), an explanation could be the competition for processing resources in learning: it is possible that being exposed to two different pre-acquired forms when learning a new word form is less efficient than mapping the new form to one known form (and meaning).

11.3 Concluding remarks

Vocabulary learning benefits from a mixture of tasks that belong to the different learning strands. Simply increasing the involvement or intensity of learning in one type of task (i.e. one strand) alone is not sufficient, as there is evidence for trade-offs between different dimensions of lexical processing (Barcroft 2015): if learners in a task focus strongly on meaning, the formal aspects of an item are backgrounded and less likely to be learned.

The evidence discussed in this chapter suggests that it is unlikely, in particular at lower levels of language proficiency, that words will be picked up effortlessly just from exposure to the target-language, for several reasons. First, the words of the target-language often do not occur frequently enough in the input to get a chance to be learned. Second, the learners need already to know many other words in order to infer the meaning of newly encountered items. Incidental learning in the first of Nation's learning strands is based on previous knowledge that is not necessarily available to all learners. Therefore, beginners should rapidly

[8] See Lindstromberg (2019: 247) for an excellent discussion of the evidence on the keyword method.

attain as high a lexical text coverage as possible, so that they can benefit more from such implicit learning processes. In other words, the (lexically) rich benefit from rich input, but the (lexically) poor are likely to be overwhelmed by the input and fail to progress. This is an instance of a Matthew effect (cf. Stanovich 2000 for such effects in reading).

Regarding the suitability of authentic texts as input for beginners, such materials should be used cautiously, as they will only provide low lexical coverage of future texts the learner will encounter. Moreover, if the learners' vocabulary is small, comprehension will be very difficult and thus not much incidental learning will take place. Moreover, even if some low-frequency items are learnt, they are likely to be relatively useless beside high-frequency words in the 1K or 2K bands.

It thus seems a good idea, at the beginning of new language, to teach the most frequent word families (ideally ≈3,000) as suggested by Nation et al. (1997). In doing so, it is certainly also useful to rely on L1 knowledge, in particular at the beginning (Schmitt 2008: 337).

An explicit focus on lemma properties and aspects of the lexeme (word form), again in particular at lower proficiency levels, is more efficient than hoping for incidental learning only. This is not to say that the first learning strand is not also important, and specific teaching paradigms are well suited for catering to this strand: CLIL, immersion, or exchange programs, provide learning opportunities with significantly higher language exposure. But even there, purely focusing on content and not also on language is less efficient, as learners do not necessarily notice cross-linguistic similarities or differences.

> The most effective and efficient lexical development will occur in multifaceted curriculums that achieve a pedagogically sound balance between explicit activities for L2 learners at all levels of their development. (Hunt & Beglar 2005: 1)

It is thus recommended that the learning strands be mixed, and the involvement load increased, when working with texts with unknown words. The process of vocabulary learning, regarding both breadth and depth, is incremental in nature and takes time. Both noticing and sufficient exposure are required for learning.

Memory strategies and multimodality can help create lasting long-term memory traces. Both traditional (flashcards) and digital tools provide admittedly non-communicative learning techniques that efficiently speed up the learning of the fundamental vocabulary (Mahdi 2018).

A crucial difference between L1 and L2 learning is that in L2 learning a conceptual system of semantic and functional categories is already in place. This conceptual system permits faster mapping of forms to (known) concepts. As discussed in Chapter 3.2.2, the specific lexical semantics may not be perfectly equal across the languages in a multilingual's repertoire. If such semantic differences are subtle enough, they may fly under the learner's radar and fail to be acquired. Again, this shows the usefulness of processes that help learners notice the differences between the languages involved.

Overall the evidence does not yet justify discarding altogether more traditional, explicit learning paradigms as inefficient (see also the discussion of the meta-analysis by Norris & Ortega (2000) in Chapter 6).

Converging evidence, as discussed in this chapter, suggests that simply relying on comprehensible input as advocated by Krashen (see Chapter 6), relying on the low-effort workings of the *Language Acquisition Device* (see Section 4.1), is not good enough. The studies discussed in this chapter suggest that purely incidental learning, through attending to target-language speech is not necessarily the most efficient approach, in particular not if the exposure to authentic target-language use is only short, that is two to three hours a week.

12 Transfer across similar languages

Transfer across similar languages: Multilingualism, dialects, and closely related languages

Preview—Key points of this chapter

- Multilingualism involving *dialects*, *sociolects*, and *closely related languages* is special as it increases the transfer potential.
- Bidialectalism and multilingualism:
  - Dialects function psycholinguistically like languages in acquisition and use.
  - *Diglossia* creates specific learning configurations where standard and dialectal varieties coexist.
  - Ideological debates strongly shape *attitudes* toward dialects—the pendulum swings between *stigmatization* and *celebration*.
- *Linguistic distance* and transfer:
  - Linguistic overlap (e.g. in cognates) predicts more *positive transfer* in comprehension.
  - *Production* may be more challenging due to similarity.
  - Children differentiate varieties early on.
  - Dialect proficiency may foster multilingual acquisition (depending on similarity of Lx).

12.1 Bidialectal multilingualism?

In this chapter, I discuss evidence from studies on multilingual repertoires that involve closely related subsystems (dialects, sociolects, languages). As discussed in

Chapter 3, there are good reasons to include dialects in our considerations when investigating bi- and multilingualism. Scholars often explicitly include dialects in their definitions of bilingualism:

> Bilingualism is the regular use of two or more languages (or dialects), and bilinguals are those people who use two or more languages (or dialects) in their everyday lives. (Grosjean 2008: 10)

If mastering very closely related varieties/languages (as in bidialectalism) is no different from regular bilingualism, everything we know about learning and using two or more languages applies equally to learning and using two or more dialects/varieties. However, things—as always—are more complicated than that. The following quotation from 1953 shows that bilingualism scholars have long been aware of the grey zone between prototyical bilingualism in two recognized languages and receptive and productive use of varieties of what may be considered the same language.

> [C]ouldn't we we imagine all sorts of intermediate cases between every successive two among the following ones; […] a substandard speaker who can, if need be, trim his speech into something close to standard; a […] patois speaker who will treat his vernacular and the standard as two clearly different registers with largely deviating structures? (André Martinet in Weinreich 1953: viii)

In Chapter 5, we discussed evidence suggesting that linguistic proximity/similarity is an important predictor of learning an additional language's grammar. In the current chapter I present further evidence for such proximity effects. We will see that the specifics of multilingualism involving closely-related languages (including bidialectalism) deserve more scrutiny.

Note that here I will focus on the effects of linguistic proximity within the multilingual repertoire on *(additional) language learning*. In the chapter dedicated to cognitive consequences and correlates of multilingualism (Chapter 15), the question of other, cognitive correlates of bidialectalism will be discussed.

> Diglossia is a relatively stable language situation in which, in addition to the primary dialects of the language [=L, RB] […], there is a very divergent, highly codified (often grammatically more complex) super-posed variety [=H, RB], the vehicle of a large and respected body of written literature, either of an earlier period or in another speech community, which is learned

> largely by formal education and is used for most written and formal spoken purposes but is not used by any sector of the community for ordinary conversation. (Ferguson 1959: 336)

Bidialectalism has raised scholarly interest for several reasons. First, sociolinguists and sociologists of language are interested in the social, ethnic, gender-related, and other connotations of social and dialectal markers and indices. Second, in classic situations of diglossia (see Ferguson's definition), the linguistic proximity of dialects and 'their' corresponding standard languages is an interesting configuration from the point of view of language learning.

The cognitive-acquisitional consequences of learning and using closely related systems are the focus of what follows. However, I will also briefly discuss attitudinal and ideological matters, since they are inextricably related to sociolinguistic and dialectological variability.

By now it is common knowledge that a decision about the language or dialect status of a linguistic variety cannot be taken on purely linguistic grounds. The usual definition given by linguists is Max Weinreich's (1945) bonmot:

(1) עַ שפּראַך עיז עַ דיאַלעקט מיט עַן עַרמיי ענן פלאָט
'a shprakh iz a dialekt mit an armey un flot'

This 'definition' emphasizes the importance of institutional support in establishing a language as such, at least in the Western world. However, defining and counting languages is a very complicated business, and institutional recognition is only one of the factors involved.[1] Typological distance and mutual intelligibility, history, geography, and group identity are also relevant (see Chevrot & Ghimenton 2018).

There are fundamental differences in sociolinguistic theory (Buson et al. 2018: 806) regarding the nature of variability: some construe variability as a probabilistic but rule-governed set of patterns (as in the classic variationist approach, cf. e.g. Labov 1966). Others put the emphasis on individual agency and a not necessarily systematic but *bricolage* type of choice in a dynamically interactive process, for example along the lines of the ideas discussed by Le Page & Tabouret-Keller (1985).

This difference in construal of the sociolinguistic object of investigation is mirrored—and radicalized—in the more recent discussion of the multilingual repertoire as a fluid collection of patterns instead of separable codes or languages (*translanguaging* instead of *code-switching*, see below and Chapters 3 and 8 for more on this).

[1] See also Berthele (2019c) for a discussion of the problem of language counts.

12.2 Linguistic distance

One element that is relevant for acquisitionists is the dimension of linguistic distance: since dialects of the roofing language are genealogically close, it is likely that there is considerable overlap in linguistic patterns (word forms, syntax, morphology, semantic space). And, as argued in some of the theories presented in Chapter 3, large overlap increases the likelihood of cross-linguistic influence and transfer across languages. This is in line with the earliest findings in transfer research: the more similar two cognitive domains are, the more likely people are to transfer skills or operations from one domain to the other (Thorndike & Woodworth 1901). Transfer across such similar domains is called *near transfer*. *Far transfer*, on the other hand, that is transfer of the type *Learning Latin is good for thinking logically*, remains elusive, to say the least (see Gerhards et al. 2019, Haag & Stern 2000, Berthele 2018, Willingham 2012).

Linguistic overlap, however, is not a relationship that pertains only to varieties of a given language. If we look at individual words across related languages, we will often see overlap, sometimes even complete formal and/or phonological identity (as in perfect cognates). Cognateness, however, is not binary, but located on a continuum, and the words of the languages and dialects that are involved can be located at different points on this continuum.

1	2	3	4	5	6	7	8	9	10	Σ
s	c	h	r	e	i	b	e	n		
s	c		r		i	v	e	r	e	
		D		D		S		S	I	5

Figure 12.1: Example of a Levenshtein distance computation for an Italian–German cognate. (D: deletion, I: insertion, S: substitution)

Figure 12.1 shows how linguistic distance in the domain of lexical units can be quantified. The value obtained by the counts of the number of string edits (insertions, deletions, subsitutions) is usually normalized by a metric of length (word length or the length of the longest alignment of the two words). This accounts for the fact that longer words obviously come with more potential edits than shorter ones. Such a *normalized* Levenshtein distance metric produces values between 0 and 1. Figure 12.2 shows the phonological normalized Levenshtein distances between selected pairs of words. Phonological distances can be computed in a

way that different substitutions are weighted differently (e.g. a change from /o/ to /a/ represents a smaller distance than a change from /a/ to /i/).[2]

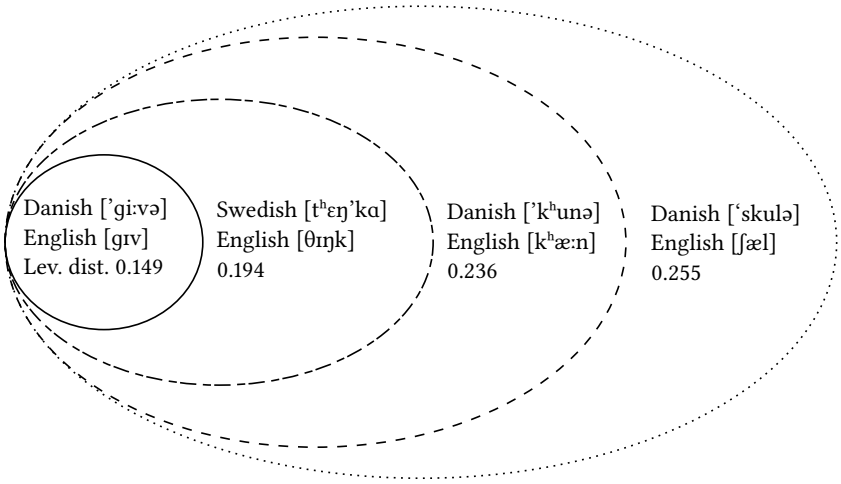


Figure 12.2: A continuum of cognateness. Figure adapted from Berthele (2012a: 210).

The target items in the study on which Figure 12.3 is based were words from different Germanic languages (Danish, Dutch, Frisian, Swedish) that were not part of the study participants' multilingual repertoires. The y-axis of Figure 12.3 shows the distance of these target words to the most similar cognate items known by the participants. The y-axis shows the likelihood of correct inferencing. I will give more details about these cognate studies below.

If we calculate such distances for many different words of the dialects or languages we are interested in, this gives us a metric for linguistic distances between languages. Figure 12.4 shows distances between participants' first languages and French and German in a sample.[3] The metric used was proposed by Bakker et al. (2009), and there is free software available that computes the distances (Wichmann et al. 2016).

The distance measure used in Figure 12.4 is based on a Levenshtein-type comparison of word lists from the languages. Curiously, the figure shows a slightly larger distance between Standard German and Bernese Swiss German than be-

[2]For more on the Levenshtein algorithm and its use in dialectology cf. Heeringa et al. (2006).

[3]I use pupils' L1s in a project of the Institute of Multilingualism, Peyer et al. (2016), Berthele et al. (2022) to which I will return later in this chapter.

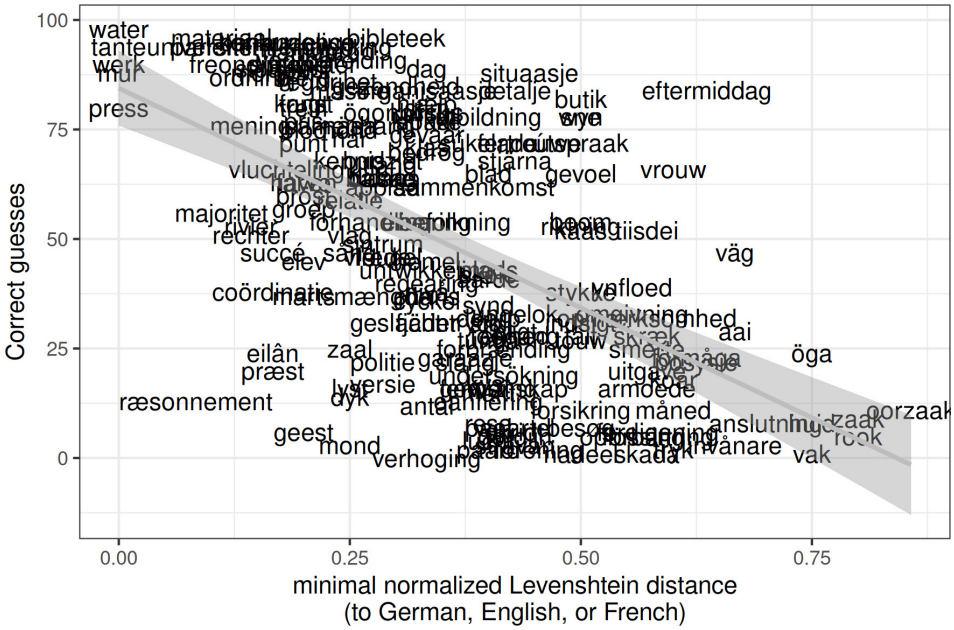


Figure 12.3: The association between the minimal Levenshtein string distance of a target item to one of three languages (German, English, French) in the multilingual repertoires and the probability of correct translations; Figure adapted from from Vanhove & Berthele (2013: 186)

tween Standard German and Dutch.[4] Assessing relative distances between varieties and languages in this way shows clearly that attributing the status of 'a language' solely on the grounds of linguistic similarity or difference would lead to a surprising reshuffling of our institutional linguistic landscape.

Terms that capture the diachronic differences between what is synchronically considered a language are *Ausbausprache* (when a dialect gradually evolves into an (official) language, usually with institutional support), and *Abstandsprache*, that is a language that undoubtedly represents a different category (and has 'always' been considered as being a different category; e.g. Basque; cf. Kloss 1987).

Given that the problem of the exact delimitation of dialects and languages cannot be resolved by descriptive linguistics, it is ultimately a normative decision. Descriptive linguistics certainly can contribute thorough accounts of the

[4] I am not claiming that this difference in distance is in itself dramatic, but it is a good illustration of the fact that distances between varieties of a language can be considerable, while distances between languages may be smaller than we think.

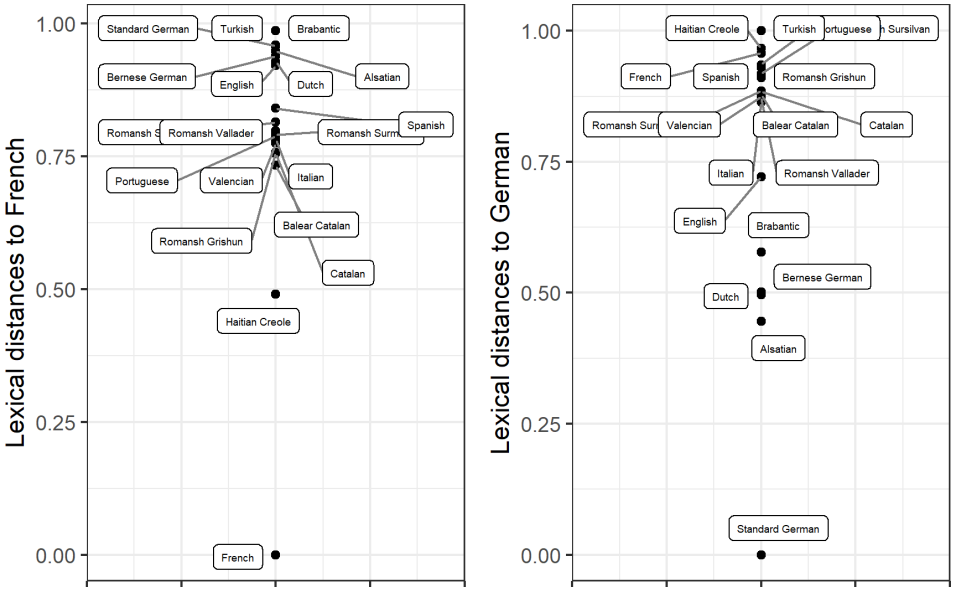


Figure 12.4: Lexical distances of a sample of languages to French and German

diachronic changes and synchronic typological similarities/dissimilarities across dialects/languages.

Despite the ideological underpinnings of the question, scholars have explicitly considered skills and competences in dialects as an important part of the multilingual repertoire, as shown in Wandruszka's term *internal multilingualism* (in German: *innere Mehrsprachigkeit*):

> We are already multilingual in our mother tongue. After the regionally, socially and culturally bounded language of our childhood, the trans-regional, trans-social cultural language that we learn at school is to a certain extent our first foreign language. (Wandruszka 1975: 321, translation RB)

12.3 Dialects/patois vs. standard languages as means of instruction

The first interesting aspect of dialects is that their legitimacy is often contested in pedagogical and language policy discourses. The three examples below are an

illustration from the Swiss context: example (2) claims that dialect is a language, example (3) that dialect-standard *together* are 'a language'; example (4) claims that a dialect *cannot* be a language.

(2) The foreign language German - that is the right expression, because High German is the first foreign language to be learned - should be given appropriate priority as the first language.[5]

(3) Our mother tongue is German in two forms: dialect and High German, as naturally and from early childhood as a bicycle has two wheels.[6]

(4) Parents realize that by going to French schools their children will never learn their true mother tongue: Standard High German.[7]

Luxembourgish: An interesting example of a national language whose status has been debated at several points in time is Luxembourgish/Lëtzebuergesch.

> Luxembourgish is a German dialect. But you can't say that! Against the linguistic truth, a psychological truth and a national truth have been established. We used to say 'Lëtzeburger Deitsch,' but 'Luxembourg German' has given way to 'Luxembourgish' or 'our language'; to say that it is a 'Germanic dialect' is at most acceptable. (Fehlen 2024: 165; in this passage, the author cites Ernest Ludovicy, a linguist who made this claim in 1954)

What do you think of this 'linguistic truth'? If you don't know much about the language situation in Luxembourg, look it up. Why do you think Luxembourg did not list Luxembourgish as an official language of the European Union?

Dialectologists and sociolinguists notoriously claimed very early on that dialects, sociolects and ethnolects are perfectly 'legitimate' systems in their own right. Similarly, many sociolinguists today consider it important to declare not

[5] Green Party statement, Canton of Nidwalden 2014, translation RB

[6] Peter von Matt, TagesAnzeiger 2010, translation RB

[7] The term often used to refer to Standard High German in French-speaking Switzerland literally means 'good German'; Letter to the editor, La Liberté, 2001, translation RB

only dialectal varieties, but also different varieties of the standard languages, to be legitimate[8] for learning, teaching, or general use.

This is a reaction to the standard language ideology that pervaded the metalinguistic discourse in many European countries in the past (sometimes we still see traces of it today, but rarely formulated by linguists).

12.3.1 Germany and German-speaking Switzerland

In the German school context,[9] up to the 1970s, one of the goals was to 'cure' dialect speakers with therapy, with the help of linguists. As an example, German linguists published a whole series of contrastive analyses of German dialects and Standard German, with the ambition to …

> …address the particular language difficulties of dialect speakers in dealing with standard German, especially in the classroom context, for the first time with practical therapeutic measures. (Wegera 1977: 3, translation RB; see also Barbour & Stevenson 1990)

Table 12.1: Examples from the contrastive approach in a textbook from Bavaria, Zehetner (1977: 108)

Dialect ("Mundart")	Standard langage	Translation
i nimm, gib, iss	ich nehme, gebe, esse	I take, give, eat
du/er messt	du/er misst	you/he measures
du tragst, er tragt	du trägst, er trägt	you carry, he carries

The pedagogical goal was to teach dialect-speaking students the standard language.

In German-speaking Switzerland, on the one hand, the emphasis was (as in the German context discussed above) on teaching literacy in the standard language. On the other hand, there was also the idea of cultivating dialects - and keeping both dialects and the standard language pure (for more on this see Berthele 2020, 2019a, Ruoss & Schröter 2020):

[8] See e.g. Ruck (2020: 18) for an example.

[9] See also the contrastive approach to teaching standard French in Fribourg as advocated by Girard (1821), see Section 12.3.2 below.

> We all feel that we can only preserve our unique character and Swiss diversity if we respect our mother tongue. […] Our goal is therefore clear to us: we want to cultivate dialect and written language side by side. […] With a clean dialect and flawless written German, we preserve our homeland in the broadest sense and at the same time keep the doors to the world open. (from Schwarz 1976: 329, translation RB)

More recently, the emphasis was on the standard language only, and the use of the dialect was dispreferred. One of the worries was (and maybe still is) the 'horror mixturae', i.e. the worry that multilinguals are incapable of separating the two varieties:

> The language of instruction is usually High German […]. Teachers frequently switch between High German and dialect in class, often even for individual utterances. Pupils are thus exposed to a constant alternation that can confuse not only foreign speakers. (Bachmann & Good 2003: 4, translation RB)

This worry recalls the concern some parents have about early simultaneous bilingualism, and of the idea that in the beginning bilinguals only have one fused system (an idea first proposed by Leopold 1949: 186 and later developed by Volterra & Taeschner 1978: 312).

12.3.2 Patois Franco-Provençal and Standard French

In the Swiss Francophone context, a similar contrastive approach to that in 20th century Germany emerged in the 19th century, when the native language of pupils in the French-speaking part of the Canton of Fribourg was Franco-Provençal. The language of education and scholarship, however, was Standard French. The goal, exactly as in the German context discussed above, was to foster standard language skills and competence via a contrastive analysis-based training in the standard language forms. The educator Grégoire Girard proposed a systematic series of contrastive exercises.

> Recognize the tenses:
> Ask the children the following questions, and if necessary translate them into dialect to help them understand. Allow them to answer in their own words, but then teach them to answer in French. (Girard 1821, translation RB)

Table 12.2: Examples from the contrastive grammar by Girard (1821: 1)

French	Franco-Provençal	Translation
Je parle à présent	i parlo ora	I am talking
Je parlai autrefois	i parlavo on iadzo	I was talking in the past
Je parlerai après	i parléri apri	I will speak later

12.4 Emancipation and celebration of varieties

The typical (socio-)linguistic posture opposes widely held views of 'good' (pure, educated, elaborated, ...) languages and 'bad' or 'corrupt' languages or varieties. The ideological underpinnings of this standard language ideology are the subject of a large body of scholarly literature (see e.g. Kristiansen 1998, Irvine & Gal 2000, Geeraerts 2003, Blanchet 2016, McLelland 2021).

The typical sociolinguistic argument challenges the idea of unequal values of languages or dialects. This is also the case for the bi- and multilingualism literature, where authors often decree the normative principle that all languages and (learner-)varieties be regarded as equal. Furthermore, in the more recent post-modern approaches to multilingualism, there is not only the idea of 'co-equal' [sic!] use of languages, but the reference point of the native speaker of whatever language or dialect is dropped, together with the boundaries separating languages (or dialects, it does not really matter):

> Under the umbrella of post-native-speakerism [...], a new approach to F[oreign] L[anguage] pedagogy that moves away from categorizing teachers into native or non-native speakers, the multilingual proficient user becomes the default. By the same token, when bilingual students engage in translanguaging, i.e. use both their home language and their language of education co-equally, they "use language as a dynamic repertoire and not as a system with socially and politically defined boundaries". (Kunschak 2020: 229; the quote in the quote is from García & Wei 2018: 1)

As argued in Berthele (2021b: 108), I do not think it is useful and reasonable to throw out all categories just because their boundaries are unclear and because they cannot be defined via necessary and sufficient features: human cognition is perfectly equipped to cope with the typical vagueness of messy but (socially) structured continua like those between languages and dialects (see Chapter 3 for

more arguments in favor of the use of natural categories in the field of multilingualism).

Lastly, I would like to add that the expectation that in a given context (country, town, group) alternative codes (languages, dialects, sociolects, etc.) should be *perfectly equal* is not only unrealistic but also dysfunctional. Let us assume that in a bilingual town two languages A and B were completely equal, from the point of view of the law, of people's attitudes, and of the languages' sociological connotations and functional ranges as well as the social networks in which they are used, etc. How would a person then choose one language or the other in a given context? The choice would be completely random and therefore unpredictable. Such a configuration is not in line with the human tendency to categorize, functionalize, and thus attribute meaning to categories structuring our experiential environment: if we encounter free variability in our cognitive-social environment, we ascribe meaning to the alternatives (or linguistic variants), even if they may have originated as sociolinguistically more or less equal. Thus, complete equality ultimately implies that one of the two codes is superfluous: either the two codes merge into one, or one gets dropped.

12.5 Acquisitional consequences

Just like bilingual children, children growing up bidialectally distinguish between the two varieties from very early on (Chevrot & Ghimenton 2018: 515). As other early multilinguals, they tend to draw on all available codes (as illustrated in example (1) and discussed in Chapters 6.2.1 and 8). From the point of view of current scholarship, there is no empirical evidence that suggests we should worry about language confusion in healthy children.

Furthermore, we know that the influence of peers is considerable in the development of dialect proficiency and the learning of a second dialect if the home language does not correspond to the language of the environment.[10] As an interesting more recent example, it has been shown that native Swiss Germans will develop features of multiethnolects if growing up in an environment where such varieties are spoken (Schmid 2010). This has also been shown earlier in other contexts (Rampton 1995).

Another worry related to dialects is that the simultaneous acquisition of both a local dialect and the standard language by migrant children might overwhelm them and hamper their literacy development. However, as discussed in Chapter

[10]Berthele (2002); see Siegel (2010) for a comprehensive discussion of second dialect acquisition.

13, there is no evidence for the claim that heritage-language speakers are *more* disadvantaged in the diglossic Swiss-German environment than in a non-diglossic environment.

12.6 Multilingual advantage due to dialects?

Whereas dialects have traditionally been regarded as an acquisitional and pedagogical problem, more recent research focusing on the multilingual repertoire has also tested the theory that dialect knowledge might be helpful in multilingual language using and learning. DeLuca (2024: 10) even suggests there might be general cognitive advantages of bilingualism in closely-related systems (see Chapter 15 for more on the bilingual advantage debate). As an example for such linguistic advantages, some studies suggest that Norwegians, who are speakers of many different regional dialects, are better at Germanic intercomprehension because of their dialect skills (Delsing & Lundin Åkesson 2005: 115). Other studies, however, have not confirmed this finding (Gooskens & Heeringa 2014).

Diglossia with mutually more or less intelligible varieties represents specific challenges both on the sociolinguistic and on the pedagogical levels. Mutual intelligibility is well researched in particular in the Germanic/Scandinavian context, but there is also evidence from Slavic and Romance languages (see Gooskens 2024 for a recent contribution on all three language families).

I have already refered to the Swiss German situation (see Section 12.2 and Berthele 2020 for more on pedagogical problems in this context). As the study by Trentman & Shiri (2020) shows, teaching and learning Arabic (in its modern standard form) as an additional language involves tricky questions regarding the selection of varieties that can or should be intelligible for learners besides the standard form.

We ran a series of studies in which we investigated the ability of children, adolescents and adults to infer cognate words in languages they have not 'officially' learnt but that are genealogically related to one or more of their languages (Berthele 2011, 2008, Berthele & Lambelet 2009, Vanhove 2014, Berthele & Vanhove 2014, Vanhove & Berthele 2015a).

In the very first of these studies, I tested 183 students of German ('Germanistik') in Switzerland and Germany (Universities of Zürich, Fribourg, and Marburg respectively). They were native speakers of at least one German variety (dialect and/or standard). They filled in a questionnaire that explicitly asked for skills and use of languages *and* dialects, rated on a 6-point Likert scale. The information was gathered via a paper and pencil task involving three components:

1. Read a short text in Dutch and answer seven comprehension questions
2. Infer the meaning of 17 words from this text (cognates) and spell out the transfer path
3. Infer the meaning of 29 highly frequent Danish and Swedish verbs (all cognate to German)

The following examples are all translations of words in Northern Germanic languages where participants indicated dialect knowledge as interlingual bridges (all translations are correct).[11]

(5) *kunne*: 'können'
participant's comment: "klingt nach Schwälmer Platt"
'sounds like dialect from Schwalm'

(6) *sidde*: 'sitzen'
participant's comment: "Plattdeutsch"

(7) *tale*: 'sprechen'
participant's comment: "Plattdeutsch"

(8) *blive*: 'bleiben'
participant's comment: "Schweizerdeutsch bliibe"
'Swiss German bliibe'

Figure 12.5 shows a reanalysis of these data (my statistical skills have improved since that paper was written), fitting a logistic mixed effects model with fixed (dialect proficiency, English proficiency, number of languages in the repertoire) and random effect terms (random intercepts per participants and target words). The analyses show superior inferencing skills associated with dialect proficiency, as well as with English skills.

The positive impact of closely related languages in the individual repertoire was later confirmed in several studies, also with Romance languages (Berthele & Lambelet 2009).

My interpretation of this finding is that there is a specifically interesting potential in the mastery of closely-related systems for receptive multilingualism. Moreover, specifically bidialectals are not only used to juggling two related systems, but are often also exposed to yet other, slightly different dialects of the same dia-system. And this practice represents an interesting transfer base for the inferencing processes in an unknown but related target language. Figure 12.6 is an attempt to represent this idea on the level of a single entry in the mental lexicon.

[11]Berthele (2008: 103)

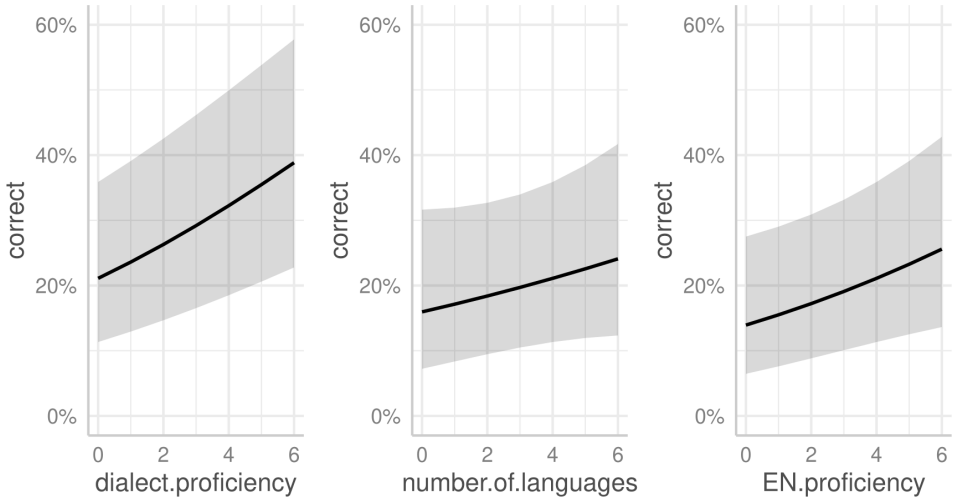


Figure 12.5: Effects of dialect* and English proficiency* and the number of languages in the repertoire (n.s.); third task (verbs only)

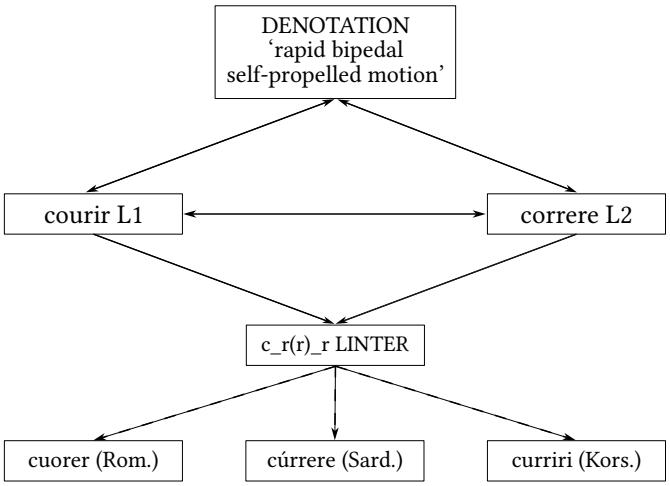


Figure 12.6: An attempt to understand the bidialectal advantage in interlingual inferencing

Bidialectals are, on the one hand, more tolerant when it comes to slight formal deviations from what is expected in their acquired languages. At the same time, they also seem to have better heuristics as to what is a likely correspondence and what isn't. The data suggest that they are less likely to fall for homophonic word realism, that is, they do not automatically assume that the same word form always implies the same meaning, which entails that they are also better in detecting false friends (see Berthele 2011 for more speculation about this ability).

12.7 Linguistic proximity and skill learning

In Berthele et al. (2022), we reanalyzed data from a large-scale assessment project on foreign language skills in German-speaking (central) Switzerland. We investigated 8th graders who all speak at least one language other than German at home. Their exposure to the target language, French, varied depending on the local curricula (Swiss federalism allows for regional variation in curricula). The 8th-graders had had either 9, 10, 12 or 14 cumulative weekly lessons (CWL) of French since they started learning that language (their second foreign language).

Our final subsample comprised 409 8th-graders overall, 390 students for listening, 337 for reading, 294 for writing, and 196 for speaking. A total of 167 pupils completed tasks in all four skills. The sample size is different for each skill because of the way the different test items were allocated to individuals (see Peyer et al. 2016 for more details).

Writing, listening and reading were assessed based on descriptors adapted from the Common European Framework of Reference (CEFR) scales and descriptors, covering levels A1 to B1+.

We calculated two distance metrics; first, the one already shown in Figure 12.4, and second, one that compares the morphological complexity of the first languages and the target language, inspired by what others have done (van der Slik et al. 2017). This second metric takes into account the difficulties we addressed in Chapter 6 when discussing morphosyntactic learnability within the usage-based framework. As an example, Vietnamese is less complex than French because it has no verbal inflection (0 categories per word), whereas French has different verb forms depending on person, number, etc. (see Berthele et al. 2022: 431 for full details). If the target language is morphologically more complex than the L1, we expect it to be more difficult to learn than if the level of complexity is similar.

The lexical distance is calculated based on the Levenshtein distances (see above) between lists of core vocabulary in the L1 and the target language.

We wanted to know whether these metrics predict achievement in French in 8th grade. As always, there are many other variables that have an impact on competence tests, which is why we controlled for a wealth of other factors.

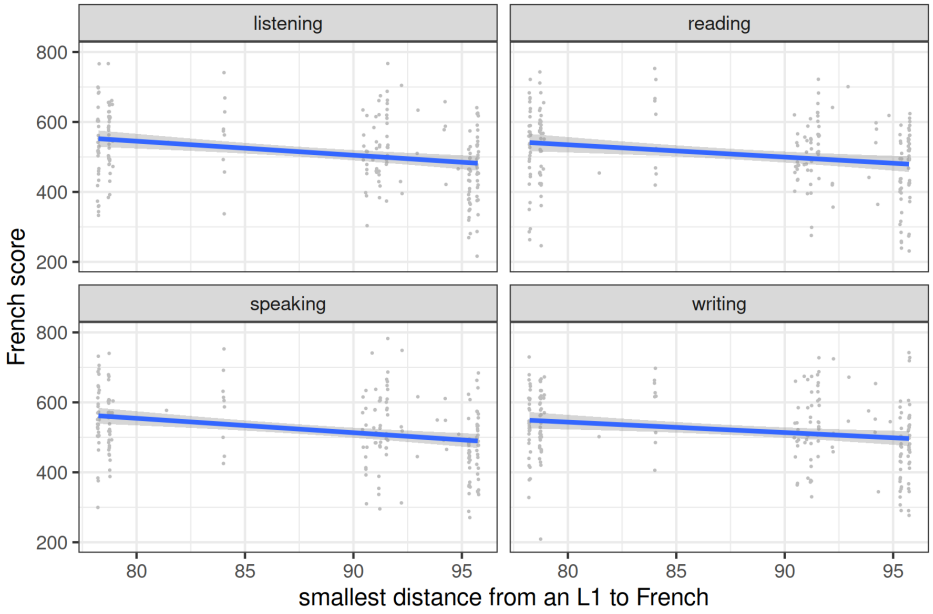


Figure 12.7: Association of lexical distance (LDND) with four skills; Figure based on data analyzed in Berthele et al. (2022)

The analyses show that the lexical distance in particular turns out to be significantly related to all four skills. The effect, as can be seen in Figure 12.7, is not enormously strong, but it is still detectable even when controlling for teaching hours, socio-economic background, etc.

The fact that such distances matter was known from the second language learning of adults in migration situations (Schepens et al. 2020, Schepens 2014). That they predict skills in *foreign* language class is a new finding. Thus it may well be that linguistic proximity fosters cumulative positive transfer (and leads to less negative transfer) which then means that a new language can be learnt faster and more easily.

12.8 Concluding remarks

Questions regarding the status and 'legitimacy' of dialects and dialect speakers are obviously an important backdrop to the question of language and dialect learning. They merit attention and are discussed in the field of sociolinguistics. From the point of view of the acquisition of linguistic patterns and skills, multilingualism involving dialects is an interesting field of inquiry: the important structural overlap between dialects (and their roofing standard languages) bears a specific configuration of transfer and, more generally CLI potential. It is not surprising that it is in such disglossic contexts that early forms of contrastive language teaching emerge.[12]

A first robust, albeit unsurprising, finding from the research discussed in this chapter is that receptive skills in closely-related systems develop rather quickly. Often speakers spontaneously understand substantial chunks of a previously unlearnt target language/dialect due to the linguistic overlap, in particular if they have good inferencing skills.

Second, this spontaneous ability to understand other varieties may lead to heightened difficulties in the acquisition of production, both in terms of cross-linguistic influence and from the point of view of motivation: why bother learning to pronounce things in a slightly different way if mutual intelligibility is a given anyway? This applies in particular to adults. Children and adolescents, however, are more prone to fit in with a (dialectally) new social environment and therefore accommodate more easily.

As Kloss (1929: 15) already noted, reception and production in the acquisition of closely-related systems stand in a paradoxical relationship, since the former is (very) easy, whereas the latter can be tricky. Due to the overlap and systematic correspondences in the dia-systems described in this chapter, closely-related varieties facilitate cross-linguistic influence and convergence phenomena. The absence of official codification in most dialects makes multilingual contact situations involving dialects more dynamic than contact situations involving institutionally normed standard languages only. This is one of the reasons that many minority languages/dialects change and converge rapidly to their respective dominant contact languages.

Furthermore, as our study from central Switzerland and the large-scale investigation of L2 acquisition show, linguistic overlap is a robust predictor of second/additional language skills (Schepens 2014: 218).

If dialects were regarded critically in the past, this was often because they were confounded with social class (not so much in German-speaking Switzerland, but

[12] See Lado (1957) for a contrastive approach to foreign language learning in general.

in many other areas). Dialect was therefore associated with less (and normatively speaking worse) input, smaller repertoires, predominantly oral use within close-knit communities (and, as a consequence, lack of practice in academic language use), etc. Indeed, dialects are almost by definition conceptionally oral (see Chapter 13). If elaborated literacy as in Western standard languages is the educational goal and the expected norm for a 'competent speaker', dialect speakers undoubtedly need to learn more than speakers who grow up in a standard language culture.

13 Transfer of Literacy: Interdependence of language skills

Preview—Key points of this chapter

- Literacy skills are important for *academic* uses of languages.
- Different pairs of terms capture differences between *literacy* and *orality* concerning *complexity* and *context-dependency* (e.g. *BICS/CALP, Basic/Higher Language Cognition, restriced/elaborated codes*).
- Transfer of literacy skills across languages in multilinguals is often called *interdependence*:
  - Skills in literacy-related functions are assumed to transfer drawing on a *Common Underlying Proficiency* (CUP).
  - Empirical challenges: Studies often, but not always, find 'significant' cross-language associations.
  - Correlations across languages may reflect *general cognitive abilities* or *task wiseness* rather than direct transfer.
  - Absence of strong associations are frequently explained via *threshold* accounts.
- Robust empirical evidence for literacy transfer/interdependence is elusive.
- Policies advocating for heritage language maintenance and multilingualism should not exclusively rest on transfer claims but on the broader *cultural* and *social values*.

It is quite common for policy documents on international (cf. e.g. OECD 2020: 129) and national levels to refer to a positive impact of previously learnt languages on additional (foreign, second) languages. In the case of migration and heritage language speakers, developing first language skills is considered positive for the development of second language skills.

One of the domains in which this beneficial effect of first/heritage language instruction is most frequently claimed to apply is literacy (acquisition). In this chapter, we will therefore focus on literacy skills and theoretical and empirical investigations into their inter-relatedness.

13.1 Approaches to Literacy

Literacy in the narrow sense refers to the mastery of reading and writing. The terms *bi-* or *multiliteracy* refer to such practices in more than one language. In a wider sense, literacy can also refer to culture-specific uses of written language. This can involve the transmission of a culture's narrative heritage, the recital of religious texts (see e.g. Weth 2009: 57), or the use of written language for administrative purposes (e.g. filling in tax forms). Often, specific literacy practices are typical for certain languages but not others; think e.g. of the mostly receptive use of Latin or classical Greek in the Western educational tradition. Moreover, especially in migratory or other contexts involving linguistic minorization, literacy is often fostered in the locally dominant and legitimate languages and not or only marginally developed in the minority (or heritage) languages. For example, Chinese migrants in Europe may have a good oral command of one form of Chinese, but only partial reading and writing skills.

Just as literacy practices may vary considerably across contexts and cultures, scholarly approaches to literacy come in many different colors. There are functional approaches that focus on reading and writing tasks and skills; there are socio-cultural approaches that describe the values and meanings attached to different types of literacy (often termed *multiliteracies* in multilingual environments); finally there are *critical* approaches to literacy that investigate social inequalities, power relationships, and meaning making in the literacy domain. Baker & Wright (2017: Chapter 14) give a good overview of the most influential approaches to literacy studies (see also Gogolin et al. 2020 for a more recent overview).

In what follows I will mostly focus on the functional or basic skills approach. This approach seems to be the most widespread, also from the point of view of the educational policy discourse.

Literacy involves the dimension of complexity, which is typically higher in academic, written language, and the dimension of context-dependency, which tends to be higher for informal oral communication. Figure 13.1 shows these two dimensions and different terms referring to different types of language use within this two-dimensional space.

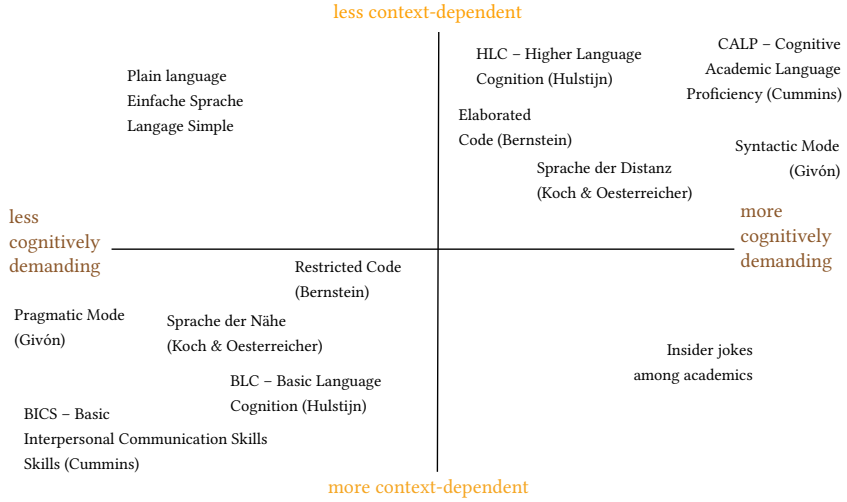


Figure 13.1: Terms for differing language skills in a two-dimensional grid of contextual support and cognitive demands.

The various terminological alternatives in Figure 13.1 are not synonymous, but overlap in their attempt to capture an important difference between two prototypical ways of using language along two orthogonal dimensions. In the lower left quadrant, language is used to communicate meaning through shared experience and shared knowledge (*common ground*), and the conceptual structure of what is conveyed is relatively simple.[1] The opposite case is when complex meaning is conveyed in what is considered a decontextualized style of language use. This is what we are expected to produce in an academic context—explicit, clear, and logical texts that do not overly depend on tacit inferences that can only be drawn if there is considerable common ground. Arguably, one of the goals of education in Western countries is to teach this latter use of language.

The two other quadrants represent cases in which complexity and context-dependence are not positively associated: on the one hand, institutional and decontextualized communication can be achieved with simple language instead of

[1]For more background refer to Koch & Oesterreicher (1985), Cummins (1979b), Hulstijn (2015), Givón (1979), Bernstein (1971).

with elaborated academic codes. On the other hand, it is obviously also possible in very witty and linguistically elaborate communication to rely heavily on shared common ground, as for example with insider jokes among educated people such as doctors, professors, lawyers or the like.

13.2 Shared or transferred proficiency

In particular the cognitive academic language (CALP) use arguably relies on resources that are not part of the manifest linguistic matter and patterns but that are considered shared across the languages of the individual. This idea is often visualized as in Figure 13.2 (cf. Cummins 2001: 118). The iceberg metaphor was first proposed by Shuy (1978: 104).

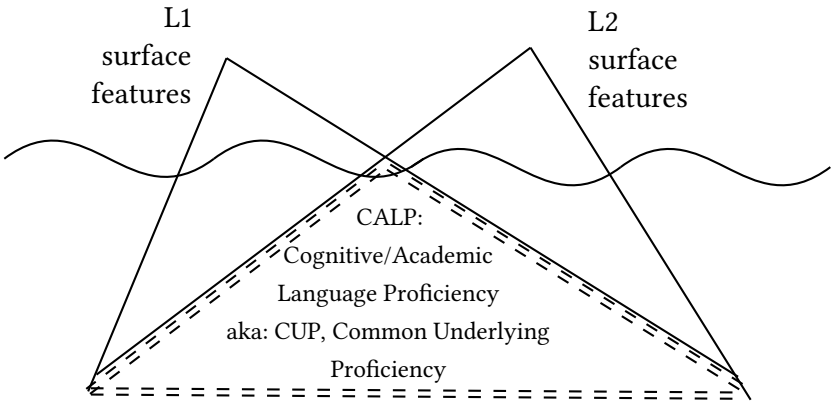


Figure 13.2: The 'dual-iceberg' representation of bilingual proficiency, e.g. used in Cummins (2001: 118)

Cummins' assumption of interdependence of the CALP skills is the following:

> [P]revious learning of literacy-related functions of language (in Ll) will predict future learning of these functions (in L2). (Cummins 2001: 118)

Basic interpersonal communication skills (BICS) develop much faster in an L2 than CALP. Generally, the assumption is that it takes between 1 and 3 years to develop them (Collier 1989: 513) in a second/additional language.

Cummins argues that if a bilingual child (heritage language speaker) has literacy in her L1, then it takes between 5 and 7 years to acquire CALP in her L2. If

no literacy is developed in L1, then it takes longer to develop CALP in L2, 7 to 10 years.

The central idea of this influential construal of sharedness (which is a form of multilingual influence, cf. Figure 3.3) can be summarized as follows: languages in bilinguals don't simply develop as a function of the time spent on learning/using them (this would be a *time on task* theory of language learning) but rely on an underlying proficiency that is not language-specific, sometimes referred to as *common underlying proficiency* (CUP). The theory directly addresses the worry that bilinguals and multilinguals, e.g. in a heritage language context, underperform in literacy acquisition compared to the mainstream children (often monolinguals in the locally dominant language). The interdependence theory objects to this negative view of multilingualism and states that on the contrary, bilingual and multilingual literacy development may present advantages over monolingual development.

Cummins' idea of CUP has had considerable impact on educational policies in many countries. As an example, the policy documents issued by the Council of Europe[2] systematically refer to interdependence ideas in multiliteracies.

Numerous studies have investigated aspects of skill interdependence. Note that such investigations do not imply direct comparison of linguistic features as in the research discussed in the chapters dedicated to grammar or the lexicon (these would be surface manifestations in Figure 13.2). Rather, the idea of CUP involves the transfer or sharedness of constructs beyond linguistic patterns—although the mastery of linguistic patterns is obviously also involved in literacy skill development.

In this chapter, I will draw on two of our own studies to illustrate conceptual and methodological problems that arise when the goal is to investigate interlingual effects on skills in the multilingual repertoire.

The following points sum up some assumptions of such theories of interdependent bi- or multilingual development (see also next section for more on Cummins' idea of interdependence):[3]

Transfer is mostly positive: negative transfer is not considered a (major) problem in multiple language learning. Language skills, metalinguistic awareness, metacognitive skills (e.g. learning strategy use) as well as certain more general cognitive abilities benefit from bi- and multilingual language learning. The following quotation is a good illustration of this idea of specific ('boosting') advantages in multilingual language learning:

[2] As an example see Beacco et al. (2010: 57).

[3] See, e.g., Cummins (2017), Herdina & Jessner (2002), Hirosh & Degani (2018).

> [W]e expect a difference in the development of communicative efficiency exhibited by the monolingual and the bilingual speaker in TLA [Third Language Acquisition, RB]. Furthermore the M-factor can be interpreted as having the same effect on the acquisition of a third language as its component MLA [=(multi)language aptitude/metalinguistic abilities]. This effect could best be represented in terms of relative growth which marks the difference between the expected and the accelerated development of the third language system. (Herdina & Jessner 2002: 130)

It is important to note that neither the authors nor most other scholars working in the field maintain the obsolete and unrealistic view that bi- or multilinguals can be identical to multiple monolinguals. We discussed evidence for the specifics of multilingual repertoires (also compared to monolinguals) in the preceding chapters on grammar and vocabulary.

13.3 Literacy skills in heritage language speakers

In Section 3.2.1 I discuss the conditions that need to be met so that interlingual transfer can be tested. In the case of skills such as reading or writing, transfer is much harder to prove: it involves less easily detectable mechanisms and outcomes than the replication of patterns or matter from one into the other language as investigated in the more linguistically oriented CLI studies.

13.3.1 Group comparisons of literacy skills

In the project reported on in Berthele & Lambelet (2017), we tested hypotheses that we formulated based on the interdependence framework. We tested L1 Portuguese primary school children in the francophone (N=108) and German-speaking (N=88) parts of Switzerland over a period of two school years, from the beginning of third to the end of fourth grade (see also Section 9.3.3).

The children carried out communicative reading and writing tasks that were based on the learning outcomes defined in the respective official curricula. The Portuguese children carried out these tasks in two languages—Portuguese, and either German or French. Here, I focus on overall scores the children obtained in the reading and writing tasks.

Figure 13.3 shows the group comparisons for the reading scores across all groups involved. The tasks in the different languages had the same structure and used translation equivalent texts and question items. Nevertheless, it is not possible to compare the scores across languages, as translating a test might change its

empirical difficulty. Only comparisons within languages are therefore relevant here.

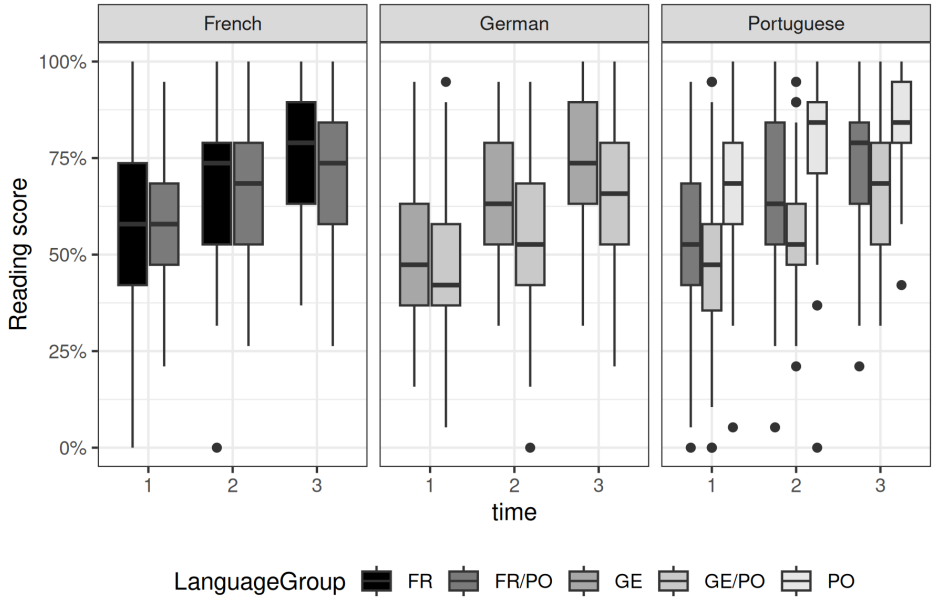


Figure 13.3: Group comparison: reading skill, adapted from Berthele & Vanhove (2020)

The visual examination shows that the scores of the Portuguese heritage language speakers, where different from those of the other children, tend to be somewhat lower. This difference is more consistent in German, but inferential statistical analyses showed that there is no fundamental difference between the French- and the German-speaking context (cf. Berthele & Lambelet 2017 for a full account). There are, however, clear differences between the Portuguese skills of the Portuguese pupils in Portugal (3rd panel) and the two other groups. Moreover, the Portuguese in French-speaking Switzerland have higher scores in Portuguese skills than the Portuguese in German-speaking Switzerland. The differences between scores in the writing tasks are similar to those in the reading tasks.

To test the idea of skill interdependence we first need to formulate testable hypotheses.

13.3.2 Testing interdependence: Hypotheses on inter-linguistic associations

Our hypotheses were three:

1. An individual's score at time T predicts their score in the same skill in the other language at time T+1.
2. cross-linguistic effects from the school language to the heritage language are stronger than the other way around.
3. cross-linguistic effects between French and Portuguese are stronger than those between German and Portuguese.

The first hypothesis was our attempt to formulate a general expectation based on the idea of the interdependent development of languages. The second takes into account that the school language gets the big boost of CALP instruction, whereas heritage language literacy is developed to a much lesser extent, typically in a few hours of heritage language classes a week. The third hypothesis added a typological component, since many scholars have shown that typology matters in L2 and L3 acquisition (remember the discussion in Section 5.3.1).

To test these hypotheses, we decided to estimate the degree of linear association between the previous and the following measurements both within languages (auto-regressive) and across languages (cross-lagged). Figure 13.4 shows the correlation coefficients for the children in the French-speaking environment and Figure 13.5 the same for the children in the German-speaking environment.

Based on these measures of association within and across languages, we tried to test the three hypotheses formulated above. These findings apply ceteris paribus to both the reading and writing skills.

The associations across languages of T1→T2 and T2→T3 are all positive and statistically significant (see Figures 13.4 and 13.5 for the correlation coefficients). Hypothesis 1 therefore seems confirmed.

There is no statistically significant difference between the cross-lagged (T1→T2) association of French or German with Portuguese and the associations of Portuguese with German and with French respectively. Therefore, Hypothesis 2 is not confirmed.

As we have already seen above, group differences are not themselves statistically different across French- and German-speaking Switzerland. Therefore, we reject Hypothesis 3 regarding the 'helping' linguistic proximity between French on Portuguese.

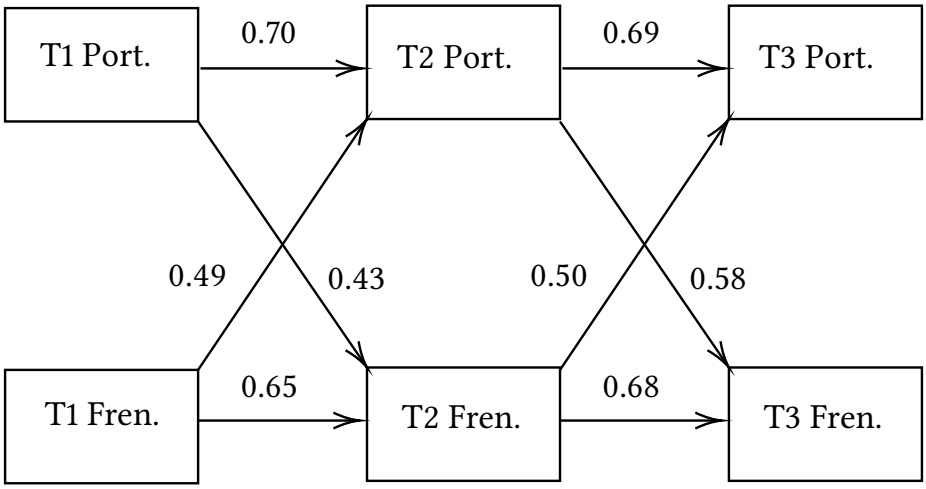


Figure 13.4: Relationship between reading comprehension scores in Portuguese and French across three measurement times. See Berthele & Vanhove (2020) for more detail.

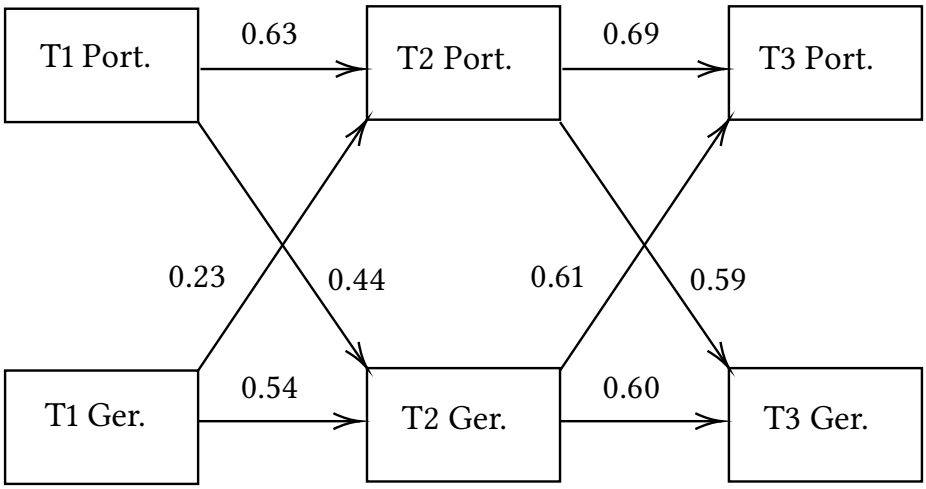


Figure 13.5: Relationship between reading comprehension scores in Portuguese and German across three measurement times. See Berthele & Vanhove (2020) for more detail.

However, when thinking about our results, we realized that there were many problems with the hypotheses and the type of data that we gathered.

Firstly, correlation is not causality: there are many causes of and contributions to linear associations across languages that are not related to the transfer of language skills:

- general cognitive abilities (IQ, memory), as advocated by Genesee et al. (2008)
- task and test wiseness (the task format and the tests were structurally equivalent across languages), as investigated by Barras (2021)
- measurement errors can be correlated, which leads to correlation that does not reveal the actual association of the skills

Secondly, correlational data, even if it involves longitudinal development, can hardly ever be considered unequivocal evidence for interdependent skills. We had not found evidence for a training effect of the literacy skills in the school language on the heritage language. When thinking more thoroughly about our research paradigm we started having doubts about the empirical testability of interdependence claims altogether.

We wrote an article about the data and our doubts which went into peer review. Here are some of the comments of the (anonymous) peer reviewers we got in the year 2017:

(1) In multiple elaborations of the IH [interdependence hypothesis] and the construct of 'academic language proficiency' or 'cognitive academic language proficiency' (CALP), Cummins has been clear that CALP represents a fusion of conceptual and linguistic knowledge.

(2) [C]ross-linguistic relationships will be observed only when literacy-related language skills continue to develop in both languages beyond the early grades of schooling.

(3) Interdependence theorists/Cummins never claimed that typology plays a role.

The reviewers also recommended further readings that, in their view, would correct our erroneous take on interdependence. Here are some passages from these readings:

> To the extent that instruction in Lx is effective in promoting proficiency in Lx, transfer of this proficiency to Ly will occur provided there is adequate exposure to Ly (either in school or environment) and adequate motivation to learn Ly. (Cummins 1996: 111)

Arguably, the constraints mentioned in this passage would indeed explain why our hypothesis 2 was not confirmed by the data. Another element that is used in the interdependence literature to explain such absence of associations are language proficiency thresholds (see also Figure 13.6) that need to be attained before transfer may be expected to happen:

> The threshold cannot be defined in absolute terms; rather it is likely to vary according to the children's stage of cognitive development and the academic demands of different stages of schooling. (Cummins 1979a: 230)

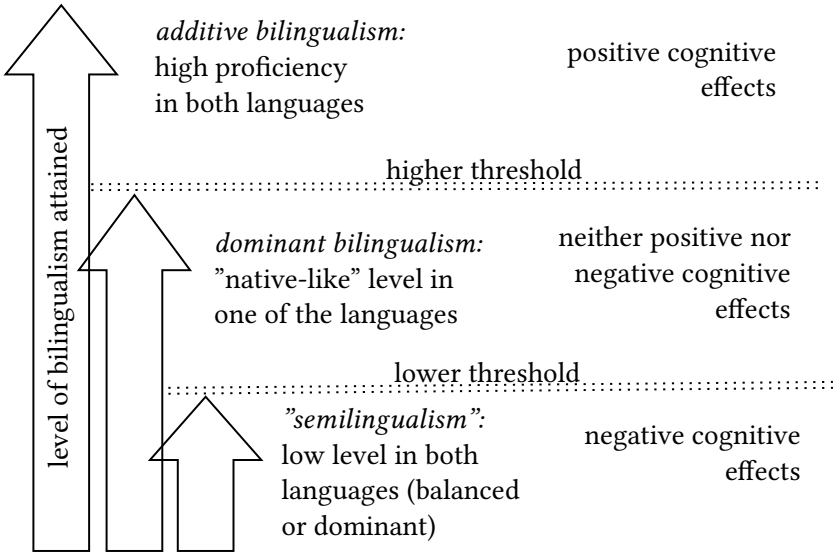


Figure 13.6: A widely used illustration of thresholds and cognitive effects of bilingualism; cf. Cummins 2001: 72. I added scare quotes to terms such as "semilingualism" and "native-like" as many scholars today have doubts regarding their usefulness or adequacy.

This reviewing process led to some more in-depth thinking about the interdependence framework that we had adopted for our study: assuming that an empirical study like ours measures skills in two languages longitudinally, which

patterns of association are imaginable, and which of these imaginable associations are compatible or not compatible with the idea of interdependence as described in the literature cited above? Figure 13.7 and Table 13.1 show different possible linear and non-linear associations and their possible explanations.

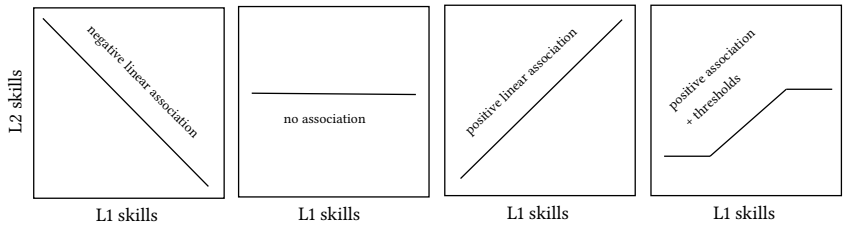


Figure 13.7: Four possible association patterns between L1 and L2 skills

Table 13.1: Correlational patterns and theoretical explanations thereof; always assuming that minimal conditions providing learning opportunities and exposure are met; cf. Berthele (2017: 195). *Note: a positive association is incompatible here if controlled for time spent on learning/using the languages.

Association type found in data	Interdep. no thresholds	Interdep. + thresholds	Time on task	Language giftedness	General cognition
Negative association	Incompatible, theory rejected	Compatible, theory not rejected	Compatible, theory not rejected	Incompatible, theory rejected	Incompatible, theory rejected
No association	Incompatible, theory rejected	Compatible, theory not rejected	Compatible, theory not rejected	Incompatible, theory rejected	Incompatible, theory rejected
Positive association	Compatible, theory not rejected	Compatible, theory not rejected	Incompatible,* theory rejected	Compatible, theory not rejected	Compatible, theory not rejected

As shown in Table 13.1, the interdependence theory with thresholds as illustrated in the quotation and in the 3rd column explains all imaginable patterns in the data. In other words, the theory predicts that language skills are positively correlated unless they are not, and this without spelling out beforehand where the thresholds are to be expected or what "adequate exposure" really means.

The findings from the study discussed above are not isolated. Lorenz et al. (2020) is an impressive study of a large sample of second or third language learners of English in Germany. The data analyzed yield small positive (L1 reading score) and negative (L1 reading fluency) linear associations of heritage language

skills with third language English skills (p. 199). This result, too, is difficult to interpret in the light of interdependence. The authors also discuss the idea of thresholds that were not (yet) attained as a possible explanation:

> According to this theory, a speaker needs to have at least a certain level of proficiency in a language before beneficial effects on another language can be expected (Cummins, 1979:229). (Lorenz et al. 2020: 200)

If we knew where to expect such thresholds (e.g. in terms of vocabulary size, grammar development, or other proficiency level such as B1 etc.), we could put it to the test. But since we ignore them, many scholars have expressed their doubts as to the usefulness of such ex-post threshold explanations (cf. for example Takakuwa 2005, Martin-Jones & Romaine 1986, Hulstijn 2015).

The study by Lorenz et al. (2020), however, offers other important insights which I discuss in the next section and in Chapter 14: cognitive abilities as measured by standardized tests are more strongly associated with the outcome variable (English skills) than the first languages.

13.3.3 Alternative explanations

Positive linear association of skills can have many other explanations. A possible alternative is for example the *time on task* idea already mentioned above: it is possible that children who spend much time reading in L2 also read regularly in L1, without there being direct transfer. Scholars who advocate such a view are, among others, Esser (2006), and Hopf (2005).

Another explanation draws on individual differences in language learning aptitude, an approach I will discuss more thoroughly in Chapter 14. Scholars who emphasize such differences are Carroll & Sapon (1959), and Li (2019). Individual differences on the level of general cognition, that is not language-specific skills, are another possibility:

> Relationships between first- and second-language acquisition have also been attributed to underlying cognitive abilities […]. Working memory, phonological short-term memory (e.g., pseudoword repetition), phonological awareness, and phonological recoding […] are commonly identified in the research literature as such abilities. […] These underlying abilities are thought to account for individual differences in the rate and success of language learning for a first, second, or any other language. (Genesee et al. 2008: 66)

Language similarity or dissimilarity has indeed been included by some in interdependence research (Proctor et al. 2010).[4]

Lastly, Hulstijn (2015, 2024) proposes his *Basic Language Cognition/Higher Language Cognition* model, which in some ways is similar to BICS/CALP, but more linguistically focused. As Hulstijn emphasizes, he considers his model testable (as opposed to the formulations of the CUP model discussed in this chapter). He does not postulate any thresholds, but includes the assumption of differences in *scholastic aptitude*.

13.4 Multilingual boost vs. general cognition

The second study to be discussed here takes into account the factor mentioned in the quotation by Genesee et al. above. There are indeed good reasons to include individual differences in general cognition and with respect to language learning in the investigation of multilingual acquisition. In Berthele & Udry (2022), we tried again to measure interlingual effects, also putting certain assumptions discussed in Chapter 3 to the test. Most prominently, we wanted to test the idea that previously acquired skills in more than one language will boost the acquisition of a third language.

We confront this multilingual boost hypothesis with the aforementioned alternative theory that general cognition might be sufficient an explanation for variability in bi- and multilingual skills.

Typical measures of general cognition are working memory (visual or verbal/phonological), and intelligence. Beside general cognitive skills, language-related skills that are not dedicated to a specific language but to language learning in general, such as phonological awareness, are also often measured. Such constructs are considered relatively stable and therefore there is no hypothesis that general cognition or language-related aptitudes benefit from first (and second) language learning directly. Rather, they shape acquisition in all languages of the individual.

We tested a total of 179 pupils in 4th (3 classes) and 5th (7 classes) elementary school grades (between age 10 and 12) in the German-speaking part of the canton of Fribourg. 157 were born in Switzerland, 13 were born outside Switzerland (9 different countries).

[4] But keep in mind that our data—surprisingly so for us—do not show an effect of typology as the differences between the school language scores in the German- and the French-speaking contexts are not big enough.

Table 13.2: Participants and test times of the study

Time	Age and Grade	Language Instruction	Tests
T1 April 2017	7th grade 11 years	L2 French 2 ½ years (248 lessons) L3 English ½ year (58 lessons) FL total: 306 lessons	L1 German L2 French Cognition: IQ, WM (visual, verbal)
T2 April 2018	8th grade, 12 years	L2 French 3 ½ years (324 lessons) L3 English 1 ½ years (152 lessons) FL total: 476 lessons	L3 English

We administered the ELFE reading test (Lenhard & Schneider 2006) to assess reading in German. French was tested with 4 short texts in the form of C-Tests (Grotjahn 1992), and English was tested via the Oxford Young Learners Proficiency Test (OYLPT, the test yields scores of language use and reading comprehension).

Moreover, we tested intelligence with the number sequencing form of the CFT 20-R test (Weiss 2006), visual working memory with a Corsi Block task, and verbal working memory with a Forward Digit Span task.

13.4.1 Hypotheses

Hypothesis 1 is based on the multilingual boost idea: linguistic skills at T1 in L1 and L2 explain substantial amounts of variance in abilities in L3 at T2 even when accounting for the effects of general cognition. Several sub-hypotheses can be deduced from that general idea:

Hypothesis 1a: Variability in (mostly L1) German skills at T1 explains variability in L3 English skills at T2, even when accounting for the effects of general cognition.

Hypothesis 1b: Variability in L2 French skills at T1 explains variability in L3 English skills at T2, even when accounting for the effects of general cognition.
Hypothesis 1c: Variability in (mostly L1) German skills at T1 explains variability in L2 French skills at T1, even when accounting for the effects of general cognition.
Hypothesis 2 is inspired by the general cognition theory discussed above: general cognition is the key variable underlying success in language learning; thus skills in previously learnt languages do not explain substantial amounts of additional variance in L3.

We tested two structural equation models that correspond to the two theoretical positions spelled out above. Both of these models turn out to have an acceptable fit to the data.

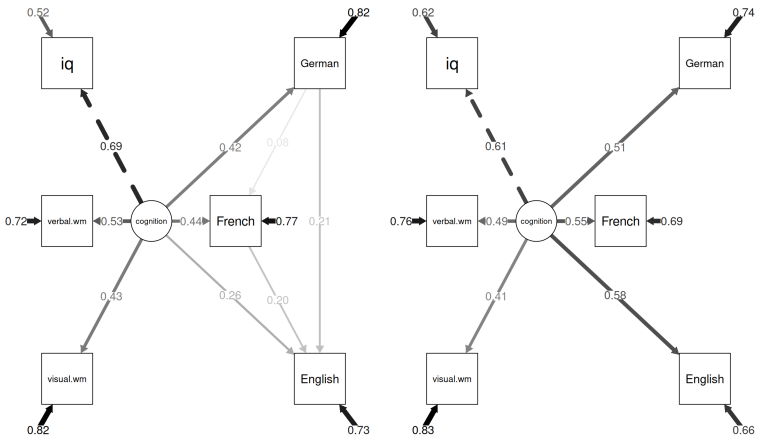


Figure 13.8: Standardised solution path diagrams of two models fitted to the data. Nodes: iq = intelligence, visual.wm = visuo-spatial working memory, verbal.wm = verbal working memory, cognition (latent construct), German = German reading test score, French = French C-Test score, English = English OYLPT score. All measures taken at T1, except English at T2.

How well do the associations uncovered by our analyses fit in with the two alternative theoretical assumptions discussed above? All correlations among the cognitive and linguistic abilities are positive. Negative associations would challenge both the multilingual boost and the general cognition theories. The association of German reading and French skills is 0.28 if we do not account for general

cognition, but it drops to a negligible 0.08 if we enter the cognitive variables (see Figure 13.8). The associations of German and French skills with English are somewhat stronger in Figure 13.8. A closer look testing the contribution of these additional paths of influence across the three languages, when compared to the simpler model (right panel of Figure 13.8), suggests that they do not contribute in a statistically meaningful way. Therefore, we conclude that the more complicated model is not statistically justified compared to the simpler one. The theoretical positions that emphasize the importance of the cognitive underpinnings without making claims about cross-language effects seem better in line with these data.

Nobody doubts that there is a strong association of cognition with language skills. What is controversial is the role that skills in previously acquired languages play for additional language learning. It is difficult to test their impact in an unbiased way. A typical problem is that third language learners (that are compared with second language learners) are often elective multilinguals, which means that they are not random learners but somehow preselected as good, efficient (language) learners. These and other methodological problems make it difficult to isolate the influence of the linguistic repertoire from other sources of influence. In our case, however, the study investigates a sample of pupils in a state school who *have to* learn two foreign languages as a part of their curriculum. No students in our classes are exempted from these foreign language lessons. The results suggest that the influence of L1 and L2 on L3 is negligible.

Considering these methodological problems, we need to accept that causal explanations are often merely part of our theories, as regression data alone cannot prove causal links. Another open question is whether the metalinguistic skills should be better taught in the language classrooms, which in turn would boost L3 acquisition. There are studies that investigate this question (Hicks 2021, Diogo 2020, Hopp & Thoma 2021) but at the moment it is unclear whether there are consistent benefits and if so, how large and long-lasting such effects really are.

Given the difficulties for causal inference based on correlational data, experimental studies seem a more promising way to shed light on causal effects. Unfortunately, it is difficult to induce individual bi- or multilingualism experimentally: it takes years to develop the skills, and it would be ethically rather problematic to randomly select babies after birth and assign them to a monolingual and a bilingual condition. What can be done, however, is an experimental or at least quasi-experimental investigation of pedagogical interventions, ideally over a relatively long period. There are some rare studies that have tried to do this regarding questions similar to those discussed in this chapter. The study of Wenk et al. (2016) shows that there is an effect of writing training over two months in the school language on the heritage language (although the effect is somewhat

inconsistent across the different measurement times), while Moser et al. (2017) show that even a curriculum-anchored intervention promoting first languages over 2 years does not yield any noteworthy effects (neither in the L1 nor in the L2).

13.5 Concluding remarks

Overall, it seems that our discipline tends to promote the idea of interdependence while failing to provide convincing evidence about such beneficial cross-language effects. The fact that measures are correlated cross-linguistically is insufficient. Recommendations regarding positive transfer effects in the skills domain are therefore not based on sufficient robust evidence (see e.g. Hopf 2005: 239 and Berthele 2019b: 7).

Even when more complicated research designs are chosen, e.g. involving measures of cognitive skills and longitudinal paths, we have acknowledged that it is impossible to draw causal inferences from correlational studies.

What the field needs is intervention research, wherever this is at all possible. As things stand, however, the few results of such studies do not seem to lend unequivocal support to the idea of linguistic interdependence.

The values of (heritage) languages Transfer-related benefits are but one possible value a (heritage, minority, additional, …) language may represent. The finding that this benefit is elusive by no means implies that we should not foster multilingulism involving such languages.

Think of other types of values and functions such languages represent.

Why could it even be counterproductive to advocate heritage languages based on the argument of interdependence/positive transfer?

14 Individual differences: Language learning aptitude

Preview—Key points of this chapter

- Research on *individual differences* in language learning aptitude covers cognitive, motivational, and contextual factors that explain variability in learning processes and outcomes.
- Historical foundations: Early aptitude tests (e.g., MLAT) sought to *predict language learning success* through abilities such as *phonetic coding* and *grammatical sensitivity*.
- Contemporary perspectives: Aptitude is now seen as a *multifaceted construct* involving both domain-general and language-specific skills, shaped by *motivation* and *social environment*.
- Empirical findings: Studies on young learners show that *cognitive ability* and *intrinsic motivation* best predict achievement; family background influences learning indirectly through these factors.
- Educational implications: There is no evidence that bilingual or migrant pupils are *disadvantaged*––or that multilinguals enjoy a universal *language learning "boost"*. More research is needed to investigate whether differentiated learning dispositions adapted to individual profiles produce better learning results.

Often when we compare groups of learners, for example multilinguals and monolinguals, we are interested in comparing estimates such as means or medians. In the process (see e.g. Figure 13.3 above), we sometimes forget that there is always considerable within-category variation. While scholars in our field undoubtedly agree that anybody can learn an additional language, the speed of

learning and its outcomes may differ considerably beyond what is explained by the predictor variables such as L1 or age.

In this chapter, I discuss such additional, individual variability, which in part is covered by the term language aptitude (sometimes also *modern language aptitude* or *language learning aptitude*). Language aptitude as a construct overlaps with *language awareness* (see e.g. the discussion in Section 3.1.2). I start with a brief historical contextualization of why people started looking into aptitude, then I discuss what people have thought its components are, and I end by giving a concrete example of an attempt to measure aptitude in primary school children.

14.1 On the history of modern language learning aptitude research

14.1.1 Aptitude testing and language education

In Section 2.2.1, I mentioned the worry of parents and policy makers that certain children may be overwhelmed by too many languages in the curriculum.

Although many 'experts' have strong opinions about this, actual research on the topic is scarce. Moreover, what scholars mean when they use terms such as "overwhelmed" is unclear: what would count as evidence for pupils being in that specific state? Is a child overwhelmed by a subject or curriculum if she does not learn anything in that specific subject? Or if she does not learn *much*? Or if the subject actually has *detrimental effects* on the learning of other subjects?

Research into the ability to learn foreign, second, or additional languages emerged in a similar context where there was a need to select learners for foreign language curricula.

14.1.2 Learner selection

Interest in and concerns about variation in the ability to learn a new language are far from a new phenomenon. In ninth-century England, King Alfred ruled that all English boys should learn English, but only a selection of gifted boys should also learn Latin.

> lære mon siððan furður on Lædengeðiode ða ðe mon furðor læran wille ond to hierran hade don wille
>
> 'let the Latin language be taught as an extra to those whom one wants to teach further and raise to holy orders' (Critten & Dutton 2021: 16)

Identifying the apt or the gifted students involves prognosticating about their future development. Accurate prognostication is an important goal that motivated the development of aptitude tests. The other, more scholarly reason for interest in prognostication is its importance in understanding what makes people apt for multilingualism (or even super-polyglottism). The two questions are related but not identical: certain measures may be highly valuable in prognosticating an ability in the future, but because of the notorious difficulty in assigning causality to individual factors in a complicated structure of interdependence (see Chapter 13), those same measures might have low explanatory value if the goal is a better grasp of what it means to learn a new language. We will look at aptitude from both perspectives in this chapter.

14.1.3 Early aptitude tests

The development of general intelligence tests led to the question whether it is possible to test the ability to learn specific subjects, including foreign languages (Spolsky 1995). The background to this interest was the introduction of universal access to high school education in the US which then necessitated generalized teaching of foreign languages. However, only very few lessons were allocated to the foreign languages and there was an extremely high failure rate.[1]

As Spolsky's (1995) overview shows, these early scholars discussed questions that are still on the table in today's aptitude research:

- Is it general cognitive abilities or a specific ability that makes students succeed or fail at learning a modern language?
- What is the importance of motivational and other (e.g. curriculum- and teacher-related) factors for target language learning?
- To what extent is it possible to prognosticate the development of a learner?
- Should prognostic testing involve just a test of the target language (e.g. grammar or vocabulary), other elements less directly related to the target language studied, or a combination of the two?
- Are there thresholds (e.g. minimal IQ levels) for successful modern language study?

[1] "[T]he deplorable mortality in foreign language classes", cf. Michel (1936: 275).

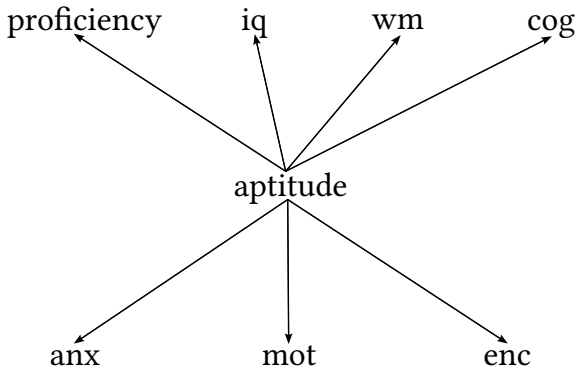


Figure 14.1: The construct of language aptitude: early ideas involving cognitive (e.g. intelligence [iq], working memory [wm]) and motivational (e.g. anxiety [anx], motivation [mot], encouragement [enc]) variables

Most of these early tests involved sub-tests tapping into analytic skills in the language of instruction (e.g. grammar), and other target language skills, sometimes involving the recognition of cognate words. Moreover, test items involving the memorization of new words and mini-lessons in an unfamiliar language (e.g. Esperanto) were administered:

> [Sister Virgil] administered […] a newly devised German prognosis test that she had constructed, including a memory test of short German sentences with their English translations, an analogies test of words that were cognate in German and English, and a series of German grammar rules and exercises. (Spolsky 1995: 328)

Some of the elements used in these early tests, such as cognate words, are surprisingly similar to modern teaching methods and to things tested in (our) research on multilingual language learning (see Chapter 12.6).

These early prognostic instruments proved overall rather unsatisfactory. The problem of failing students could not be solved. However, these early tests set the stage for the subsequent, more systematic approach to understanding and testing language aptitude. Such attempts were made in the context of post-WWII language teaching in the US Army (the training school in Monterey taught Russian, Hungarian, Serbo-Croatian, Arabic, Japanese and Mandarin Chinese). Again, the problem to be solved was the high failure rates. There was an urgent need for a valid screening procedure to select the gifted students. Up to 80% of the students in the Japanese program failed to achieve the educational goals (Spolsky 1995: 334).

14.1.4 The systematic investigation of aptitude

In the 1950s, the most influential development in the field of aptitude testing took place at Harvard University, under the direction of John Carroll. Once again, the goal was to lower the high failure rates of foreign language learners in expensive programs, in particular in military language schools (e.g. the Army Language School in Monterey, CA that offered intensive full-time programs over 8–12 months). As Spolsky puts it,

> [a]n accurate measurement of foreign-language learning aptitude should be able to provide a valuable screening device for costly governmental programs and minimize training failures […]. (Spolsky 1995: 334)

Carroll and Sapon's (Carroll & Sapon 1959) findings and suggestions were and still are highly influential.[2] They administered a range of tests assessing relevant abilities for L2 learning to two Air Force groups (total N=168) attending a one-week intensive training course for Mandarin Chinese (Carroll 1958, 1962). The outcome measure was the instructors' rating of participants' final L2 achievement. A factor analysis with the test results yielded 7 factors of cognitive abilities associated with language aptitude: rote memory for foreign language materials (associative memory), linguistic interest, inductive language learning, grammatical sensitivity, phonetic coding ability, verbal knowledge, and speed of association. These factors were correlated with the outcome variable. Considering factor weights, correlations with the outcome variable, and the ability to describe the cognitive dimension presumably measured by the factor, Carroll (1964) eventually defined four components of language aptitude:

- Phonetic coding ability—ability to perceive and remember distinct sounds associated with symbols
- Grammatical sensitivity—ability to recognize the function of a lexical element in a sentence
- Rote learning ability—ability to learn and retain associations between words in a new language and their meaning in English
- Inductive learning ability—ability to infer or induce rules governing the structure of a language

[2] In this section, I draw on the discussion of aptitude in a book chapter (Udry et al. 2021).

From the tests administered to their participants, Carroll and Sapon selected five tasks for the Modern Language Aptitude Test (MLAT), based on how well they measured the aptitude components and predicted L2 achievement (Table 14.1).

Table 14.1: The five components of the MLAT test; Carroll & Sapon (1959)

Task	Content	Components
Number Learning	Participants memorize numbers in an artificial language presented to them aurally. During testing, they hear number sequences and write them down.	Phonetic coding ability; Rote learning ability
Phonetic Script	Non-words must be assigned to phonetic symbols.	Phonetic coding ability
Spelling Clues	Multiple-choice vocabulary task with a time limit. Participants are asked to find a synonym for a word presented to them in a phonetic transcription.	Phonetic coding ability (Verbal Learning, high correlation on this factor, but the factor was not retained as an aptitude component due to low factor loadings)
Words in Sentences	The syntactic function of a particular word in a sentence must be recognized and the word with the same function in another sentence must be identified	Grammatical sensitivity
Paired Associates	During a trial phase, participants memorize word pairs (artificial language/English) presented in writing. During actual testing, they must assign the English expression to the corresponding artificial word via a multiple-choice task.	Rote learning ability

14.1.5 More recent test developments

Many recent tests, including the freely available LLAMA (Meara 2005), are based on or inspired by the MLAT. Some developments pay more attention to inductive skills and include also a section on motivation, such as the PLAB (Pimsleur 1966). Both MLAT and PLAB aim to select people who are likely to progress fast at the beginning of language learning.

Another new development, the CANAL-FT (Cognitive Ability for Novelty in Acquisition of Language (Foreign) Test; Grigorenko et al. 2000) is based on a cognitive theory of knowledge acquisition (2000: 392). The theory states that a crucial ability for foreign language acquisition is the ability to cope with novelty and ambiguity. The test therefore simulates naturalistic learning by gradually introducing participants to an artificial language. It assesses specific mechanisms relevant for language processing. It is dynamic as it induces learning during testing.

Finally, the Hi-LAB (Linck et al. 2013) aims to predict high-level attainment in advanced stages of learning. The test includes measures of working memory, associative memory, long-term memory retrieval, implicit learning, processing speed, and auditory perceptual acuity. However, the test is not (yet? cf. Erard 2014) available to the scholarly community and it is therefore difficult to gauge its validity.

A striking aspect of numerous aptitude tests is their association with the fields of (the US) military and intelligence (see also the "Defense language aptitude battery" DLAB, Petersen & Al-Haik 1976). The fact that funding came from these domains might explain the lack of transparency regarding the instruments and results.

14.2 Current takes on aptitude

Today, the Carrollian approach to modern language learning aptitude is not the only one in the field (see the discussion in Li 2019). New models have emerged from the explanatory-interactional approach (for a concise overview see Wen et al. 2017).

The following list shows the different perspectives on and approaches to aptitude:

- "Carrollian" approach as instantiated in the MLAT
- Linguistic coding difference (e.g. Sparks et al. 1989)
- Fundamental difference hypothesis, i.e. implicit, automatic learning in children, explicit learning in adults (Bley-Vroman 1988)
- Different abilities relevant at different stages of acquisition, "staged" aptitude models (Skehan 2002, 2019)

- Aptitude Complexes framework, also involving aptitude-treatment interaction (ATI; Robinson 2002, DeKeyser 2021)
- Aptitude for learning explicitly vs. implicitly (Suzuki & DeKeyser 2017, Roehr-Brackin 2024)
- Specific focus on one component (e.g. phonology, see Golestani et al. 2011 or music, see Christiner & Reiterer 2013)

Some scholars focus on specific subcomponents of language (learning) ability, e.g. phonology and musical ability, as is the case in Christiner & Reiterer (2013). Others are interested in the sharedness of coding abilities (or problems therewith), as in the numerous publications by Ganschow and Sparks. They conclude that the same components are important for learning first and second/additional languages, and that L1 skills are systematically positively associated with scores in language aptitude tests (they also use the MLAT) and L2 achievement (see e.g. Ganschow & Sparks 1995).

> In brief, findings showed: (a) successful FL learners exhibited significantly stronger native language skills than unsuccessful FL learners on measures of phonological/orthographic and syntactic skills, but not on semantic tasks; (b) successful FL learners exhibited significantly stronger FL aptitude on the MLAT; and (c) students with stronger native language skills and higher FL aptitude achieved higher levels of proficiency in the FL after two years of FL study. (Sparks & Ganschow 2001: 97)

To date, not many studies have explored the connection between aptitude profiles and instructional treatments on a large scale (*Aptitude-Treatment-Interaction*, ATI, a view that is closely related to the idea of learning styles). An early exception with a relatively large sample is a Canadian study by Wesche (Wesche 1981). Here, aptitude profiles for each participant were created based on three different sources: aptitude tests (MLAT and PLAB), L1 proficiency measures and an interview with an experienced teacher. Pairs of learners with the same profile were assigned to different instructional groups: one person was taught according to their profile, the other according to a method that was unsuitable for their profile.

The choice was between three teaching methods: the Analytical Approach (best suited for highly analytical students with strong first language skills and perfectionist tendencies); the Functional Approach (appropriate for students with a relatively restricted command of their L1, yet with good memory capacity); and

the Audio-Visual Method (the most common teaching instrument at the time of the study and best-suited for non-type-specific learners). After 55 lessons, participants who were exposed to a suitable teaching method achieved higher L2 proficiency scores and reported more pleasure in language learning than their counterparts.

Results like those discussed by Wesche seem promising (see DeKeyser 2021 for a more recent collection of studies). Nevertheless, many more large-scale studies would be required to make sound claims about the effects of ATI based learning settings, and to counter the well-argued objections to the learning style idea in the literature (Pashler et al. 2008, Riener & Willingham 2010, Kirschner 2017).

14.2.1 Genetic component?

When language aptitude is investigated, and not only in pedagogical contexts, the question arises: what influences the construct? Is aptitude a product of experience? Is it social influences that make children and adults apt for language learning? Or are we also born with different predispositions for language learning and using?

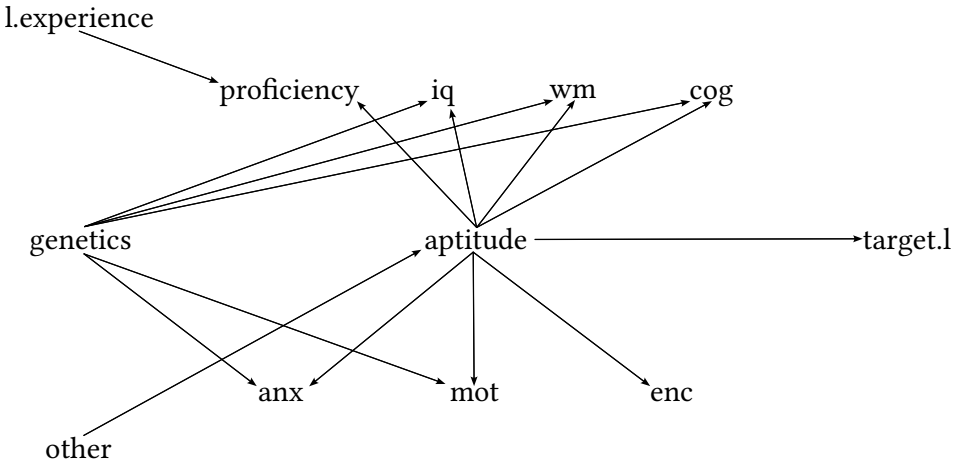


Figure 14.2: Genetics as an underlying cause for variability in aptitude, together with language experience [l.experience] and other factors.

One relatively recent development is the connection of language learning ability to mental/cognitive capacities that can only partially be trained. An example is the study by Golestani et al. (2011), in which language experts (phoneticians) are compared to non-expert controls. The study investigates structural features of the brain and finds evidence for the influence of both experience and innate structural diffences:

> Phoneticians were also more likely to have multiple or split left transverse gyri in the auditory cortex than nonexpert controls, and the amount of phonetic transcription training did not predict auditory cortex morphology. The transverse gyri are thought to be established in utero; our results thus suggest that this gross morphological difference may have existed before the onset of phonetic training, and that its presence confers an advantage of sufficient magnitude to affect career choices. (Golestani et al. 2011: 4213)

Another source of evidence for the influence of genetics is twin studies, e.g. the large-scale study by Rimfeld et al. (2015). The GCSE (standardized test scores in the UK school system) in English and in the foreign languages of 12,526 participants were collected (6,263 pairs of twins), as well as their IQ scores. Both identical and fraternal twins were in the sample (the former share 100% of segregating genes, and the latter only 50%). Moreover, some twin pairs were raised together; others grew up separated. This allows scholars to calculate the variability in the outcome variables (the language scores) associated with the additive genetic, the shared environmental, and the non-shared environmental influences.

As other authors also note (Plomin 2019, Harden 2021), if we look for a single most important factor that explains variability in the outcome variable (in this case foreign language skills), genetic differences have much higher explanatory power than family language policies, school or other environmental influences (Rimfeld et al. 2015: 4–5).

> Genetic factors account for much of the variance in linguistic abilities among people with written or spoken language disorders and some of the variance in linguistic abilities among normal people. In addition to heritable factors that influence both nonverbal and verbal abilities, there appear to be genetic factors that specifically influence linguistic abilities. (Stromswold 2001: 647)

The role of twin studies in the investigation of genetic predispositions is—unsurprisingly—controversial. Willingham (2009: 245) argues that there are several problems with this type of research. For instance, genetic predispositions may prepare a person well for certain skills (having a very agile body for yoga, being tall for basketball), but the skills that may then be developed are not themselves innate but environmentally constrained. Thus, our genes predispose us for specific activities or domains, which we then may develop or not (professionally, or as a hobby).

It seems safe to say that parts of our (cognitive) abilities are inherited, while at the same time our social and cultural environment also fosters the development

of abilities—and that the two interact: if I have remarkable athletic or musical abilities and I am being given the opportunities to develop them, the corresponding skills will most likely thrive.

Even if this genetic impact is as substantial (e.g. 50%) as many authors claim, note that this does not automatically mean that we are *determined* by our genes: on the contrary, there are still the other 50% on which environment (society, curriculum, teachers, …) will have an influence. Moreover, there might be interesting interactions between the social and the genetic domains that remain to be explored and—once we understand them sufficiently—pedagogically addressed (see the thought-provoking book by Plomin 2019).

14.2.2 Aptitude and language teaching methodologies

Remember the no-interface position in Chapter 4. Krashen's idea was that there is a (biologically programmed) module that takes care of natural language acquisition provided there is sufficient comprehensible input and no affective impediment to language learning. This very influential, generativist line of thought led scholars to think of language aptitude as a negligible factor:

> These observations furthermore suggest that the possibility of manipulating and controlling the students' verbal behavior in the classroom is in fact quite limited. (Felix 1981: 109)

As the most influential development in aptitude testing had been made during the heyday of audio-lingual teaching methodology, advocates of subsequent pedagogical innovations, such as Krashen, considered aptitude obsolete and only relevant for "old-fashioned" learning, not acquisiton. The more the learners' engagement with natural, authentic input was the focus of SLA studies, the less relevant aptitude as operationalized by the MLAT was deemed prognostic for acquisitional achievement (Skehan 2002: 72).

However, when people started to use the classical aptitude measures again and tested their association with language skills and their prognostic value for language learning equally in the new, supposedly *natural* teaching paradigm, the strength of the association was the same as it had been in the past. This is why many people continue up to today to use these similar tests for the investigation of language learning.

Most scholars have worked with (young) adults. The project presented in the remainder of this chapter investigates modern language learning aptitude in primary school children.

Individual variability in first language acquisition? Language aptitude research focuses mainly on difficulty or ease of second/additional language learning. While most scholars agree that people differ in terms of aptitude for learning an L2 or Lx, it is somewhat controversial to what extent first language acquisition is also affected by individual differences in abilities.

Think about first language acquisition: is it universally robust or also variable? If you think it is variable, what might be the reasons that giftedness for first languages is not really debated?

If you want to know more about the connections between first and additional language aptitude(s), I recommend reading work done by Richard Sparks and collaborators, for example Sparks et al. (2011, 2006).

14.3 Aptitude in young learners

In a project called LAPS (Language Aptitude in Primary School Children; cf. Berthele & Udry 2021), we tried to do both prognostic testing and analysis of the subskills or subdimensions of language learning aptitude. The aptitude construct was defined in an extremely (maybe excessively) inclusive way, following the recommendations of scholars from different subfields (see e.g. also Parry & Stansfield 1990: 2):

> [T]he relationship between language aptitude and motivation [...] requires a new, integrated approach whereby we focus on the blended operation of cognition and motivation rather than the discrete treatment of the two ID variables. (Dörnyei 2010: 267)

We pursued such an integrated approach, taking into account both cognitive abilities and affective/motivational constructs. The first, smaller sample we gathered within this project has already been briefly presented in Chapter 13, Section 13.4.

The full test battery (testing took place in 2x2 lessons in the classrooms) is listed in Table 14.2. The column *LAPS I* refers to this first stage of the project.

14.3.1 Dimensions of aptitude: Factor analyses

As Table 14.2 shows, many variables were tested in the project. The first question we asked is whether we can identify, among these many variables and constructs,

meaningful and empirically robust dimensions that all belong to the overarching construct *aptitude*. These variables are mutually associated with different directions and strengths. A technique that helps uncover the internal structure of such a rich array of measures is factor analysis. The main goal of this technique is to reduce the many bivariate correlation coefficients to a few dimensions, each of which is strongly associated with some measures but not with others. These dimensions may be—cautiously—interpreted as latent constructs, also termed *factors* (hence *factor* analysis). Figure 14.3 shows these associations (called factor loadings) of all variables measured with three factors.[3]

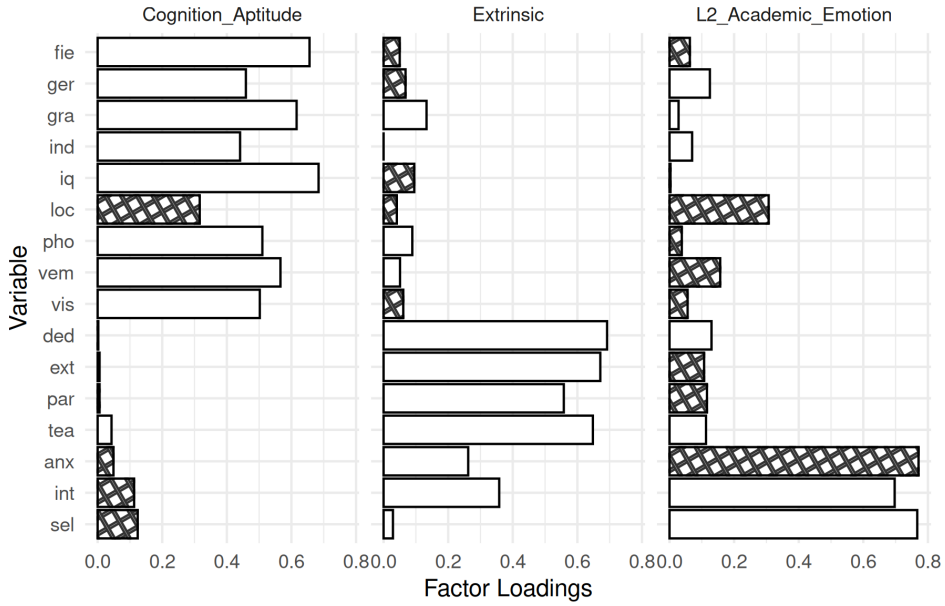


Figure 14.3: Factor loadings, exploratory factor analysis; crosshatched bars show negative loadings

In a first step, we tried to come up with meaningful labels for the three dimensions that emerge from the data:

1. FL learning aptitude, intelligence, field (in-)dependence and working memory ⟶ *cognition*
2. Motivation, mostly extrinsic ⟶ *extrinsic motivation*
3. Intrinsic motivation, foreign language anxiety, L2-Self-concept ⟶ *L2_-academic_emotion*

[3]For more details refer to Udry & Berthele (2021).

Table 14.2: The test batteries in LAPS I and II

Subdimension	Instruments LAPS I	Instruments LAPS II
Inductive Ability	Language Detective (adapted from the PLAB part 4 Language Analysis, Pimsleur et al. (2004))	Language Detective
Grammatical Sensitivity	Team up Words (adapted from MLAT-E part 2: Matching Words, Carroll & Sapon (2010))	Team up Words
Sound-Symbol Association and phonemic memory	LLAMA-E Meara (2005)	–
Phonemic discrimination and memory	–	LLAMA-D
Visuospatial Working Memory	Corsi Blocks	Corsi Blocks (Conditions Adapted)
Verbal Working Memory (Phonological Loop)	Forward Digit Span	Forward Digit Span
Verbal Working Memory (Phon. Loop + Central Executive)	-	Backward Digit Span
Field (In-)Dependence	Group Embedded Figures Test (GEFT, Witkin et al. 2014)	Group Embedded Figures Test (GEFT)
Crystallised Intelligence	CFT 20-R (Number Sequences, Weiss (2006))	–
Fluid Intelligence	–	CFT 20-R (Matrices + Topology, Weiss (2006))
Processing speed	–	Alphabet Task (Berninger et al. (1992))
Creativity	TCT-DP Urban 2005	–
Locus of Control	N-S Personality Scale Nowicki & Strickland 1973	N-S Personality Scale
Motivation, Self-Concept, Language Learning Anxiety, Teacher & Parental Encouragement	Pupil Questionnaire (L2 French, L3 English)	Pupil Questionnaire (L2 English, L3 French)
Linguistic Background, Environment, Migration, SES	Parental Questionnaire	Parental Questionnaire
Reading Proficiency	ELFE 1–6 Lenhard & Schneider 2006	ELFE 1–6
General Language Proficiency	C-Test (French, T1), Oxford Young Learners Placement Test (English, T2, Oxford University Press 2013)	Oxford Young Learners Placement Test (English T1), C-Test (English T2, T3)

Exploratory factor analysis is a tool that provides insights into the internal dimensionality of complex constructs measured via many different variables. However, it is often unclear to what extent the structure uncovered in one study applies to other samples of the population to which one wishes to generalize. This is why we replicated the Fribourg study in a different setting, in the Canton of Zürich, where *English* is the first foreign language taught at school (LAPS II).

Table 14.3: LAPS II (Canton of Zürich): number of participating pupils and their mean age

Cohort	Time of data collection (grade)	Mean age	Number of pupils
4th grade at T1	T1, autumn 2017 (4th)	9;11	289
	T2, spring 2018 (4th)	10;6	274
	T3, spring 2019 (5th)	11;6	260
5th grade at T1	T1, autumn 2017 (5th)	10;11	326
	T2, spring 2018 (5th)	11;7	304
	T3, spring 2019 (6th)	12;7	306

The schoolchildren again took a series of different tests.[4] In this second stage of the project, the foreign language tested was not French, but English (also longitudinally, at three measurement points, see Table 14.3).

To see whether what we had found in LAPS I reflects a factor structure that could be found in other contexts and with other target languages, we checked whether these factors also explain the new data. A confirmatory factor analysis shows that the factor structure that emerged from the first subproject (LAPS I) also applies to the data from the second project (LAPS II). We can therefore assume with greater confidence that there is, indeed, *no fundamental difference* between general cognitive abilities and specific linguistic abilities for the children in our samples.

The school language (German) test loads onto this first factor. Thus, general cognitive ability and language ability appear to go hand-in-hand.

Furthermore, we see that *motivation* is not a uniform construct, but that we have to distinguish between *intrinsic motivation* and (the absence of) anxiety when using the target language, which is to say genuine enjoyment of learning and using the target language in the classroom setting, and *extrinsic motivation* and other, more external social influences (e.g. teachers' or parents' encouragement).

[4]There were some minor changes in the test battery, see Table 14.2 for details.

In the next step, we tested to what extent these three factors are associated with the target language skills. Figure 14.4 shows the association for each factor separately. A statistical analysis (multiple regression with mixed effect models) shows that the factors *cognition* and *L2 academic emotion* are consistently positively associated with target language skills. Thus, cognitive ability and intrinsic enjoyment are strongly associated with both French learning in Fribourg and English learning in Zürich.

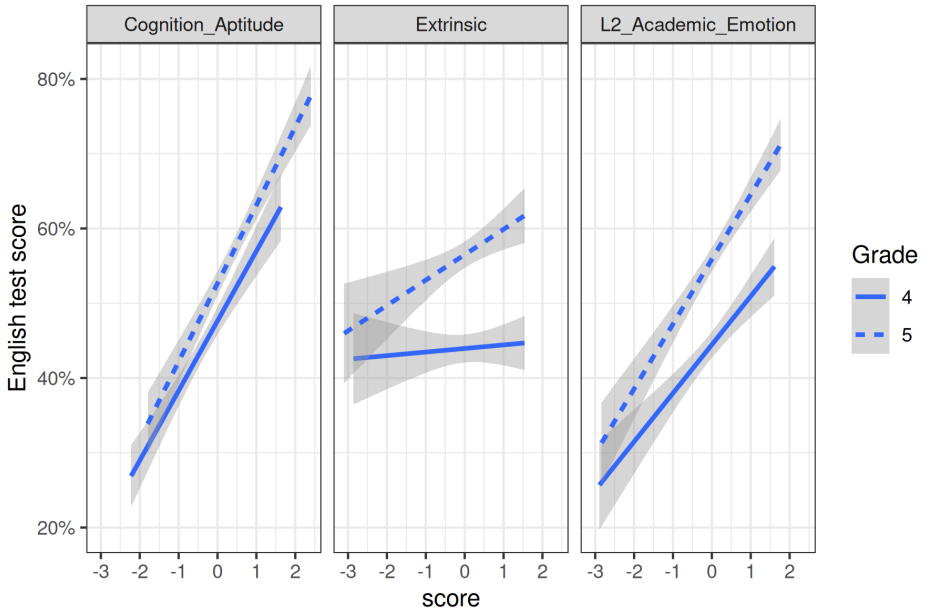


Figure 14.4: Linear association (unmodeled) of the three factors with English skills

14.3.2 Other predispositions

In the last analysis discussed here,[5] I shed light on the association of social background, most notably the parents' educational capital and economic resources, with the other constructs discussed in the previous sections. Information about these additional variables was collected in questionnaires (see Table 14.4 for a complete list)

[5]This section is loosely based on the analyses discussed in Berthele (2021a).

I have mentioned social differences when discussing the twin studies above, and it is clear that social differences, for example regarding the pupils' families' levels of income or education, must not be excluded from the inquiry into learner differences.

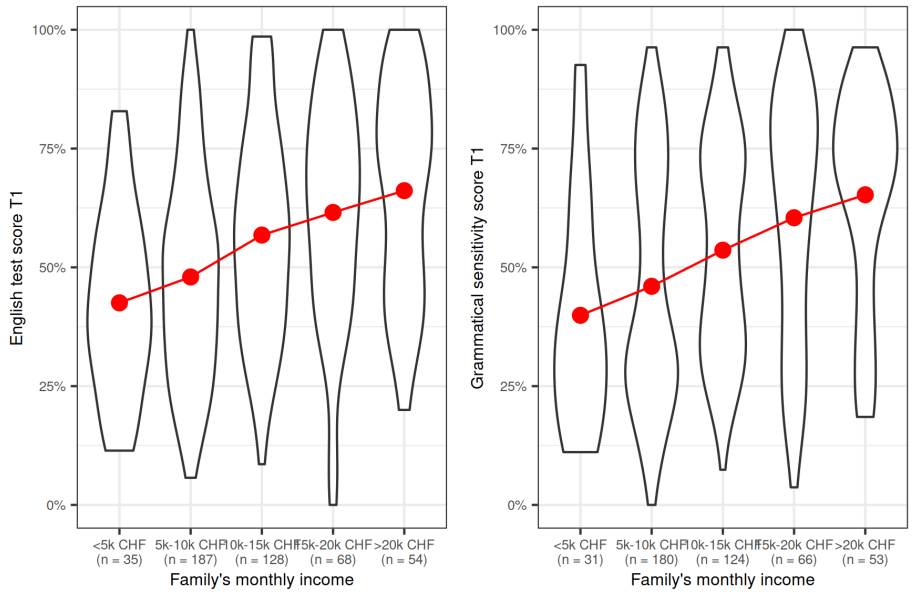


Figure 14.5: Associations between earnings and a) English skill and b) language analysis measures; the dots and lines connect the means per income group

Figure 14.5 shows that there is a linear relationship between the family's monthly income and both average English skills and average language analysis ability.

The first panel of Figure 14.6 suggests that no multilingual 'explosion' is observed: the group of those who do not speak German at home shows a slightly lower central tendency. We will see below whether this effect is borne out in a more complex analysis.

Another variable that is relevant from the point of view of educational policy is whether the learners have a migrant background or not. In debates about (early) foreign language instruction in Switzerland and elsewhere, the question of migrant children who are L2-learners of the language of instruction is systematically raised, sometimes with the claim that they are disadvantaged (because they have to learn the local language first) or that they are advantaged (due to

the multilingual boost theories discussed in Chapter 3). Figure 14.6 shows that there is a difference in English skills at T1 depending on whether German is one of the home languages or whether the pupil was born in Switzerland or not.

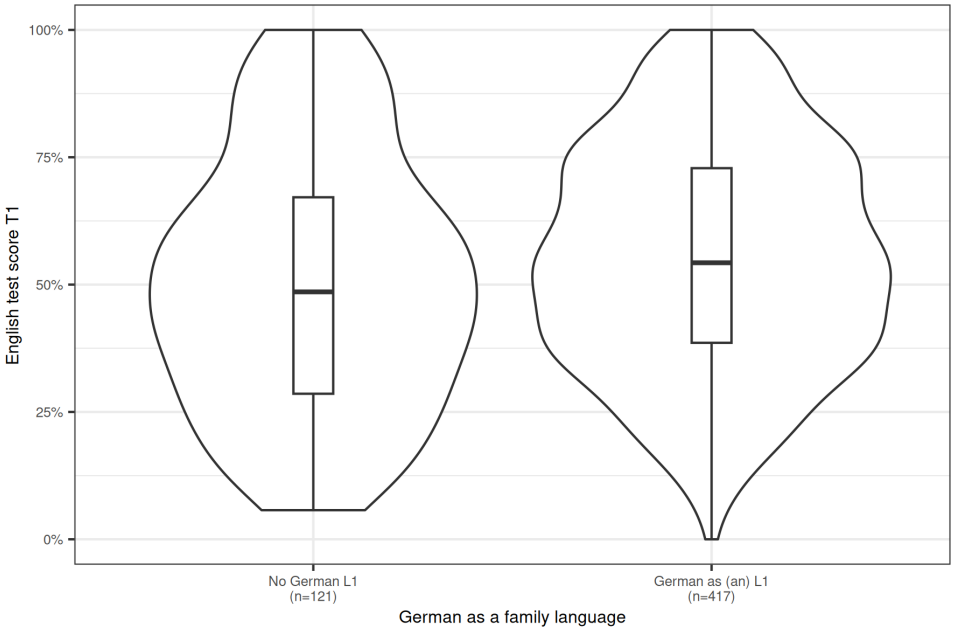


Figure 14.6: English scores at T1 and German as a home language

Bivariate associations as in Figures 14.5 and 14.6 single out two variables respectively, but there is no doubt that the interplay of the factors calls for more complex modeling strategies. Here, I suggest taking into account four factors. Two of these are the same as those associated with the English score discussed above, in Section 14.3.1 (the short names of the variables are given in small caps):

Academic emotion (ACADEMO): the same factor as described in Section 14.3.1; manifest measures of English self-concept (SEL), foreign language anxiety in the English classroom (ANX), and intrinsic motivation to learn English (INT).

Cognition: the same factor as described in Section 14.3.1; manifest measures of intelligence (IQ), visual and verbal working memory (VIS, VEM), phonetic coding ability (PHO), grammatical sensitivity (GRA), inductive ability (IND), field independence (FIE), and German reading (GER).

To this list I add two constructs related to the individual background of each learner (see variables listed in Table 14.4):

Table 14.4: The background variables elicited via a parents' questionnaire

node label	variable
Swiss	Was the pupil born in Switzerland?
educ_f	Highest level of father's education
educ_m	Highest level of mother's education
earnings	Family's monthly income
bills	"Is there enough money to pay the monthly bills?"
savings	"Is there enough money for saving?"
holidays	"Is there enough money for travelling and holidays?"
medical	"Is there enough money for medical and dental care?"
books	"How many books are there in your household?"
L1_Ger	German (a) family language
ParentsSwissBoth	Country in which pupil's parents were born
ParentSwiss	Country in which pupil's parents were born

Economic predispositions (ECON_P): manifest measures are SAVINGS, BILLS, MEDICAL, HOLIDAYS, and EARNINGS.

Cultural predispositions (CULT_P): manifest measures are L1_GER, SWISS, BOOKS, EDUC_F, and EDUC_M.

English: English proficiency at T1 as measured by the OYLPT test. Two manifest scores are available, language use (USE) and listening comprehension (LISTENING).

Figure 14.7 is a simplified representation that only shows the latent constructs (for full detail cf. Berthele 2021a). The two background constructs (economic and cultural predispositions) are mutually positively associated, unsurprisingly there is a connection between being relatively well educated and being relatively wealthy. Moreover, a comparatively strong association emerges between cognition on the one hand and cultural predispositions on the other. To a somewhat lesser extent, economic predispositions are also positively associated with cognition. The two constructs operationalizing two dimensions of the family background thus are first and foremost associated with the cognitive abilities of the pupils.

The literature on multilingual education often points out the incompatibility of the (often monolingual) habitus expected by Western educational systems with the attitudes and the habitus of low-income and immigrant families. The term

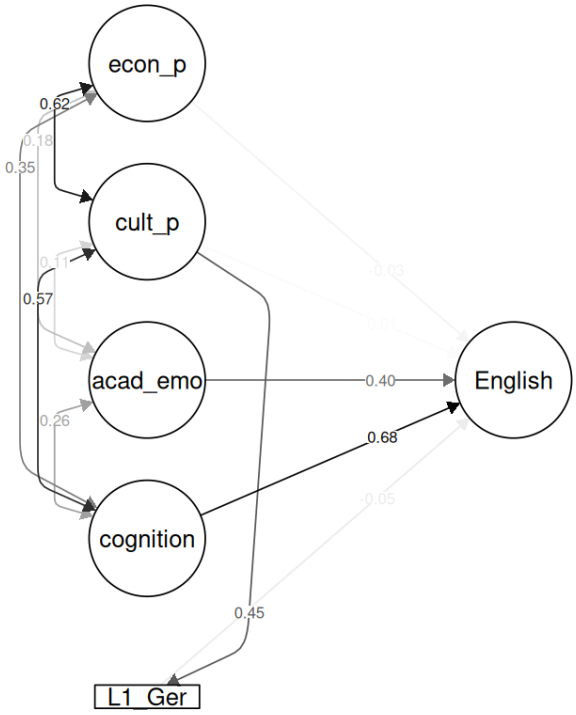


Figure 14.7: The relationships among all four constructs (and the criterion of German as a family language) and English

habitus is borrowed from the Bourdieu (1979) approach and typically authors in the field of intercultural studies and multilingual education advocate a new, different, multilingual habitus that is claimed to make the educational systems a better place for minorities (Gogolin 1994: 187). Based on such assumptions, one would expect the association between these background variables and the attitudinal and emotional construct (acad_emo) to be important: many migrant families are low-income families, and low-income families would arguably foster attitudes that clash with the educational system's expectations. As a consequence, children from such backgrounds should feel emotionally less at ease with respect to schooling and school subjects.

In our data, it seems that this association is not particularly strong, as the linear association estimates for acad_emo in the structural models are 0.12 and 0.18 for the cult_p and econ_p constructs, respectively. This could either mean that expectations based on this habitus approach are not empirically borne out in

the first place or that the schools under investigation have managed to equalize the problems caused by different *habitūs*.

To test whether the apparent associations of families' wealth and migrant status in Figures 14.5 and 14.6 still apply if one controls for the complex associations of all constructs investigated, I fitted two more models, one highlighting specifically the impact on English skills at T1 of speaking German at home or not, and one highlighting specifically the impact of being born in Switzerland or not.

The standardized estimates from these two highlighted variables to English are negligible.[6] This means that being born abroad or not and speaking German at home or not have no measurable specific impact on English FL skills if everything else is controlled for.

The comparison of the models fitted to the data set shows that there is indeed a sound empirical basis for the classic distinction between economic and cultural predispositions of the participants. The analysis furthermore shows that these two constructs, if all other factors are held constant, are not directly associated with foreign language skills. They are, however, associated with the two latent constructs that are on their part associated with English skills -– most importantly with what we termed *cognition*. This construct involves not only memory and intelligence, but also language-specific components such as grammatical sensitivity, inductive learning, etc.

I deliberately modeled a two-way relationship between cognition and academic emotion on the one hand and cultural predispositions on the other, since we know that other constructs that were not measured have an effect on both. The path leading from cultural and economic backgrounds to English skills via cognition, however, raises a few questions. Not only, so it seems, are smart children obviously more likely to achieve better in the foreign language, but these smart children are more likely to come from families with high cultural interests (that are often also economically well-off).

One of the widely shared expectations is that educational systems should somehow manage to even out these inequalities and create more 'equality of chances', which boils down to comparable or almost equal skill levels at crucial moments of institutional selection.[7] If the schools in which the pupils in our sample are educated produced more equality in this sense, the associations between the background variables and constructs such as cognition should be weak. However, they are not. What we observe is an indirect association of family background

[6] German L1 or not as a predictor is associated with the estimate of -0.05 and being born in Switzerland or not with an estimate of ~0.

[7] See Heid (1988) for an early critical discussion of this postulate.

on cognition and the emotional construct, which in turn has an effect on English skills.[8] As far as our analyses allow any insight into the school's potential to even out socially caused inequalities, they seem to be neither reduced nor exacerbated by the system. Exacerbation would be observed if, on top of their advantage already visible at T1, social variables explained additional variance beyond what is acquired and measured at T1 for the prediction of skills at T3, which is not the case.

As discussed in Chapter 3, the mainstream view in multilingualism research predicts that learning an additional (foreign) language provides a headstart for a vulnerable subgroup of children: immigrants who speak different languages at home should already have gathered useful experience in learning new languages and should benefit from a multilingual boost. It seems, at least in our data, that such an effect cannot be found when controlling for the cultural and economic characteristics of the families.

14.4 Concluding remarks

The study of modern language learning aptitude has an interesting history that began in the early decades of the 20th century. What is striking is that the core questions regarding the construct remained the same: to what extent can language aptitude be separated from general cognition? What role do low-level abilities such as phonological encoding skills play? Are motivation and other affective components part of it or not? How well can skills be prognosticated by aptitude tests?

The question of the determinants of aptitude, ranging from genetics to social variables, undoubtedly still deserves scholarly attention. To conclude, I would like to briefly sum up the main aspects of language aptitude research. Language aptitude testing has several distinct functions: initially, the main goal was to select apt/gifted learners (and to deselect low-aptitude learners). Another function is to identify learners with special needs (e.g. dyslexia, phonological problems, etc.) and provide specific pedagogical setups for these learners. More generally, aptitude testing can be a basis for aptitude-treatment interaction, that is language teaching via individualized, adapted methods and materials for individual learners.[9]

[8] As we show in Berthele et al. (2021: 98), English skills at T1 are highly predictive of English skills at T3.

[9] Li (2019), Zimmermann (2012), Wesche (1981: 91); but note that the related idea of learning styles is considered a myth by many cognitive psychologists, e.g. Riener & Willingham (2010).

From a theoretical point of view, aptitude research provides insights into the abilities that are associated with language learning, which in turn tells us something about the domain-specific vs. domain-general nature of language competence: the analyses in Section 14.3.1 above suggest that we cannot identify a language-specific factor in the data from the primary school foreign language learners. What emerges from the data seems rather a general cognitive factor, a factor that is associated with achievement in the target language in the expected direction. If general cognitive variables turn out to be systematically associated with learning of L1, L2, Lx, then this does not support 'encapsulated', modular views of language competence as advocated by scholars working in the generativist tradition (see Chapter 5.1). As always, one study is not enough to prove such a claim, but as evidence from other studies, also on adults, seems to point in a similar direction,[10] it is legitimate to affirm that there is no clear evidence in favor of strongly modularist claims.

Moreover, the type of research discussed in this chapter unveils the roles and mutual associations of cognitive and affective/motivational variables.

The evidence from the more recent aptitude studies suggests that the tests based on the subskills proposed a long time ago by John Carroll are still useful and empirically robust predictors of language learning abilities. Such MLAT-based metrics are positively correlated with general cognitive abilities such as IQ or working memory.

Other important predictors of foreign language achievement are intrinsic motivation and foreign language anxiety. Among the motivational dimensions of language aptitude research, extrinsic motivational variables seem to be less systematically associated with skills in the target language than we had expected (cf. also Li 2019).

Whereas one often hears in the pedagogical/media/policy discourse on foreign language learning that "everybody can learn several languages, all that counts is motivation and a playful learning setting", the data discussed in this chapter show a more fine-grained picture: intrinsic motivation, indeed, seems helpful and positively associated with the outcome variable, but other motivational constructs, e.g. parental encouragement or instrumental motivation to learn the language, do not show the expected strong association.

The question whether children are overwhelmed with two foreign languages in primary school depends on what state the term *overwhelmed* refers to. Our data show no evidence of overwhelmed children in the samples (regarding the first foreign language) in the sense that a large majority of children learn at least

[10] See also Li (2019), Rampinini et al. (2024: 85).

something in the target language. This also applies to children with special needs whom we had not excluded from our analyses (see Udry & Berthele 2025 for details).

As far as such research can inform theory development in multilingual language learning, the analyses of the background variables (including other languages spoken at home or not) do not support multilingual boost theories (as advocated by scholars and theories discussed in in Chapters 3 and 13). As soon as we control for cognitive and other individual differences variables, there is no clear evidence for a positive effect of previous learning of second languages on additional language learning.[11]

A number of problems and questions remain unsolved: for instance, it is difficult to make strong claims about the causal direction of effects. To what extent are the abilities that are positively associated with language learning malleable (as opposed to innate)? Are learners intrinsically motivated to learn a language because they are successful learners or are they successful learners because they are intrinsically motivated? It is possible that other types of research, for example into abilities which we know for certain are innate, or the effect of training (i.e. genetic and neuroscientific research), will provide some new answers to these questions.

[11] Maybe you were wondering why the linguistic distances to the first languages were not considered as a predictor here, while they turned out to be robustly associated with French as a foreign language in Section 12.2. The reason is simple: as all children in the sample have (some form of) German as one acquired language and the typical languages of immigration are not Danish or Dutch, there is not enough variability in linguistic distance between the respective L1s and the target language English to run such an analysis—in particular, there are virtually no L1s that are closer to English than (Swiss) German.

15 Bi- and multilingualism and cognitive abilities

Preview—Key points of this chapter

- Ideas on the relationship between multilingualism and cognitive abilities have undergone radical changes:
  - Early work considered bilingualism to be *detrimental for cognition*. This view typically confused bilingualism with social class.
  - From the 1960s on, a *benefit narrative* begins, multilingualism is deemed to have positive effects.
- Domains investigated:
  - General cognition (e.g. *intelligence; executive control; working memory*)
  - Specific domains (e.g. *creativity; metacognitive awareness; language learning*)
- Main insights after several decades of research:
  - Advantages are elusive, effects found are modest in size.
  - There are recurrent concerns about direction of *causality*, *publication bias* and *construct/measurement validity*.
  - Advantages for *receptive skills* in related languages are robust.
  - Categories bilingualism/multilingualism: modeling *clines* is preferable to binary labels.
  - A *trade-off* view seems more adequate than a unilateral focus on benefits.

In this chapter, I discuss evidence for the association of bi- and multilingualism (1) with cognitive abilities in general and (2) with additional language learning in particular. Many scholars in recent decades have argued that bilingualism has non-trivial and mostly beneficial effects on 'the brain' and on cognition (see the quotation from Marian below and review articles such as Costa & Sebastián-Gallés 2014). This has had a lasting effect on public debates about language learning.

> Some new parents trust ill-informed nurses, doctors, teachers, school administrators, family members, and even cabdrivers, following the mistaken advice to speak only one language to their children. In the process, they deprive their children not only of exposure to another language and culture that would enrich their lives but also of the cognitive, neural, social, and economic advantages. (Marian 2023: 85)

In Chapter 13, we encountered and critically discussed the idea of the multilingual boost that is currently particularly influential in language pedagogy (see Section 3.5).

In this chapter, I will mostly focus on non-linguistic, cognitive effects attributed to multilingualism. Evidence relating to the linguistic domain will only be briefly summarized in the last section of the chapter.

15.1 Cognitive consequences of bilingualism and multilingualism

Scholarly perception of bi- and multilingualism has changed from pathologization in the 19th and first half of the 20th century to celebration. Celebration sometimes comes with pathologization of monolingualism, as expressed in booktitles such as "Monolingualism is curable" (Ammon et al. 1997). While today most scholars seem convinced that bilingualism entails benefits and advantages (it is considered 'good for the brain', but often also for finding jobs, the economy, society, etc.), the views of non-specialists, depending on contextual and social parameters, vary considerably from monolingual mindsets to positive views of (certain types) of multilingualism.

In the present chapter, I discuss the empirical evidence for the association of multilingualism with cognitive abilities. Given the vast range of linguistic configurations covered by terms such as *bilingualism* and *multilingualism* (see Chapter 3 above and Figure 15.3 below), it is not surprising that the evidence for almost every domain we will focus on is inconclusive.

As the interest in the effects discussed in this chapter has risen in the context of bilingualism, and as most investigations focus on subjects with *two* languages in the repertoire, evidence for the effects of three or more languages on cognition is comparatively scarce. I discuss insights into such effects wherever appropriate.

15.1.1 Dependent variables investigated

Many different constructs were investigated with respect to a possible influence of bilingualism: general capacities on cognitively lower or higher levels, and specifically linguistic capacities.

Cognition:

- intelligence
- cognitive control (task switching, inhibition, monitoring)
- working memory (linked to monitoring)
- cognitive reserve (protection from dementia or compensation of symptoms of dementia)
- creativity, cognitive flexibility
- metacognitive awareness
- moral reasoning

Language domain:

- third language acquisition (TLA)
- receptive multilingualism (comprehension of unlearnt but more or less related languages)
- metalinguistic awareness
- fluidity
- literacy
- grammar
- vocabulary

15.1.2 Early investigations: Bilingualism as a pathology

Most of the anti-bilingualism positions were not based on research but were purely programmatic (or dogmatic), as was for example the case for Laurie's educational argument that mental development is retarded because of the double effort that bilinguals need to make:

> [C]hildren should be made to live in the atmosphere of their mother-tongue alone, and think through the vehicle of it alone, if we are to promote in them depth and solidity of nature and unity of character. (Laurie 1890: 57)

Similar ideas were held among scholars even in the late 20th century (e.g. by the German linguist Weisgerber 1966: 73.)

While none of these claims were substantiated by any noteworthy empirical evidence, there were some early empirical investigations of cognitive abilities and bilingualism that, at first sight, seemed indeed to lend support to the idea of negative effects of bilingualism on cognition. Among them are studies from Wales or Ireland (Saer 1923, MacNamara 1966).

These early investigations were carried out in the school context, and the main assumption was that the human language learning capacity is limited, and therefore, that learning two languages was detrimental to cognitive development in other domains. Jansen et al. (2021: 151) describe this idea of competing languages in terms of the metaphorical *contention* model.

The association of low intelligence with bilingualism in the Welsh study is an example of a spurious statistical relationship, since other important (social) factors were not controlled for. As also pointed out by Tabouret-Keller, the social situation of the (bilingual) Welsh children was precarious (see Section 14.3.2), which renders simplistic conclusions based on a direct comparison of psychometric scores of bilinguals and monolinguals unscientific:

> Due to the disastrous historical and political conditions of cohabitation among the languages, these obvious difficulties are interpreted as a handicap inherent to bilingualism itself. (Tabouret-Keller 2011: 137, translation RB)

15.1.3 Paradigm shift: Bilingualism as cognitively beneficial

A seminal study with a sustained impact on the field of bilingualism studies was Peal & Lambert (1962). In this study, multiple associations of cognitive and social background variables were tested. The authors rigorously selected their participants (N=364), matched bi- and monolinguals for socio-economic status (SES), linguistic experience, sex, age, and language attitudes. The definition of bilingualism was strict, that is, very high scores in a vocabulary test were required to be included in the French-English bilingual group. The tasks administered involved a word association and word recognition tests, the Peabody Picture vocabulary test (see Section 9.2.3), a language self-rating task, and different intelligence tests.

The results showed that the bilinguals performed better than the monolinguals on most tasks, both verbal and non-verbal. In particular the better performance on the verbal tasks was a surprise. The bilingual group was also diagnosed to be cognitively more flexible than the monolingual group. Moreover, the bilinguals

not only outperformed the monolinguals in some of these tests, they also showed more positive attitudes towards their languages.

The study marked a turning point in bilingualism research. It is still widely (and often uncritically) cited as evidence for bilinguals' superiority, despite the selection biases in the sample, as discussed quite a while ago by Hakuta & Diaz (1985: 322).[1]

The watershed study by Peal & Lambert (1962) thus marked the beginning of a renewed and sustained scholarly interest in the relationships among cognitive abilities. Most studies on intelligence in the wake of this seminal paper, if better controlled and less biased, showed neither intelligence advantages nor disadvantages across the groups. Most of the research in the last decades, however, did not investigate intelligence, but more specific domains of cognition.

15.2 The analysis-and-control framework

The analysis-and-control framework is the most popular line of research to be discussed here. It is associated with psychologist Ellen Bialystok.

The framework focuses on several subcomponents that are used to explain task demands in cognitive processing. The basic idea is that being bilingual trains these components, which leads to superior processing abilities. This framework involves inhibition, attention, and switching between tasks (=control):

1. *monitoring, i.e. attention* allocated to relevant cues, signals for the task at hand
2. *inhibition* of irrelevant information that interferes/competes with relevant information in the task
3. *switching* of the focus/attention depending on task requirements, so that the task's goals may be reached efficiently (Bialystok 2007, Costa et al. 2008, Costa & Sebastián-Gallés 2014)

Costa et al. (2009: 136) describe the current underlying rationale for why managing two languages should enhance conflict *monitoring*: Given that in many contexts bilinguals need consciously to select the suitable language as a function of topic, interlocutors, etc. (mostly in conversation, which means rapid and

[1]For more on the impact and interpretation of this study see also Ng & Wigglesworth (2007: 196).

fluid cognitive operations are required), they develop the attentional 'surveillance' skills of their speech production and reception apparatus—in other words, they have more efficient monitors.

In addition, the two other components arguably benefit from using two or more languages regularly:

> Fluent bilinguals have extensive experience in language switching that involves monitoring the situation to select the appropriate language, activating the selected language, and inhibiting the other language. This extensive practice may lead to an enhanced ability in cognitive control that is general and not language specific. (Paap & Greenberg 2013: 232)

Typical tasks used in this research tradition are the Stroop, Flanker (Figure 15.1), and Simon tasks.

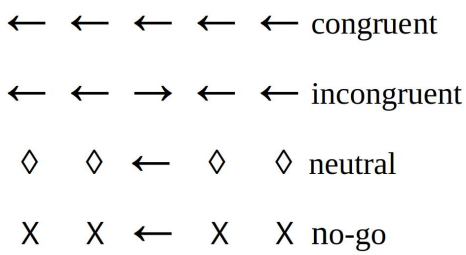


Figure 15.1: Example "Flanker Task" with go/no-go condition; participants respond to the central symbol (push left or right button depending on the direction of the arrow)

Figure 15.1 can be used to illustrate all three components of the analysis and control framework: congruent flanker trials show a central cue that is aligned with the distractors to the left and the right. Incongruent flanker trials show distractors that point in the other direction. Neutral trials show distractors without any orientation. Finally, the go/no-go trials show yet different distractor symbols that mean 'no-go', that is no action from the participant is required (i.e. a task switch).

The reaction times (RTs) on the congruent trials form the baseline that measures the *monitoring* ability. RT differences between the incongruent and the congruent trials are deemed a measure of *inhibition* costs, and differences in RTs on the go/no-go trials following and preceding other trials measure *task switching* costs.

The main results produced by Bialystok and other colleagues in the field can be summarized as follows: Bilinguals have better cognitive control abilities (comparatively shorter RTs above all on the incongruent trials) than monolinguals, and this effect extends over the lifespan.

Bilingualism and dementia, a more recent development within this line of research, was investigated in several studies.[2] Here, the evidence seems to suggest that bilinguals manage to compensate for the *symptoms of dementia* for about four years longer than monolinguals. Please note that one of the leading scholars in this field, Ellen Bialystok, does not claim that bilingualism affects the *causes* or the *time of onset* of the actual brain deterioration. What is pushed back is the *emergence of manifest symptoms* of dementia.

However, not everybody agrees with these findings and interpretations. Regarding the monitoring/attentional component, some scholars, e.g. Kousaie & Phillips (2012), Paap & Greenberg (2013), Paap et al. (2015), Humphrey & Valian (2012) do not find any differences in the relevant RTs between the bilingual and monolingual groups. Moreover, in some studies, if there are any significant effects, they are negative for multilinguals (e.g. Humphrey & Valian 2012).

A recent contribution that investigates the association of multilingualism and ageing is the large-scale study by Amoruso et al. (2025). This study integrates a wide range of variables describing individuals and their respective countries of residence. The paper shows a positive association of being multilingual and delayed ageing. The exact underlying mechanisms are unknown (they might be related to cognitive reserve as discussed in this section). The interpretation of the paper is difficult, also because the authors acknowledge, for the same reasons discussed in different chapters of this book, that no causal inference may be drawn from their analyses[3] but make an unambiguously causal claim in the title of the paper ("Multilingualism protects against accelerated ageing"; see Vanhove 2026 for a long list of other things that are problematic in this study).

Regarding *inhibition*, e.g., there are dissenting voices. For example, Hilchey & Klein (2011), in their extensive literature review, come to the conclusion that there is no advantage for children and young adults; their review is "simply inconsistent with the proposal that bilingualism has a general positive effect on inhibitory control processes" (629).

[2] Chertkow et al. (2010), Craik et al. (2010), Bialystok (2011), Perquin et al. (2013), Freedman et al. (2014), Perani & Abutalebi (2015), Mukadam et al. (2017), Bialystok et al. (2007), Mendez (2019).

[3] "While this approach provides evidence of temporal precedence, it does not establish causality" (Amoruso et al. 2025: 11).

The investigation of *task switching*, the third component, also yields null results in several studies:[4]

> [T]here were no group differences in switching costs and there was a bilingual disadvantage on a measure of inhibitory control. Tare and Linck conclude "These results suggest that factors other than bilingualism per se may be driving any purported bilingual cognitive advantages". (Paap & Greenberg 2013: 251)

All studies cited here so far investigated unimodal bi- and multilinguals, more specifically, they all focus on oral and written languages. Only now we understand to what extent bimodal bilingualism in sign and oral languages has similar or different effects on cognition.

As argued in Frederiksen & Kroll (2022: 8), there is less competition between oral and sign language as the two may be and are often performed simultaneously. If fluent bimodal bilinguals thus need lower levels of regulation, we would expect differences with respect to the effects predicted by the attention and control framework discussed above. The evidence is (once again) inconclusive: while some studies on early bimodal bilingualism indeed do not seem to find any evidence for enhancement of cognitive abilities (or their anatomical underpinnings as in Olulade et al. 2016), others, in particular on late second language learning of sign languages (Macnamara & Conway 2014), indeed suggest similar effects to those found in some groups of unimodal bilinguals.

15.2.1 Overview of evidence on the analysis and control framework

The following list represents my current knowledge of the state of the art. An increasing number of publications either find and report null results or argue in favor of a more nuanced analysis of bilingualism and its possible effects.

Bilingual advantages overall confirmed:

- in children and adults (e.g. Bialystok 2007 and other studies from her lab)
- positive effects in bi-/trilingual children (Poarch & van Hell 2012)
- some positive effects in late bilinguals (Vega-Mendoza et al. 2015)

[4] See also Prior & Gollan (2011), Paap & Greenberg (2013), Tare & Linck (2011).

- positive effects of intensive language class ("auditory tests of attentional inhibition and switching"; Bak et al. 2016)
- positive effects on inhibition also when controlling for socio-economic variables (Cox et al. 2016)
- positive effects in bidialectals (Greek and Cypriot Greek; Antoniou et al. 2016)
- positive effects in Swabian-Standard German bidialectals (Poarch et al. 2018)
- meta-analysis yielding mainly positive findings and no evidence for publication bias (Adesope et al. 2010)
- literature review focusing on the brain, mainly positive effects (Perani & Abutalebi 2015)
- meta-analysis finding advantages in older bilinguals and depending on tasks (Ware et al. 2020)

Bilingual advantages questioned; calls for nuances:

- differences within bilinguals emphasized (Valian 2015)
- meta-analysis with focus on dementia (Mukadam et al. 2017)
- effect is possible, but study designs should be better (Noort et al. 2019)
- trade-off position: there cannot be advantages without disadvantages (Del Giudice & Crespi 2018, Struys et al. 2018)
- systematic review finding overall more advantages but raising serious doubts about their robustness due to lack of methodological rigor (van den Noort et al. 2019)
- review paper by Bialystok & Craik (2022) that questions the componential view (inhibition, attention, switching) and argues for a more 'holistic' view claiming bilingualism has an effect on attentional control

Rejection of bilingual advantages:

- no evidence for advantages in several studies of children and adults (Paap & Greenberg 2013, Paap 2019)
- no evidence in studies on children (Antón et al. 2014) and elderly adults (Kirk et al. 2014)
- no effects of bidialectalism and bilingualism on executive functions (Oschwald et al. 2018)
- meta-analysis that does not find evidence for effects (Lehtonen et al. 2018)
- no effects of bilingualism in massive sample (N>11,000; Nichols et al. 2020)
- meta-analysis on younger bilinguals (<18 YOA); evidence for publication bias and no cognitive effects except for switching (Gunnerud et al. 2020)
- comparison of results reported in conference abstracts and published research yielding evidence for publication bias (de Bruin et al. 2014)

15.2.2 Is there an advantage or not?

The number of studies, systematic reviews and meta-analyses of the topic is impressive. The idea that using two or more dialects or languages regularly is good for cognition intuitively makes sense, and in the light of the stigmatization of bilingualism and of dialects in the past it is not surprising that the field is somewhat biased towards the positive view. I believe that the most important insight of the debate—which indeed is not controversial—is that bi- and multilingualism are clearly not detrimental. As we have seen for the language domain (e.g. in the field of vocabulary development, see Chapter 10), there is a price to pay for bilingualism, but there are also advantages in being bilingual—thus, there is a *trade-off*. In recent publications, the trade-off idea has been advanced for the cognitive domain:

> Contrary to widespread belief, bilingual advantages and disadvantages are not stand-alone outcomes in free variation. We recast them as the connatural components of a dynamic trade-off, whereby enhanced performance in any domain entails costs and compensations. (Dentella et al. 2024: 1)

There is not much evidence for *robust* and certainly not for *large* positive effects of bilingualism on cognition. Keep in mind that the positive findings in reality mean that bilinguals, on average, respond a few milliseconds faster when pushing buttons in a psycholinguistic lab. The dementia studies seem more relevant for real-life problems. Bilingualism arguably provides *cognitive reserve* that leads to better compensation of the cognitive symptoms of Alzheimer's disease. This means that bilinguals will likely be diagnosed when their brains are already more damaged than those of monolinguals: the same amount of neural deterioration leads to less salient behavioural symptoms in bilinguals. I am not expert enough to know whether the advantages (of better coping) or disavantages (of having the disease undiagnosed for a longer time) prevail.

There seems to be an increasing number of analyses that reveal a publication bias, that is evidence for the fact that "successful studies" (i.e. studies that show the expected result) are published, while studies producing null results end up in the drawer. Among the published results, the findings are undoubtedly inconsistent. The tasks and constructs are criticized for lack of conceptual clarity and lack of validity in the measures, and the notion of *bilingual* is unclear, as the category is notoriously ill-defined and internally heterogeneous.

It is uncontroversial that learning and using two or more languages at high levels of proficiency is good for the brain, just as many other cognitively interesting and demanding activities are (even if they are carried out only in one language).

One of the main problems is once again causality (see the discussion in Chapter 14): are skilled bilinguals skilled because they are cognitively gifted or cognitively gifted because they are skilled bilinguals? We should heed the same advice, not to jump to causal interpretations, when investigating positive effects of bilingualism (as already critically discussed in Chapters 13 and 14): both glottophobic (Blanchet 2016: 43) and glottophile[5] attitudes towards bi- and multilingualism are commonly based on simplistic, often correlational analyses that can hardly ever prove causality. Testing causal theories in this field is often tricky, and if it is conceivable at all it involves controlling for known alternative predictors that have an effect on the dependent variables. In Chapter 14, we saw that as soon as important sources of influence other than the bi- or multilingual repertoire are accounted for, the effects may disappear.

[5]I borrow this term from Alexandre Duchêne who used it in a public lecture in Berne (December 8, 2021).

15.3 Creatitivity

There is no doubt that adding a second or additional language to the cognitive system has an effect on the representations of both linguistic form and meaning (see Ning et al. 2020 for a recent example on effects on semantics). Today's advocates of multilingual education and multilingualism in general emphasize the positive potential of such changes due to the idea of multilingualism's advantages for the development of creativity (see Lasagabaster Herrarte 1998 for an early example). As always, the construct of creativity is difficult to define.

Scholars have focused on what is called *divergent thinking*: divergent thinking is one component of the complex process of creative thinking. The process, according to Kharkhurin (2007: 176), involves the following stages:

> problem definition/redefinition → divergent thinking → synthesis → reorganization → evaluation.

Divergent thinking is often tested with tasks such as the *alternate use task* where the participants are shown an object (e.g. a pen) and are asked to come up with a maximum number of 'creative' possible uses of this object.

> [B]ilingualism might contribute to individuals' creative abilities, but its contribution is likely to be limited to an increase in divergent thinking. This argument stems from the notion that bilinguals show greater cognitive abilities compared to their monolingual counterparts. (Kharkhurin 2007: 179)

While Kharkhurin indeed found advantages in divergent thinking, other studies did not (Hommel et al. 2011, Booton et al. 2021).

Since multilingualism and bilingualism are features of participants that emerge over (a long) time, it is virtually impossible to run experimental studies that might license drawing conclusions about causality. All the studies discussed here, therefore, show associations or correlations, but cannot prove causation.

For example, Fürst & Grin (2018) analyze data from a self-selected sample of participants, undergraduates from the University of Geneva, who filled in a questionnaire (N=596). They were asked to assess their creative potential by responding to items such as the following:[6]

[6]See also the analysis based on data from the Language, Religion and Culture survey done by the Swiss Federal Office of Statistics in Grin & Masiero (2024: 144).

- Idea generation:
  - I easily come up with a lot of ideas
  - I like to play with ideas just for the fun of it
- Idea selection:
  - I carefully craft and elaborate my ideas
  - I criticize and evaluate my work thoroughly
- Creativity (participants' activities):
  - music (singing, playing an instrument, composing), literature/writing (e.g. fiction, prose, scenarios)
  - performance art (e.g. dance, drama, humor)
  - visual arts (e.g. drawing, photography, graphical design)
  - 3D design (e.g. architecture, industrial design, fashion)
  - inventions and technical solutions (e.g. DIY, electronics, computer programming)
  - science (e.g. academic work in the social sciences, the humanities, or the life sciences)

The authors report the correlations as given in Table 15.1

Table 15.1: Correlation coefficients in the study by Fürst & Grin (2018); Note: significance level of correlations: '†': p < .10; '*': p < .05; '**': p < .01; '***': p < .001.

	L2 skills	L3 skills	L3 skills	# L
Idea generation	.162***	.090*	.091*	.110**
Idea selection	.102*	.047	.021	.027
Creative interests	.074†	.051	.086*	.086*
Creative activity (yes/no)	.105*	.095*	.031	.076†
Creative activity and achievement (N = 491)	.136**	.071	.091*	.147**

The correlation coefficients in the study discussed here are low.

Correlation coefficients: what do they mean? The highest correlation coefficient in Table 15.1 is 0.162. Data were collected from 596 participants.

Try to find out what possible patterns of association would yield such a coefficient. A fun way to do this, provided you have some skills in the R language, is the *plot r* function programmed by Vanhove (2016).

There are also interactive tools available online that allow you to simulate correlations (e.g. Magnusson 2023).

Suppose you were asked whether such an association provides strong evidence for an effect of multilingualism on creativity—what would you respond?

A study that actually *tested* creativity was part of the LAPS I project discussed in Chapter 14. In her MA thesis, Udry (2018) investigated creative thinking in the LAPS-I sample (140 participants in this task, 5th and 6th graders).

She used a standardized test with a graphical stimulus (Figure 15.2), and the following instructions:

> In front of you, you see a drawing that has been started. The artist stopped before s/he knew what would become of it. Now you should just keep drawing! You can draw whatever you want! So you cannot do anything wrong; whatever comes to your mind is fine. (Translation RB, from the test manual of Urban 2005: 14)

The participants had to complete this drawing. Figure 15.2 shows two sample solutions. The pupils' productions are scored using a standardized grid developed by the authors of the creativity test.

The scores obtained can be used in quantitative analyses, as we have in the LAPS-I project.[7] Udry did not find any association whatsoever with the pupils' individual linguistic repertoires (N of languages, being mono- or multilingual).

Overall, the field of creativity research is rather messy. It seems obvious that creative individuals will use their languages, if they are multilingual, in their creative thinking and production of artifacts. However, neither the direction of causal influence nor the definition of creativity seem clear:

> [T]here is […] no consensus as to how creativity should be measured […]. Massive research from the last 40 years or so provides strong evidence that

[7]We decided to drop the construct from the battery in LAPS II because it did not contribute much to the overall picture.

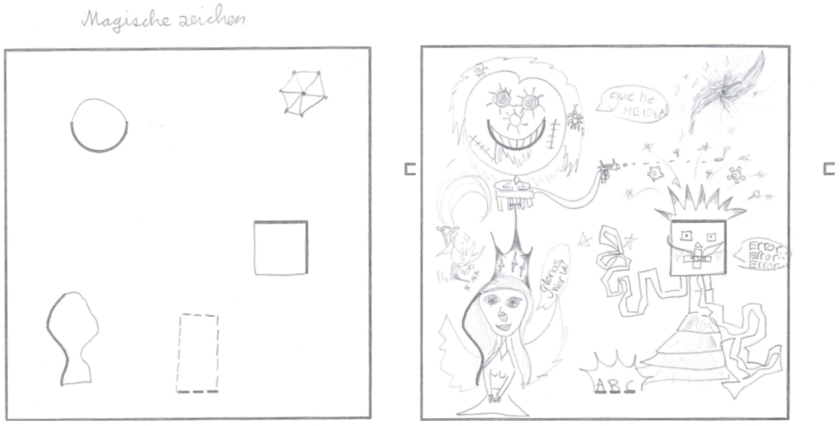


Figure 15.2: More or less creative responses to the creativity task; from Udry (2018: 51–52)

> bilingualism somehow supports creativity, and a recent report of the European Commission has listed more than 200 articles demonstrating this connection […]. Unfortunately, however, the methodological diversity and sample characteristics of these studies are enormous, which renders it more than questionable whether they were actually assessing the same construct and processes. (Hommel et al. 2011, cf. also Ricciardelli 1992)

15.4 Other effects

There are other effects associated with being bi- or multilingual. One rather puzzling finding that seems to be in line with positive transfer effects from language to other cognitive domains (here: arithmetic) even when controlling for social background comes from a Norwegian study on biliterate Norwegians (Nynorsk and Bokmål, Vangsnes et al. 2017). The authors found that even when carefully controlling for these confounds, the fact that in pupils' schools both Norwegian standard languages were used (as opposed to an overwhelming use of Bokmål), had a positive impact on arithmetic.

Another example is Leivada et al. (2021). These scholars found that bilinguals are better at detecting manipulative language than monolinguals, while being overall slower in processing certain information. They thus formulate a trade-

off theory of bilingualism (see also Dentella et al. 2024 for more on the trade-off idea).

A last type of effect on cognition is the *foreign language effect*, as investigated by Costa et al. (2014). When multilinguals are confronted with moral dilemmas (whatever you do in a given situation, people are going to die—but by killing one, you will save the lives of more people than would die by doing nothing), they tend to respond in a more utilitarian way, which means they are more enclined to choose the option where a maximum number of lives is saved, when a foreign, less dominant language is used than the L1.

This effect seems to be replicated in several studies (see e.g. Dewaele et al. 2024 for a recent example), but there are various different explanations for it (see e.g. Geipel et al. 2015: 12). Unsurprisingly, it seems that the better multilinguals get in the weaker language, the more this effect disappears (Stankovic et al. 2022: 9).

15.5 Cognition—what can we conclude?

The overall picture of the possible influence of bi- and multilingualism on cognition is confusing and no clear conclusions can be drawn.

After a first period with negative findings (that were undoubtedly due to confounds and strongly biased samples), there was a period of findings hinting at cognitive and linguistic advantages, starting with the seminal Canadian study by Peal and Lambert. At the same time, the focus was broadened, and constructs such as creativity and the analysis-and-control framework were investigated.

Published studies reporting null effects are becoming more and more frequent. In my view, this is due to raised awareness of publication bias and, more generally, of the replication crisis (see e.g. Ritchie 2020: 25) in psychology. The samples investigated are increasingly large and diverse, involving many different types of bilingualism, and the studies are improving test materials and elicitation methods. Overall, the better the methods and sampling strategies, the smaller the effects found (see Ritchie 2020, chapter 5 on the problems of underpowered research).

I would like to add that being bi- or multilingual is a value *per se*—being multilingual does not need any cognitive miracles to happen to be a fine thing. In this respect, the development reconstructed by Tabouret-Keller (2011) is positive: the stigma, at least in Western contexts, has largely disappeared, certainly for recognized, legitimate languages and varieties.

I do not claim that discrimination based on real or supposed language repertoires that diverge from what is considered 'normal' has disappeared (see e.g.

Berthele 2012c for stereotype effects of ethnicity/first languages on language skill assessment), but it is no longer omnipresent or as dominant as in the past.

Overall, I think Edwards' quotation on the effects of bilingualism is still very much to the point:

> In essence, being bilingual (or multilingual, for that matter) is unlikely to mean any significant increase in cognitive and intellectual skills, although it is also clear that bilingualism need not lead to decreased or weakened capacities. It would be perverse, however, to deny that bilingualism can represent another dimension of one's capacities, and in that sense be a repertoire expansion. I see nothing controversial about this, just as I would see nothing controversial in the statement that a number of years' devotion to the study of great literature can lead to a heightened or, at least, altered sensitivity to the human condition. (Edwards 2006: 17)

15.6 Bi- and multilingualism effects on additional languages

This topic has been addressed repeatedly throughout this book (most importantly in Chapter 3 and Section 13.4). In this section, I summarize very briefly what the current research says about the known effects of mastering two or more languages on the use and learning of additional (third, fourth, nth) languages.

The references given below are examples, as it would be impossible to give an exhaustive list of publications on each aspect.

15.6.1 Fluency

It seems clear that bi- and multilinguals generally manifest slower performance on *linguistic fluency* measures.

- more tip of the tongue states in bilinguals (Gollan & Acenas 2004)
- monolinguals more fluid than bilinguals (semantic fluency, rapid production of words, picture naming, Gollan et al. 2002)
- longer latency in accessing lexical semantics (Gollan et al. 2002)
- stuttering: more frequent in bilinguals—but note: this is a contentious finding (Howell et al. 2009)
- divergent thinking: sometimes considered a measure of fluency (Hommel et al. 2011)

15.6.2 Vocabulary measures

We addressed matters regarding bi- and multilingual vocabularies in Chapter 10. We need to distinguish between potential and observed vocabulary in reception and production.

Advantages

- Potential vocabulary in reception in genealogically related languages
- e.g. Germanic (Delsing & Lundin Åkesson 2005, Berthele & Vanhove 2014, Vanhove & Berthele 2015b)
- e.g. Romance (Berthele & Lambelet 2009)
- e.g. Slavic (Pančíková & Horák 2020)
- e.g. Ethio-Semitic (Feleke et al. 2020)

Disadvantages

- smaller observed vocabularies (reception, production) per language than monolingual controls (Monsrud et al. 2022, Hoff et al. 2012, de Bot 2004)
- rare words less used (Bonvin et al. 2018)
- smaller lexical diversity in text production (Bonvin et al. 2023)
- lexical retrieval deficits (e.g. picture naming tasks; a manifestation of fluency, see above)
- interferences, convergence phenomena (Matras 2022, Berthele 2012b, Toribio 2004)[8]

15.6.3 Grammar, constructions

We encountered a variety of cross-linguistic influence phenomena in the chapters on grammar (6–7). From studies of grammar development and use we know that bilingual/multilingual grammars are not and cannot be multiple monolingual grammars (see van Dijk et al. 2022 for a meta-analysis on child development).

[8]Whether interlingual influences are considered good or bad is a matter of linguistic norm.

Cross-linguistic influence in the grammatical domain is observed in a great number of studies with very different configurations of the repertoire.[9]

Often studies show both positive and negative effects, as in the study by Chan et al. (2017), where trilinguals in Cantonese, English, and Mandarin on the one hand benefit from positive transfer across the two closely related languages but, on the other hand show worse performance in comprehension tasks with relative clauses in their L1 compared to monolinguals.

Bi-/multilinguals...

- have 'wider grammars', i.e. they accept and produce constructions that monolinguals do not accept or produce (Zobl 1992)
- show lower sensitivity for collocations in their languages (Laufer 2003)
- are less confident regarding grammaticality judgements
- show more cross-linguistic influence in general (aka interference, convergence, negative transfer, Pavlenko & Jarvis 2002)

From a normative point of view, therefore, "multilinguals [are] worse speakers of the respective languages than monolingual speakers with the same educational background" (Herdina & Jessner 2002: 106). However, it cannot be overemphasized that bilinguals, unless there are serious developmental issues, are not semilingual or incompetent speakers: "The bilingual as a competent but specific speaker-hearer" (Grosjean 1985).

15.6.4 Literacy

Literacy skills are probably the most frequently investigated area of transfer in applied linguistics. As discussed in Chapter 13, the dominant view is that multilinguals, under certain (unfortunately un- or ill-defined) conditions, can positively transfer skills from one language to the other(s). Again, I list only selected studies here.

- Advantages
  - positive transfer in literacy provided the systems are (linguistically) similar, e.g. in terms of script or within language families (Proctor et al. 2010)

[9] A few classic works that set the stage are Zobl (1992), Jarvis & Pavlenko (2008), Laufer (2003).

  - common underlying proficiency and interdependence, combined with thresholds (Cummins 1979b, Bernhardt & Kamil 1995)[10]

- Disadvantages
  - old studies that do not control for SES etc. (low IQ, low literacy in one or both languages)
  - culturally different (and therefore unhelpful for the host region's literacy education) approach to literacy, e.g. Weth (2008)
  - double semilingualism, as in the early works by Cummins[11]

15.6.5 Advantages in learning an additional language

This section will be brief as the topic has already been discussed in Chapter 13. The classic argument goes as follows:

> Whereas the L2 learner is a complete beginner in the learning process of a second or first foreign language, the L3 learner already knows about the foreign language learning process and has (consciously or subconsciously) gathered individual techniques and strategies to deal with such a situation with differing degrees of success. (Jessner 2008: 23)

The assumption is also related to the claim that bilinguals benefit from higher metalinguistic awareness (see also next section). There are many studies on this topic. The results do not converge, it is therefore surprising that overview articles very often unilaterally cite studies reporting what the authors obviously consider 'positive' results (see Montanari 2019: 299 and D'Angelo 2023: 8 for recent examples, but also Siemund 2023: 62 for a more critical discussion of the multilingual advantages).

- Advantages found
  - in general target language skills (Bild & Swain 1989, Cenoz & Valencia 1994, Thomas 1988, Haenni Hoti & Heinzmann 2009, Klieme 2006, Koç 2022, Mady 2015)

[10] See Chapber 13 for a critical discussion of interdependence and threshold theories.

[11] Note that the notion of semilingualism is highly disputed in bilingualism research, e.g. MacSwan (2000), Martin-Jones & Jones (2000).

  - studies on receptive multilingualism can be considered relevant here, as they often show advantages in figuring out the meaning of words and texts in an unknown L3 if this L3 is related to L1 or L2 (e.g. Vanhove & Berthele 2015b, Berthele & Lambelet 2009)
  - advantages specifically in skill learning in related languages (Schepens 2014, Berthele et al. 2022)
  - Hopp et al. (2019) find advantages of being bilingual in learning English as L3, but they disappear in 4th grade; similarly Maluch et al. (2016) find initial advantages that fade out over time
  - transfer benefits from L2 to L3 found in certain aspects of text production (Egli Cuenat & Bleichenbacher 2020)
- Disadvantages
  - general skills (Engel et al. 2009, Köller et al. 2010, Stanat et al. 2016)
  - focus on literacy skills (Elsner et al. 2007)
  - focus on comprehension of relative clauses (Chan et al. 2017)
- No difference:
  - general skills (Balke-Aurell & Lindblad 1983, Sanders & Meijers 1995, Heinzmann et al. 2009, Berthele & Udry 2022, Berthele 2021a, Lorenz et al. 2020)
  - focus on literacy skills (Manno & Bleichenbacher 2020)

15.6.6 Metalinguistic awareness in bi- and multilinguals

Bilingualism (in particular in children) may foster earlier and higher development of metalinguistic awareness:

> Bilingual children have higher levels of control than monolingual children, so meta-linguistic problems based primarily on control will be more easily solved by bilingual children. Some bilingual children, notably those who are biliterate, also have advanced levels of analysis, and these children will have an advantage in solving those meta-linguistic problems that are expressly dependent upon that processing skill. (Bialystok 1991: 134)

Similar ideas about meta-linguistic awareness had already been advanced by the very early bilingualism scholars (e.g. Leopold 1949: 112).

- Advantages (bilinguals>monolinguals)
  - word awareness: higher and earlier word awareness (Bialystok 2001)
  - earlier awareness of the arbitrariness of the linguistic sign (Bialystok 1986)
  - higher phonological awareness (Yelland et al. 1993)
  - higher syntactic awareness (Bialystok 1986)
  - more meta-linguistic awareness in trilinguals > bilinguals (Thomas 1992, Missler 1999, Kemp 2001)
- No difference
  - bilinguals perform better on certain taks, monolinguals on others, effect diminishes in 1st primary grade (Bruck & Genesee 1995)
  - no trilingual advantage in metalinguistic awareness over bilinguals (El Euch 2010)

Again, today we must conclude that the evidence is mixed, but certainly nobody now claims there are meta-linguistic disadvantages in being bi- or multilingual.

As multilingualism researchers, we are particularly interested in the human ability to learn and use several languages. There is no doubt that the human mind is able to juggle with several languages. The idea that bilingualism will produce a specific dynamic that leads to more efficient learning of third and additional languages forms an attractive part of multilingual acquisition theories. The evidence as to whether bilinguals (including multilinguals) outperform monolinguals in learning a target language is unclear—both regarding the ease of learning linguistic structure/words or skills. The evidence is robust that receptive skills in overlapping language systems are learnt more easily: the more closely related the items and languages overall, the easier it is to build interlingual bridges and comprehend meaning. A number of studies show positive effects of linguistic proximity, also on the productive level. It seems, therefore, that transfer indeed happens, but it is constrained to relatively trivial cases involving similar, overlapping domains. This is an insight that is as old as transfer research itself (see Section 12.1).

The jury is still out on the effects of pedagogical awareness-raising activities. Some studies with self-selected samples suggest beneficial effects (Allgäuer-Hackl & Jessner 2013), but studies that thoroughly control for the assignment of learners to learning conditions as well as their background variables yield no (Otwinowska et al. 2020) or only weak (Diogo 2020, Hicks 2021) effects.

15.7 Concluding remarks

The overall picture of the effects of bi- and multilingualism on cognition and specifically on additional language learning is inconclusive, as most recent overviews suggest. Rather than making claims about universal benefits of being bi-/multilingual, it seems useful to assume that certain types of cognitively stimulating activities, including learning and using languages, have an impact on our brains and on cognition:

> Cognitively stimulating activities, both long and short term, lead to cognitive benefits, brain changes, and improved cognitive aging outcomes. Bilingualism […] is one such cognitive stimulation, and possibly engages a significantly larger brain network than others (such as completing crossword or Sudoku puzzles or learning how to juggle), making it a likely candidate to improve domain-general cognitive function. Effects vary across the life span and are probably most difficult to detect in young adulthood, when cognitive abilities including executive functions are at their peak, making ceiling effects likely, especially when insensitive testing procedures are used. Studies that reduce variability through stricter sampling procedures, or by using more sensitive tests and/or apparatus will be more likely to detect these minute differences, if indeed they exist. (Antoniou 2019: 407)

The (historical) reference point was the idea among scholars that bilingualism was detrimental for both general cognitive development and linguistic skills, as documented in Tabouret-Keller (2011) and Jansen et al. (2021). The pendulum since then has swung in the other direction, and now it is common sense in our field to assume that cognition and language learning causally benefit from being bi- and multilingual.

The empirical evidence, however, suggests that such a causal link is elusive. One of the reasons for the inconclusive findings is that the central categories of the field are natural categories (see Chapter 3) that cover a wide range of language repertoires. As shown in Figure 15.3, there may be a (Western, European) stereotype of bilingualism (top right corner of the Figure, conceptually at the center of the radial category), but it is clearly uncertain where the category of bilingualism ends, and whether mastering different registers or varieties of a language should or should not count; and overall the idea of counting languages in the repertoire is questioned by scholars from different subfields.

While claims that bilingualism (and multilingualism) are continuous and multidimensional in nature have a long tradition in the field, it is only relatively recently that scholars investigating cognitive consequences of bilingualism model

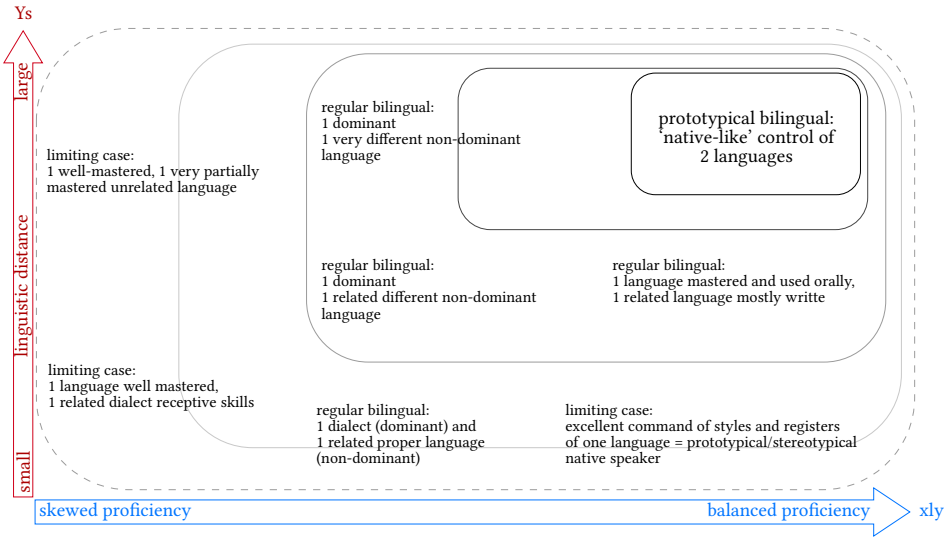


Figure 15.3: Bilingualism as a natural category: Repertoires may involve different "Ys" (dialects, sociolects, languages) mastered perfectly or poorly ("xly"). See also Berthele (2021b: 105).

them on clines rather than categorically (see e.g. Gallo et al. 2024, Kepinska et al. 2025 for recent examples from neuroscience). Operationalizing bi- and multilingual experience in such a continuous and possibly also multidimensional way is without any doubt a better approximation to reality than binary categories.

The second reason that effects such as those discussed in this chapter are sometimes observed and sometimes not is that it is difficult to identify and control all relevant factors that also influence cognition and learning: since bilingualism and multilingualism are usually mere facts of life, rather than randomly assigned conditions in an experiment, it is difficult and maybe even impossible to draw causal inferences about the isolated impact of this one specific factor, being bilingual or not, on cognition and learning. Arguably, we are dealing with complexity (see discussion in Chapter 3) here, in the sense that factors associated with learning a target language may interact among themselves. In the absence of randomized trials, studies on the effects of being mono- or multilingual on additional language learning require control of all variables potentially mediating or canceling the direct causal path from the repertoire to learning. If they don't do so, the linear associations found are uninformative.

I find the idea that there cannot be advantages without disadvantages particularly appealing:[12] Learning and using several languages arguably comes at a cost while at the same time offering potential benefits. More specifically, features of bi- and multilingualism that are sometimes regarded as disadvantages—such as smaller vocabularies or slower lexical retrieval—are outweighed by the clear advantages conferred by mastery of several languages.

Multilingualism is a socially and politically sensitive topic because it frequently arises in the context of immigration, minorization, etc. This mixture of politics and scientific complexity opens up many doors for the use and misuse of 'scientific' insights for political purposes. Rigorous investigation of a network of causes or causal contributions often shows that the effects of bi- and multilingualism are conditional on many factors and that there are usually trade-off relationships between what many consider positive and negative consequences.

Scholarly advocacy is important and justified where people are discriminated against because of their language(s). However, overzealous advocacy sometimes biases scholarly output in a way that is counterproductive in the long run. The context in which I work may serve as an example: in Switzerland, a curriculum strongly anchored in the idea of the multilingual boost in additional language learning was implemented many years ago. The expected interlingual benefits have so far not been observed, and growing skepticism toward multilingualism experts reflects the apparent disconnect between their predictions and educational realities. If experts want public opinion to trust them, they need to base their claims on evidence, not on idealizations and wishful thinking. More theoretical and methodological rigor would certainly dampen some of the lofty promises for the cognitive (and economic, or social, for that matter) benefits of multilingualism.

[12]This position is advocated e.g. in Del Giudice & Crespi (2018).

16 Wrapping up: Some final thoughts

This book covers a wide range of theories, problems, and findings. My main goal is to give students of multilingualism an overview of the current scholarly approaches to multilingual language learning and use.

The theories, assumptions and beliefs in the different subfields that are discussed in this book are still rather diverse, and, despite increasing research efforts, many fundamental questions remain to be solved. One of the goals of this book was, however, to uncover consistent lines of thought—both across time, and across sub-fields of inquiry:

1. What are the factors that shape the way additional languages are learnt and used?
2. Are there commonalities; is the development to some extent predictable?
3. If so, are there domain-specific (linguistic) or domain-general (cognitive) principles?
4. To what extent and under which conditions are acquired structures, patterns or skills transferred across languages?
5. What is the interplay between cognitive abilities on the one hand and linguistic abilities on the other?

These questions are important with respect to our theoretical conceptions of what constitutes the very fundamental nature of the human capacity to learn and create language: is it based on an innate module of some sort, or is language an emerging property of individuals whose main goal is to communicate, for example to survive as a member of one or several social groups? The generativist answers and the usage-based answers to such questions, as discussed in the respective chapters, are radically different.

Regardless of whether one subscribes to modular/nativist views of language acquisition or not, it is important for specialists in our field to be familiar with the philosophical underpinnings of the generativist tradition: this highly influential

framework has left lasting imprints on ideas of somehow more natural (hence 'good') language learning, for example via Krashen's theory of second language learning. Moreover, modularity and universal grammar are the theoretical basis for skepticism about explicit language pedagogy. At different moments in time and in different contexts, the ideas of naturalness and authenticity in language teaching and learning have gained importance. It can be traced back, at least in part, to this influential construal of language and its acquisition.

There are more theoretical frameworks in the field than just generativist and usage-based views. As scholars in the *learner varieties* tradition discussed in Chapter 7 would argue, there may well be simple, domain-specific organizational principles at work that universally shape the learners' varieties and also constrain transfer, but these principles are not necessarily rooted in a highly hierarchical and abstract, formal grammar as presupposed within the generativist tradition.

As a tribute to current debates on multilingualism in the institutional context (schools, language teaching more generally), I have summarized evidence for the efficiency of different methodological approaches to teaching and learning. It seems that providing only natural input, without focus on form, is not the most efficient way of teaching languages in such settings. However, the conclusions reported in the chapters on grammar and vocabulary learning are mostly based on samples of (young) adults. There is much less scholarly evidence as to what works with younger learners.

The insights discussed in this book converge at certain points: an individual's multilingual repertoire is undoubtedly not accurately represented as a collection of neatly separated boxes for each language. Despite all the differences among the approaches presented, nobody in the field would make such claims any longer today. We have seen many examples of cross-linguistic influence, transfer, and convergence, but we cannot (yet?) provide a coherent predictive theory of when such influences are greater or smaller. What emerges from different studies is that typology, that is the degree of overlap between the languages in the repertoire, plays a role in many respects. We have seen this in the case of skills, grammar, and vocabulary.

However, research into the question of when language skills or linguistic structures are or are not transferred is inconclusive. In the case of the pedagogically important question of literacy skill transfer I have argued that the theoretical framing currently used is not helpful, as it is almost entirely meaningless: skills across languages are positively correlated unless they are not, and the *causes of* and *constraints acting on* this correlation so far have not been spelled out a priori but are provided a posteriori. As this is not a very impressive scholarly

theory, no educational policy can or should be based upon it. A theory should be sufficiently specific to provide the possibility of a theory-based formulation of testable predictions, predictions that can be proven wrong by evidence. As long as they are not proven wrong, the theory may indeed represent the best current state of scholarly ignorance. Once the predictions are proven wrong, scholars can come up with new, better theories that provide a better understanding of the phenomena. In the scientific world, being wrong is nothing to be ashamed of: it's part of the normal process. Formulating theories that cannot be proven wrong, however, is not helpful—no new insights can be gained as whatever the data say will be compatible with the theory.

Many authors, given the variable and seemingly chaotic patterns in the data, claim that multilingualism is complex and dynamic and follows nonlinear developmental trajectories. If such views turn out to be true, multilingualism researchers, firstly, need seriously to stock up on methods of investigation that facilitate interpretation of complex, often probably somewhat chaotic systems. This is not impossible; it is done in meteorology, and yields reliable predictions about weather systems. At this time, however, I do not see how comparable prognostic modeling could feasibly predict multilingual development. Sometimes scholars who subscribe to such complexity ideas even argue that it is genuinely impossible to predict multilinguals' language behavior altogether. If developmental prediction is considered impossible, however, we should overtly admit that the discipline is unable to inform policy in the domain of multilingual language learning: if everything is individual, complex and dynamic, but ultimately unpredictable, it is unclear what evidence-based recommendations on how to teach and learn multiple languages can be formulated.

Given these fundamental problems with theories of multiple language learning and use, some scholars have decided to abandon the idea of counting and delimitating languages in the repertoire (see Chapter 3): assuming a fluid, unbounded repertoire that manifests itself in *translanguaging* practices, on the one hand, seems promising given the problems linguists have in defining languages (e.g. as opposed to dialects). On the other hand, as I argue in Chapter 3 and more extensively in Berthele (2021b: 101), language categories, even though they are undoubtedly social constructs, are *cognitively real* in the sense that speakers reference their own and others' linguistic behavior with respect to them. Instead of discarding the categories I think it is useful and justifiable to keep them both as everyday and as scholarly categories. We simply need to be aware of their status as *natural* categories that are not defined via necessary and sufficient features (cf. Lakoff 1987: 44).

The fact that our meta-linguistic categories are in part socially constructed brings us to a last important point: whether a manifestation of multilingualism—be it the smaller vocabulary per language, semantic or other interferences or convergences in the mental lexicon, or multilinguals' wider grammars—is a problem or just an interesting fact for scholarly investigation depends on the social evaluation of language uses. As multilingualism researchers we can describe what the typical manifestations of multilingualism are: we can spell out what the "specific" in Grosjean's formula of the "competent but specific speaker-hearer" (see Section 15.6.3) is. Whether any of the phenomena described are a problem or not is rarely a question to which there is a right answer solely on the grounds of linguistic analysis: as the learner variety literature shows (Chapter 7), survival is possible with very limited proficiency in a given (second, additional) language. If the pragmatic, action-oriented aspect of language is prioritized, surprisingly low mastery of target language structures may be sufficient for many communicative contexts.

Is Basic Variety French therefore good enough and—normatively speaking—ok as a learning goal? Why bother to develop the costly more sophisticated skills in a target language? Answers to such questions depend on the reason and purpose for which a language is learnt, and also on the norms applied in a specific sociolinguistic context. Linguists often consider their own work descriptive rather than normative. This might be at times a bit naive, as scholarly description almost unavoidably has normative effects. As we have seen throughout this book, the values of linguists and other important actors strongly shape scholarly practices and interpretations.

The current bias towards a celebratory approach to multilingualism has historical roots: linguists and language teaching scholars still feel the need to defend bi- and multilingualism against the stereotype of bilingualism as a pathology. While this reaction is completely understandable, it is problematic as it biases the way we conceive our research questions and designs, the way we publish, and the way we select and frame the available evidence. The most striking example of this problem is the discussion of the cognitive and linguistic advantages (see Chapter 15).

In my view, a central goal of research on multiple language learning remains a better grip on how and when learners go beyond the survival-oriented structure of basic variety competence in a target language. When and how exactly do learners attain higher levels of proficiency, and when do they even attain competence in the area of the linguistic 'luxury' (or, in MacWhorter's terms, *gunk*, Chapter 7)?

I hope this book has given you a useful overview of a slightly chaotic but nevertheless fascinating field of investigation. I also hope that, besides the fact that you have learnt something, the content of the book whets your appetite for doing your own research on some of the many open questions in the field. At the same time I hope that the book has enabled you to better discriminate between pure programmatic thinking and robust, converging evidence from empirical research—which is at times frustratingly little and occasionally utterly trivial. This should not discourage us, but incite us to do more and better research.

References

Abrahamsson, Niclas & Kenneth Hyltenstam. 2009. Age of onset and nativelikeness in a second language: Listener perception versus linguistic scrutiny. *Language Learning* 59(2). 249–306. DOI: 10.1111/j.1467-9922.2009.00507.x.

Adesope, Olusola O., Tracy Lavin, Terri Thompson & Charles Ungerleider. 2010. A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Review of Educational Research* 80(2). 207–245. DOI: 10.3102/0034654310368803.

Adger, David. 2003. *Core syntax: A minimalist approach*. 1st edition. Oxford: Oxford University Press.

Adichie, Chimamanda Ngozi. 2013. *Americanah*. New York, Toronto: Alfred A. Knopf.

Aitchison, Jean. 1993. *Words in the mind: An introduction to the mental lexicon [repr.]* Oxford / Cambridge Mass.: Wiley.

Alderson, J. Charles & Ari Huhta. 2005. The development of a suite of computer-based diagnostic tests based on the common european framework. *Language Testing* 22(3). 301–320. DOI: 10.1191/0265532205lt310oa.

Allgäuer-Hackl, Elisabeth & Ulrike Jessner. 2013. Mehrsprachigkeitsunterricht aus mehrsprachiger Sicht: Zur Förderung des metalinguistischen Bewusstseins. In Eva Vetter (ed.), *Professionalisierung für sprachliche Vielfalt. Perspektiven für eine neue Lehrerbildung*, 111–148. Baltmannsweiler: Schneider-Verlag.

Ameel, Eef, Barbara C. Malt, Gert Storms & Fons van Assche. 2009. Semantic convergence in the bilingual lexicon. *Journal of Memory and Language* 60(2). 270–290. DOI: 10.1016/j.jml.2008.10.001.

Ammon, Ulrich, Klaus J. Mattheier & Peter Nelde. 1997. *Monolingualism is curable: Reflections on the new multilingualism in Europe*. Tübingen: Max Niemeyer.

Amoruso, Lucia, Hernan Hernandez, Hernando Santamaria-Garcia, Sebastian Moguilner, Agustina Legaz, Pavel Prado, Jhosmary Cuadros, Liset Gonzalez, Raul Gonzalez-Gomez, Joaquín Migeot, Carlos Coronel-Oliveros, Josephine Cruzat, Manuel Carreiras, Vicente Medel, Marcelo Adrián Maito, Claudia Duran-Aniotz, Enzo Tagliazucchi, Sandra Baez, Adolfo M. García & Agustin Ibanez. 2025. Multilingualism protects against accelerated aging in cross-

sectional and longitudinal analyses of 27 european countries. *Nature Aging*. 1–15. DOI: 10.1038/s43587-025-01000-2.

Amunts, Katrin, Axel Schleicher & Karl Zilles. 2004. Outstanding language competence and cytoarchitecture in broca's speech region. *Brain and Language* 89(2). 346–353. DOI: 10.1016/S0093-934X(03)00360-2.

Andringa, Sible. 2005. *Form-focused instruction and the development of second language proficiency*. Groningen: University of Groningen. (Doctoral dissertation).

Andringa, Sible. 2020. The emergence of awareness in uninstructed L2 learning: A visual world eye tracking study. *Second Language Research* 36(3). 335–357. DOI: 10.1177/0267658320915502.

Andringa, Sible & Aline Godfroid. 2020. Sampling bias and the problem of generalizability in applied linguistics. *Annual Review of Applied Linguistics* 40. 134–142. DOI: 10.1017/S0267190520000033.

Anthropic. 2025. *Claude*. https://claude.ai.

Antón, Eneko, Jon A. Duñabeitia, Adelina Estévez, Juan A. Hernández, Alejandro Castillo, Luis J. Fuentes, Douglas J. Davidson & Manuel Carreiras. 2014. Is there a bilingual advantage in the ANT task? evidence from children. *Frontiers in Psychology* 5. 398. DOI: 10.3389/fpsyg.2014.00398.

Antoniou, Kyriakos, Kleanthes K. Grohmann, Maria Kambanaros & Napoleon Katsos. 2016. The effect of childhood bilectalism and multilingualism on executive control. *Cognition* 149. 18–30. DOI: 10.1016/j.cognition.2015.12.002.

Antoniou, Mark. 2019. The advantages of bilingualism debate. *Annual Review of Linguistics* 5(5). 395–415. DOI: 10.1146/annurev-linguistics-011718-011820.

Auer, Peter. 1995. The pragmatics of code-switching: A sequential aproach. In Lesley Milroy & Pieter Muysken (eds.), *One speaker, two languages. cross-disciplinary perspectives on code-switching*, 115–135. Cambridge: Cambridge University Press.

Bachmann, Thomas & Bruno Good. 2003. *Hochdeutsch als Unterrichtssprache. Befunde und Perspektiven*. Zürich: Bildungsdirektion.

Backus, Ad. 2024. Cognition and sociality shape language use: A usage-based perspective on contact linguistics. In *The 13th international conference on third language acquisition and multilingualism*. Groningen.

Bak, Thomas H., Madeleine R. Long, Mariana Vega-Mendoza & Antonella Sorace. 2016. Novelty, challenge, and practice: The impact of intensive language learning on attentional functions. *PLOS ONE* 11(4). e0153485. DOI: 10.1371/journal.pone.0153485.

Baker, Colin & Wayne E. Wright. 2017. *Foundations of bilingual education and bilingualism. 6th edition*. Clevedon etc.: Multilingual Matters.

Bakker, Dik, André Müller, Viveka Velupillai, Søren Wichmann, Brown Cecil H., Brown Pamela, Egorov Dmitry, Mailhammer Robert, Grant Anthony & Holman Eric W. 2009. Adding typology to lexicostatistics: A combined approach to language classification. *Linguistic Typology* 13(1). 169. DOI: 10.1515/LITY.2009.009.

Balke-Aurell, Gudrun & Torsten Lindblad. 1983. *Immigrant children and their languages: Final report from the project*. Gothenburg: Vasastadens Bokbinderi.

Bandia, Paul. 1996. Code-switching and code-mixing in african creative writing: Some insights for translation studies. *TTR : traduction, terminologie, rédaction* 9(1). 139–153. DOI: 10.7202/037242ar.

Barbour, Stephen & Patrick Stevenson. 1990. *Variation in german: A critical approach to german sociolinguistics*. Cambridge: Cambridge University Press. 324 pp.

Barcroft, Joe. 2015. Specificity in type of processing and learning: The topra model. In *Lexical input processing and vocabulary learning* (Language Learning & Language Teaching), 57–68. Amsterdam: John Benjamins.

Bardel, Camilla & Ylva Falk. 2007. The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research* 23(4). 459–484. DOI: 10.1177/0267658307080557.

Barras, Malgorzata. 2021. *Strategien beim Lösen von rezeptiven Sprachtestaufgaben*. Fribourg: Fribourg/Freiburg. (Doctoral dissertation).

Bates, Elizabeth, Philip S. Dale & Donna Thal. 2017. Individual differences and their implications for theories of language development. In Paul Fletcher & Brian MacWhinney (eds.), *The handbook of child language*, chap. 4, 95–151. Hoboken: Wiley. DOI: 10.1111/b.9780631203124.1996.00005.x.

Beacco, Jean-Claude, Michael Byram, Marisa Cavalli, Daniel Coste, Mirjam Egli Cuenat, Francis Goullier & Johanna Panthier. 2010. *Guide pour le développement et la mise en œuvre de curriculums pour une éducation plurilingue et interculturelle*. Conseil de l'Europe (ed.). Strasbourg: Conseil de l'Europe.

Beacco, Jean-Claude, Michael Byram, Marisa Cavalli, Daniel Coste, Mirjam Egli Cuenat, Francis Goullier & Johanna Panthier. 2016. *Guide for the development and implementation of curricula for plurilingual and intercultural education*. Conseil de l'Europe (ed.). Strasbourg: Conseil de l'Europe.

Becker, Angelika. 1994. *Lokalisierungsausdrücke im Sprachvergleich: Eine lexikalisch-semantische Analyse von Lokalisierungsausdrücken im Deutschen, Englischen, Französischen und Türkischen*. Tübingen: Niemeyer.

Beisbart, Claus. 2021. Complexity in multilingualism (research). *Language Learning* 71(S1). 39–79. DOI: 10.1111/lang.12426.

Benazzo, Sandra, Christine Dimroth & Cecilia Andorno. 2025. Back to the basic variety: Does it emerge only with specific learner profiles, environments and languages? In Cyrille Granget, Isabelle Repiso & Guillaume Fon Singh (eds.), *Language, creoles, varieties. From emergence to transmission* (EuroSLA Studies), 29–70. Berlin: LangSci Press.

Berchio, Giulia. 2023. *Modellare il bilinguismo: Produzioni orali in italiano e svizzero-tedesco di parlanti a dominanza linguistics varaible*. Milano: Franco Angeli.

Bergen, Benjamin K. 2016. *What the f: What swearing reveals about our language, our brains, and ourselves*. New York: Basic Books.

Bernhardt, Elizabeth B. & Michael L. Kamil. 1995. Interpreting relationships between L1 and L2 reading. consolidating the linguistic threshold and the linguistic interdependence hypotheses. *Applied Linguistics, 16(1).* 15–34.

Berninger, Virginia, Cheryl Yates, Ana Cartwright, Judith Rutberg, Elizabeth Remy & Robert Abbott. 1992. Lower-level developmental skills in beginning writing. *Reading and Writing* 4(3). 257–280. DOI: 10.1007/BF01027151.

Bernstein, Basil. 1971. *Class, codes and control (volume 1)*. London: Routledge & Kegan.

Berthele, Raphael. 2000. Translating African American Vernacular English into German: The problem of 'Jim' in Mark Twain's Huckleberry Finn. *Journal of Sociolinguistics 4.* 588–613.

Berthele, Raphael. 2002. Learning a second dialect: A model of idiolectal dissonance. 21(4). 327–344. DOI: 10.1515/mult.2002.014.

Berthele, Raphael. 2006. *Ort und Weg im Sprachvergleich. Lexik und Grammatik der Raumreferenz im Standarddeutschen, Schweizerdeutschen, Rätoromanischen und Französischen*. Gastvortrag. Marburg/Lahn.

Berthele, Raphael. 2007. Contact de langues et conceptualisations spatiales. aspects de la sémantique et de la grammaire de la référence spatiale en sursilvan, vallader et surmiran. *Vox Romanica* 66. 60–71.

Berthele, Raphael. 2008. Dialekt-Standard Situationen als embryonale Mehrsprachigkeit. Erkenntnisse zum interlingualen Potenzial des Provinzlerdaseins. In Klaus J. Mattheier & Alexandra Lenz (eds.), *Dialektsoziologie / Dialect Sociology / Sociologie du Dialecte. Sociolinguistica, 22*, 87–107. Tübingen: Niemeyer.

Berthele, Raphael. 2011. On abduction in receptive multilingualism. Evidence from cognate guessing tasks. *Applied Linguistics Review* 2(2011). 191–220. DOI: doi:10.1515/9783110239331.191. https://doi.org/10.1515/9783110239331.191 (17 May, 2026).

Berthele, Raphael. 2012a. Multiple languages and multiple methods: Qualitative and quantitative ways of tapping into the multilingual repertoire. In Andrea Ender, Adrian Leemann & Bernhard Wälchli (eds.), *Methods in contemporary linguistics*, 195–218. Berlin: de Gruyter.

Berthele, Raphael. 2012b. On the use of Put verbs by multilingual speakers of Romansh. In Anetta Kopecka & Bhuvana Narasimhan (eds.), *Events of putting and taking: A crosslinguistic perspective*, 145–166. Amsterdam, Philadelphia: John Benjamins.

Berthele, Raphael. 2012c. The influence of code-mixing and speaker information on perception and assessment of foreign language proficiency: An experimental study. *International Journal of Bilingualism* 16(4). 453–466. DOI: 10.1177/1367006911429514.

Berthele, Raphael. 2015. Convergence in the domains of static spatial relations and events of putting and taking. Evidence from bilingual speakers of Romansh and German. *International Journal of Bilingual Education and Bilingualism* 18(5). 624–642. DOI: 10.1080/13670050.2015.1027147.

Berthele, Raphael. 2017. Assessing heritage languages and interdependence: Why and how? In Raphael Berthele & Amelia Lambelet (eds.), *Heritage and school language literacy development in migrant children: Interdependence or independence?* (Second Language Acquisition), 188–200. Clevedon: Multilingual Matters.

Berthele, Raphael. 2018. Alle Thesen sind Hypothesen: Transfer. *Babylonia* (3). 63–67.

Berthele, Raphael. 2019a. Alemannisch und der Deutschunterricht. Schweizerdeutschdebatten in der Schweizer Schule seit 1950. *Linguistik Online* 98. 387–409. DOI: 10.13092/lo.98.5945.

Berthele, Raphael. 2019b. Policy recommendations for language learning: Linguists' contributions between scholarly debates and pseudoscience. *Journal of the European Second Language Association* 3(1). 1–11. DOI: 10.22599/jesla.50.

Berthele, Raphael. 2019c. *Rätoromanisch als Grosssprache. Beitrag zum Jubiläum 100 Jahre Lia Rumantscha.* pluriling-gr online. https://www.pluriling-gr.ch/deutsch/artikel/d-berthele-artikel/ (17 May, 2026).

Berthele, Raphael. 2020. Schweizerdeutsch in der Schule. In Emanuel Ruoss & Juliane Schroeter (eds.), *Schweizerdeutsch: Sprache und Identität von 1800 bis heute*, 193–214. Basel: Schwabe.

Berthele, Raphael. 2021a. Dispositions for language learning and social differences. In Raphael Berthele & Isabelle Udry (eds.), *Individual differences in early instructed language learning: The role of language aptitude, cognition, and motivation* (EuroSla Studies Series), 105–124. Berlin: Language Science Press.

Berthele, Raphael. 2021b. The extraordinary ordinary: Re-engineering multilingualism as a natural category. *Language Learning* 71(S1). 80–120. DOI: 10.1111/lang.12407.

Berthele, Raphael & Amelia Lambelet. 2009. Approche empirique de l'intercompréhension: Répertoires, processus et résultats. *LIDIL* 39(1). 151–162.

Berthele, Raphael & Amelia Lambelet (eds.). 2017. *Heritage and school language literacy development in migrant children: Interdependence or independence?* (Second Language Acquisition). Clevedon: Multilingual Matters.

Berthele, Raphael, Peter Lenz & Elisabeth Peyer. 2022. Predicting foreign language skills based on first languages: The role of lexical distance and relative morphological complexity. *Poznań Studies in Contemporary Linguistics* 58. 419–448. DOI: 10.1515/psicl-2022-0020.

Berthele, Raphael & Ladina Stocker. 2017. *StoBerMan - An Instrument to Elicit Motion Event Descriptions*. https://institut-plurilinguisme.ch/fr/recherche/lexpression-du-mouvement-la-frontiere-des-langues (17 May, 2026).

Berthele, Raphael & Isabelle Udry (eds.). 2021. *Individual differences in early instructed language learning: The role of language aptitude, cognition, and motivation* (EuroSla Studies Series). Berlin: Language Science Press.

Berthele, Raphael & Isabelle Udry. 2022. Multilingual boost vs. cognitive abilities: Testing two theories of multilingual language learning in a primary school context. *International Journal of Multilingualism* 19(1). 142–161. DOI: 10.1080/14790718.2019.1632315.

Berthele, Raphael, Isabelle Udry & Didier Yourassoff. 2025. The effects of digital tool use on complexity and accuracy of written texts in English as a foreign language. *trans-kom. Zeitschrift für Translationswissenschaft und Fachkommunikation* 18(2). 625–655. https://www.trans-kom.eu/bd18nr02/trans-kom_18_02_09_Berthele_ua_Tools.20251208.pdf.

Berthele, Raphael & Jan Vanhove. 2014. Entre jeunes barbes et vieux de la vieille. usages du répertoire plurilingue dans une tâche d'intercompréhension à travers les âges. *Bulletin Suisse de Linguistique Appliquée* 99(3-4). 31–50.

Berthele, Raphael & Jan Vanhove. 2020. What would disprove interdependence? Lessons learned from a study on biliteracy in Portuguese heritage language speakers in Switzerland. *International Journal of Bilingual Education and Bilingualism* 23(5). 550–566. DOI: 10.1080/13670050.2017.1385590.

Berthele, Raphael, Jan Vanhovel, Carina Steiner, Isabelle Udry & Hansjakob Schneider. 2021. Predicting L2 achievement: Results from a test battery measuring language aptitude, general learning ability, and affective factors. In Raphael Berthele & Isabelle Udry (eds.), *Individual differences in early in-*

structed language learning: The role of language aptitude, cognition, and motivation (EuroSla Studies Series), 91–104. Berlin: Language Science Press.

Bertschy, Ida. 2010. *Mille feuilles 4 [ensemble multi-supports]*. Bern: Schulverlag Plus.

Bialystok, Ellen. 1978. A theoretical model of second language learning. *Language Learning* (28). 69–84.

Bialystok, Ellen. 1986. Factors in the growth of linguistic awareness. *Child Development* (57). 498–510.

Bialystok, Ellen. 1991. Metalinguistic dimensions of bilingual language proficiency. In Ellen Bialystok (ed.), *Language processing in bilingual children*, 113–140. Cambridge: Cambridge University Press.

Bialystok, Ellen. 2001. Metalinguistic aspects of bilingual processing. *Annual Review of Applied Linguistics* 21. 169–181. DOI: 10.1017/S0267190501000101.

Bialystok, Ellen. 2007. Cognitive effects of bilingualism: How linguistic experience leads to cognitive change. *International Journal of Bilingual Education and Bilingualism* 10(3). 210–223.

Bialystok, Ellen. 2011. Reshaping the mind: The benefits of bilingualism. *Canadian Journal of Experimental Psychology / Revue canadienne de psychologie expérimentale* 65(4). 229–235. DOI: 10.1037/a0025406.

Bialystok, Ellen & Fergus I. M. Craik. 2022. How does bilingualism modify cognitive function? Attention to the mechanism. *Psychonomic Bulletin & Review* 29(4). 1246–1269. DOI: 10.3758/s13423-022-02057-5.

Bialystok, Ellen, Fergus I. M. Craik & Morris Freedman. 2007. Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia* 45(2). 459–464. DOI: 10.1016/j.neuropsychologia.2006.10.009.

Bialystok, Ellen, Fergus I. M. Craik, Raymond Klein & Mythili Viswanathan. 2004. Bilingualism, aging, and cognitive control: Evidence from the Simon task. *Psycholgy and Aging* 19(2). 290–303. DOI: 10.1037/0882-7974.19.2.290.

Bickerton, Derek. 1984. The language bioprogram hypothesis. *Behavioral and Brain Sciences* 7(2). 173–188. DOI: 10.1017/S0140525X00044149. https://www.cambridge . org / core / journals / behavioral - and - brain - sciences / article / language - bioprogram - hypothesis / 8E3812383ED990C3F0ECC874D9C73D97 (2 June, 2026).

Bild, Eva-Rebecca & Merrill Swain. 1989. Minority language students in a French immersion programme: Their French proficiency. *Journal of Multilingual and Multicultural Development* 10(3). 255–274. DOI: 10 . 1080 / 01434632 . 1989 . 9994377.

Birdsong, David. 1999. *Second language acquisition and the critical period hypothesis*. Mahwah, N. J.: Lawrence Earlbaum Associates.

Blanchet, Philippe. 2016. *Discriminations: Combattre la glottophobie*. Paris: TEXTUEL.

Bley-Vroman, Robert. 1983. The comparative fallacy in interlanguage studies: The case of systematicity. *Language Learning* (33). 1–17.

Bley-Vroman, Robert. 1988. The fundamental character of foreign language learning. In William Rutherford & Michael Sharwood Smith (eds.), *Grammar and second language teaching: A book of readings*, 19–30. Rowley, MA: Newbury House.

Bloomfield, Leonard. 1935. *Language*. London: Allen & Unwin.

Bogaards, Paul. 1994. *Le vocabulaire dans l'apprentissage des langues étrangères*. Paris: Hatier-Didier.

Bonvin, Audrey. 2023. *Structure informationnelle dans un contexte de bilinguisme*. Fribourg: Fribourg. (Doctoral dissertation). DOI: 10.51363/unifr.lth.2023.018. https://folia.unifr.ch/global/documents/325707 (22 July, 2023).

Bonvin, Audrey, Ladina Brugger & Raphael Berthele. 2023. Lexical measures as a proxy for bilingual language dominance? *International Review of Applied Linguistics in Language Teaching* 61(2). 257–285. DOI: doi:10.1515/iral-2020-0093.

Bonvin, Audrey, Jan Vanhove, Raphael Berthele & Amelia Lambelet. 2018. Die entwicklung von produktiven lexikalischen kompetenzen bei schüler(innen) mit portugiesischem migrationshintergrund in der schweiz. *Zeitschrift für interkulturellen Fremdsprachenunterricht* 23(1). 135–148.

Booton, Sophie A., Elena Hoicka, Aneyn M. O'Grady, Hiu Ying Nicole Chan & Victoria A. Murphy. 2021. Children's divergent thinking and bilingualism. *Thinking Skills and Creativity* 41. 100918. DOI: 10.1016/j.tsc.2021.100918.

Bornstein, Marc H., Linda R. Cote, Sharone Maital, Kathleen Painter, Sung-Yun Park, Liliana Pascual, Marie-Germaine Pêcheux, Josette Ruel, Paola Venuti & Andre Vyt. 2004. Cross-linguistic analysis of vocabulary in young children: Spanish, Dutch, French, Hebrew, Italian, Korean, and American English. *Child Development* 75(4). 1115–1139.

Bourdieu, Pierre. 1979. *La distinction : critique sociale du jugement*. Paris: Les Editions de Minuit.

Bowerman, Melissa & Eric Pederson. 1992. Topological relations picture series. In Steven C. Levinson (ed.), *Space stimuli kit 1.2: November 1992, 51*. Nijmegen: Max Planck Institute for Psycholinguistics.

Bronckart, Jean-Paul & Joaquim Dolz. 1999. La notion de compétence: Quelle pertinence pour l'étude de l'apprentissage des actions langagières? *Raisons éducatives* 2(1-2). 27–44. DOI: 10.3917/dbu.dolz.2002.01.0025.

Brown, Amanda. 2023. Monolingual versus multilingual foreign language teaching: French and Arabic at beginning levels. *Language Teaching Research* 27(6). 1634–1659. DOI: 10.1177/1362168821990347.

Bruck, Maggie & Fred Genesee. 1995. Phonological awareness in young second language learners. *Journal of Child Language* 22(2). 307–324.

Brysbaert, Marc. 2013. Lextale_fr a fast, free, and efficient test to measure language proficiency in French. *Psychologica Belgica* 53(1). 23–37.

Brysbaert, Marc & Wouter Duyck. 2010. Is it time to leave behind the revised hierarchical model of bilingual language processing after fifteen years of service? *Bilingualism: Language and Cognition* 13(3). 359–371. DOI: 10 . 1017 / S1366728909990344.

Buson, Laurence, Aurélie Nardy, Dominique Muller & Jean-Pierre Chevrot. 2018. The sociolinguistic repetition task: A new paradigm for exploring the cognitive coherence of language varieties. *Topics in Cognitive Science* 10(4). 803–817. DOI: 10.1111/tops.12380.

Byers-Heinlein, Krista. 2013. Parental language mixing: Its measurement and the relation of mixed input to young bilingual children's vocabulary size. *Bilingualism: Language and Cognition* 16(1). 32–48. DOI: 10.1017/S1366728912000120.

Byers-Heinlein, Krista. 2014. Languages as categories: Reframing the "one language or two" question in early bilingual development. *Language Learning* 64(s2). 184–201. DOI: 10.1111/lang.12055.

Carroll, John B. 1958. A factor analysis of two foreign language aptitude batteries. *Journal of General Psychology* 59. 3–19. DOI: 10.1080/00221309.1958.9710168.

Carroll, John B. 1962. The prediction of success in intensive foreign language training. In Robert Glaser (ed.), *Training Research and Education*, 87–136. New York: Wiley. https://eric.ed.gov/?id=ED038051.

Carroll, John B. & Stanley M. Sapon. 1959. *Modern language aptitude test.* New York: The Psychological Corporation.

Carroll, John B. & Stanley M. Sapon. 2010. *Modern language aptitude test - elementary, 2010 edition.* Rockville, MD: Second Language Testing Foundation.

Carroll, Susanne E. 2015. Exposure and input in bilingual development. *Bilingualism: Language and Cognition.* 1–14. DOI: 10.1017/S1366728915000863.

Cenoz, Jasone & Durk Gorter. 2021. Pedagogical Translanguaging. *Elements in Language Teaching.* 1–58. DOI: 10 . 1017 / 9781009029384. https : / / www . cambridge . org / core / elements / pedagogical - translanguaging / 67802C1E5AE4A418AE3B8E2DEFBAD30A (15 December, 2021).

Cenoz, Jasone & Jose F. Valencia. 1994. Additive trilingualism: Evidence from the Basque country. *Applied Psycholinguistics* (15). 195–207.

Chan, Angel, Si Chen, Stephen Matthews & Virginia Yip. 2017. Comprehension of subject and object relative clauses in a trilingual acquisition context. *Frontiers in Psychology* 8. 1–17. DOI: 10.3389/fpsyg.2017.01641.

Chertkow, Howard, Victor Whitehead, Natalie Phillips, Christina Wolfson, Julie Atherton & Howard Bergman. 2010. Multilingualism (but not always bilingualism) delays the onset of Alzheimer disease: Evidence from a bilingual community. *Alzheimer Disease & Associated Disorders* 24(2). 118–125. DOI: 10.1097/WAD.0b013e3181ca1221.

Chevrot, Jean-Pierre & Anna Ghimenton. 2018. Bilingualism and bidialectalism. In Annick De Houwer & Lourdes Ortega (eds.), *The Cambridge handbook of bilingualism* (Cambridge Handbooks in Language and Linguistics), 510–523. Cambridge: Cambridge University Press. DOI: 10.1017/9781316831922.026.

Chomsky, Noam. 1981. Principles and parameters in syntactic theory. In Norbert Hornstein & David Lightfoot (eds.), *Explanation in linguistics*, 32–75. London: Longman.

Chomsky, Noam. 1988a. *Language and problems of knowledge. the Managua lectures.* Cabridge, MA: MIT Press.

Chomsky, Noam. 1988b. *Lectures on government and binding. the Pisa lectures.* Dordrecht, Providence: Foris.

Christiner, Markus & Susanne Reiterer. 2013. Song and speech: Examining the link between singing talent and speech imitation ability. *Frontiers in Psychology* 4. 874. DOI: 10.3389/fpsyg.2013.00874.

Cobb, Tom. 2022. *Lemma v. family as grouping unit for pedagogical word lists.* Talk presented at the EUROSLA Language Learning Round Table, Fribourg, 24 August 2022. Slides available online. https://lextutor.ca/lem_fam.pdf (20 May, 2026).

Cobb, Tom. n.d. *Compleat Lexical Tutor (v.8.5).* https://www.lextutor.ca/ (20 May, 2026).

Cobb, Tom & Cathy Ball. n.d. *Web Frequency Indexer English (v 1.3).* Original program by Cathy Ball (Georgetown University); web adaptation by Tom Cobb (UQAM). https://www.lextutor.ca/freq/eng/ (20 May, 2026).

Collier, Virginia P. 1989. How long? A synthesis of research on academic achievement in a second language. *TESOL Quarterly* 23(3). 509–531. DOI: 10.2307/3586923.

Cook, Vivian. 1992. Evidence for multicompetence. *Language Learning 42.* 557–591.

Cook, Vivian. 1993. *Linguistics and second language acquisition.* Houndmills: Red Globe Press.

Cook, Vivian, Benedetta Bassetti, Chise Kasai, Miho Sasaki & Jun Takahashi. 2006. Do bilinguals have different concepts? The case of shape and material in japanese L2 users of English. *International Journal of Bilingualism* 10(2). 137–152.

Costa, Albert, Alice Foucart, Sayuri Hayakawa, Melina Aparici, Jose Apesteguia, Joy Heafner & Boaz Keysar. 2014. Your morals depend on language. *PLOS ONE* 9(4). 1–7. DOI: 10.1371/journal.pone.0094842.

Costa, Albert, Mireia Hernández, Jordi Costa-Faidella & Núria Sebastián-Gallés. 2009. On the bilingual advantage in conflict processing: Now you see it, now you don't. *Cognition* 113(2). 135–149. DOI: 10.1016/j.cognition.2009.08.001.

Costa, Albert, Mireia Hernandez & Núria Sebastián-Gallés. 2008. Bilingualism aids conflict resolution: Evidence from the ANT task. *Cognition* 106(1). 59–86. DOI: 10.1016/j.cognition.2006.12.013.

Costa, Albert & Mikel Santesteban. 2004. Lexical access in bilingual speech production: Evidence from language switching in highly proficient bilinguals and L2 learners. *Journal of Memory and Language* 50(4). 491–511. DOI: 10.1016/j.jml.2004.02.002.

Costa, Albert & Núria Sebastián-Gallés. 2014. How does the bilingual experience sculpt the brain? *Nature Reviews Neuroscience* 15(5). 336–45. DOI: 10.1038/nrn3709.

Cox, Simon R., Thomas H. Bak, Michael Allerhand, Paul Redmond, John M. Starr, Ian J. Deary & Sarah E. MacPherson. 2016. Bilingualism, social cognition and executive functions: A tale of chickens and eggs. *Neuropsychologia* 91. 299–306. DOI: 10.1016/j.neuropsychologia.2016.08.029.

Craik, Fergus I. M., Ellen Bialystok & Morris Freedman. 2010. Delaying the onset of Alzheimer disease: Bilingualism as a form of cognitive reserve. *Neurology* 75(19). 1726–9. DOI: 10.1212/WNL.0b013e3181fc2a1c.

Critten, Rory G. & Elisabeth Dutton. 2021. Medieval English multilingualisms. *Language Learning* 71(S1). 12–38. DOI: 10.1111/lang.12404.

Croft, William. 2001. *Radical construction grammar: Syntactic theory in typological perspective*. Oxford: Oxford University Press.

Cummins, Jim. 1979a. Cognitive/academic language proficiency, linguistic interdependence, the optimum age question and some other matters. *Working Papers on Bilingualism* (19). 197–205.

Cummins, Jim. 1979b. Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research* 49. 222–251.

Cummins, Jim. 1996. *Negotiating identities: Education for empowerment in a diverse society*. Los Angeles: California Association for Bilingual Education.

Cummins, Jim. 2001. *An introductory reader to the writings of Jim Cummins*. Clevedon: Multilingual Matters.

Cummins, Jim. 2017. Teaching for transfer in multilingual educational contexts. In Ofelia García, Angel M. Y. Lin & Stephen May (eds.), *Encyclopedia of language and education*, 103–115. New York: Springer.

D'Angelo, Francesca. 2023. *Teaching and learning third languages*. Clevedon: Multilingual Matters. DOI: 10.21832/DANGEL3078.

Dabrowska, Eva & Elena V. Lieven. 2005. Towards a lexically specific grammar of children's question constructions. *Cognitive Linguistics* 16(3). 437–474.

Daller, Helmut, Roeland van Hout & Jeanine Treffers-Daller. 2003. Lexical richness in the spontaneous speech of bilinguals. *Applied Linguistics* 24(2). 197–222. DOI: 10.1093/applin/24.2.197.

de Bot, Kees. 1992. A bilingual production model: Levelt's 'speaking' model adapted. *Applied Linguistics* 13. 1–24.

de Bot, Kees. 2004. A bilingual production model: Levelt's speaking model adapted. In Li Wei (ed.), *The bilingualism reader*, 420–442. London: Routledge.

de Bot, Kees, Wander Lowie, Steven L. Thorne & Marjolijn Verspoor. 2013. Dynamic systems theory as a comprehensive theory of second language development. In María del Pilar García Mayo, María Juncal Gutiérrez Mangado & María Martínez-Adrián (eds.), *Contemporary approaches to second language acquisition*, 199–220. Amsterdam: John Benjamins.

de Bruin, Angela, Barbara Treccani & Sergio Della Sala. 2014. Cognitive advantage in bilingualism an example of publication bias? *Psychological Science* 26(1). 99–107. DOI: 10.1177/0956797614557866.

de Cat, Cecile, Laurie Tuller, Arief Gusnanto, Draško Kašćelan, Philippe Prevost, Ludovica Serratrice & Sharon Unsworth. 2026. Using Q-BEx to identify risk for language impairment in bilingual children. *Journal of Speech, Language and Hearing Research*. https://eprints.whiterose.ac.uk/id/eprint/238971/ (17 May, 2026).

de Saussure, Ferdinand. 1916. *Cours de linguistique générale*. Lausanne, Paris: Payot.

DeKeyser, Robert M. (ed.). 2021. *Aptitude-treatment interaction in second language learning*. Amsterdam ; Philadelphia: John Benjamins.

Del Giudice, Marco & Bernard J. Crespi. 2018. Basic functional trade-offs in cognition: An integrative framework. *Cognition* 179. 56–70. DOI: 10.1016/j.cognition.2018.06.008.

Delsing, L. & K. Lundin Åkesson. 2005. *Håller språket ihop Norden? En forskningsrapport om ungdomars förståelse av danska, svenska och norska.* Tech. rep. Køpenhamn: Nordiska ministerrådet.

DeLuca, Vincent. 2024. The potential roles of multilingualism and language structural distance in neurocognitive adaptation to language experience. *Journal of Multilingual Theories and Practices*. DOI: 10.1558/jmtp.25486.

Dentella, Vittoria, Camilla Masullo & Evelina Leivada. 2024. Bilingual disadvantages are systematically compensated by bilingual advantages across tasks and populations. *Scientific Reports* 14(1). 2107. DOI: 10.1038/s41598-024-52417-5.

Deuber, Fabienne & Raphael Berthele. 2024. Vocabulary card learning: Testing multilingual translations and increased semantic processing. *Language Teaching Research*. 1–30. DOI: 10.1177/13621688241254311.

Deuchar, Margaret. 2020. Code-switching in linguistics: A position paper. *Languages* 5(2). 22. DOI: 10.3390/languages5020022.

Dewaele, Jean-Marc. 2010. "Christ fucking shit merde!" Language preferences for swearing among maximally proficient multilinguals. *Sociolinguistic Studies* 4(3). 595–614.

Dewaele, Jean-Marc, Irini Mavrou, Andreas Kyriakou & Pernelle Lorette. 2024. The role of language and emotional intelligence in judgments of real-life social and moral transgressions among Greek, Hungarian, and British users of English. *Journal of Behavioral Decision Making* 37(1). e2356. DOI: 10.1002/bdm.2356.

Dherbey Chapuis, Nathalie. 2021. *Enseignement ciblé implicite ou explicite : étude comparative de l'apprentissage des représentations phonétiques et phonologiques et du vocabulaire associé*. Fribourg/Freiburg: Université de Fribourg. (Doctoral dissertation).

Dherbey Chapuis, Nathalie & Raphael Berthele. 2024. Teaching methods emphasizing phonological forms enhance L2 vocabulary learning. *Language Teaching Research*. 1–24. DOI: 10.1177/13621688241270803.

Diessel, Holger. 2015. Usage-based construction grammar. In Ewa Dabrowska & Dagmar Divjak (eds.), *Handbook of Cognitive Linguistics*, 296–322. De Gruyter Mouton. https://www.degruyterbrill.com/document/doi/10.1515/9783110292022-015/html?lang=en (17 May, 2026).

Dijkstra, Ton & Walter J. B. van Heuven. 2002. The architecture of the bilingual word recognition system: From identification to decision. *Bilingualism: Language and Cognition* (5). 175–197.

Dijkstra, Ton, Alexander Wahl, Franka Buytenhuijs, Nino Van Halem, Zina Al-Jibouri, Marcel De Korte & Steven Rekké. 2019. Multilink: A computational model for bilingual word recognition and word translation. *Bilingualism: Language and Cognition* 22(4). 657–679. DOI: 10.1017/S1366728918000287.

Dimroth, Christine. 2018. Beyond statistical learning: Communication principles and language internal factors shape grammar in child and adult beginners learning Polish through controlled exposure. *Language Learning* 68(4). 863–905. DOI: 10.1111/lang.12294.

Diogo, Cédric. 2020. *Teaching languages and comparing them - is it worth it? An empirical study on the effect of training in interlingual comparisons on lower secondary school learners' cross-linguistic awareness and psychotypology.* Fribourg/Freiburg, Schweiz: Université de Fribourg/Universität Freiburg. (MA thesis).

Dörnyei, Zoltán. 2010. The relationship between language aptitude and language learning motivation: Individual differences from a dynamic systems perspective. In Ernesto Macaro (ed.), *Continuum companion to second language acquisition*, 247–267. London: Continuum.

Doughty, Catherine J. 2003. Instructed SLA: Constraints, compensation, and enhancement. In Catherine J. Doughty & Michael H. Long (eds.), *The handbook of second language acquisition*, 256–310. Malden, MA: Blackwell Publishing.

Doughty, Catherine J. & Jessica Williams. 1998. *Focus on form in classroom second language acquisition.* Cambridge: Cambridge University Press.

Duden Wörterbuch. 2026. *Leserwunsch.* https : / / www . duden . de / suchen / dudenonline/Leserwunsch (20 May, 2026).

Dunn, Douglas M. 2020. *Échelle de vocabulaire en images Peabody—Cinquième édition : Version pour francophones du Canada (PPVT-5CDN-f).* Toronto: NCS Pearson.

Dunn, Lloyd M., Douglas M. Dunn & Pearson Assessments. 2007. *PPVT-4: Peabody picture vocabulary test.* Minneapolis: Pearson Assessments.

Dunn, Lloyd M., Leota M. Dunn, Chris Whetton & Juliet Burley. 1997. *British Picture Vocabulary Scale (2nd ed.)* London: G L Assessment Ltd.

Edwards, John. 2006. Foundations of bilingualism. In Tej K. Bhatia & William C. Ritchie (eds.), *The handbook of bilingualism*, 7–31. Oxford: Blackwell.

Egli Cuenat, Mirjam & Lukas Bleichenbacher. 2020. Schriftliche und mündliche Textproduktion im Französischen mit oder ohne vorgängigen Englischunterricht am Ende der Primarstufe (6. Klasse). In Giuseppe Manno, Mirjam Egli Cuenat, Christine Le Pape Racine & Christian Brühwiler (eds.), *Schulischer Mehrsprachenerwerb am Übergang zwischen Primarstufe und Sekundarstufe I*, 1. Edition, 107–131. Münster: Waxmann Verlag GmbH.

Eisenbeiss, Sonja. 2009. Generative approaches to language learning. *Linguistics* 47(2). 273–310. DOI: 10.1515/LING.2009.011.

El Euch, S. 2010. Attitudes, motivations et conscience metalinguistique chez des bilingues et des trilingues adultes: Effets, similarités et différences. *Language Awareness* 19(1). 17–33. DOI: 10.1080/09658410903009303.

Ellis, Nick C. 2002. Frequency effects in language processing. *Studies in Second Language Acquisition* (24). 143–188.

Ellis, Nick C. & Nuria Sagarra. 2011. Learned attention in adult language acquisition. *Studies in Second Language Acquisition* 33(4). 589–624. DOI: 10.1017/S0272263111000325.

Ellis, Rod. 1997. *SLA Research and language teaching*. Oxford: Oxford University Press.

Ellis, Rod. 2005. Measuring implicit and explicit knowledge of a second language. A psychometric study. *Studies in Second Language Acquisition* 27(2). 141–172. DOI: 10.1017/S0272263105050096.

Elsner, Daniela, Lutz Küster & Britta Viebrock (eds.). 2007. *Fremdsprachenkompetenzen für ein wachsendes Europa: Das Leitziel "Multiliteralität"*. Frankfurt a.M.: Peter Lang.

Engel, Gaby, Bernd Groot-Wilken & Eike Thürmann. 2009. *Englisch in der Primarstufe - Chancen und Herausforderungen : Evaluation und Erfahrungen aus der Praxis*. 1. Aufl. Berlin: Cornelsen.

Erard, Michael. 2012. *Babel no more: The search for the world's most extraordinary language learners*. New York: Free Press.

Erard, Michael. 2014. *Secret military test, coming soon to your Spanish class*. https://nautil.us/secret-military-test-coming-soon-to-your-spanish-class-234875/ (26 August, 2024).

Esser, Hartmut. 2006. *Migration, Sprache und Integration. AKI-Forschungsbilanz 4*. Tech. rep. Berlin: Arbeitsstelle Interkulturelle Konflikte und gesellschaftliche Integration (AKI) Wissenschaftszentrum Berlin für Sozialforschung (WZB).

European Science Foundation. 1988. *ESF corpus: Second language acquisition by adult immigrants*. Collection deposited at The Language Archive, Max Planck Institute for Psycholinguistics, Nijmegen. Data collected 1982–1988. https://hdl.handle.net/1839/7129c22d-d283-4eb8-8c76-5cdaa951086b (20 May, 2026).

Fehlen, Fernand. 2024. The making of the Luxembourgish language. A former dialect becomes the pivot of a multilingual society. *Revue transatlantique d'études suisses* 12/13. 157–176.

Feleke, Tekabe Legesse, Charlotte Gooskens & Stefan Rabanus. 2020. Mapping the dimensions of linguistic distance: A study on South Ethiosemitic languages. *Lingua* 243. 102893. DOI: 10.1016/j.lingua.2020.102893.

Felix, Sascha W. 1981. The effect of formal instruction on second language acquisition. *Language Learning* 31(1). 87–112. DOI: 10.1111/j.1467-1770.1981.tb01374.x.

Ferguson, Charles A. 1959. Diglossia. *Word* 15. 325–340.
Festman, Julia. 2021. Learning and processing multiple languages: The more the easier? *Language Learning* 71(S1). 121–162. DOI: 10.1111/lang.12437.
Fibbi, Rosita, Claudio Bolzman & Antonio Fernandez. 2010. *Les Portugais en Suisse*. Berne: Office fédéral des migrations.
Fillmore, Charles J. & Paul Kay. 1999. Grammatical constructions and linguistic generalizations: The "what's x doing y?" construction. *Language* 75(1). 1–33.
Fisher Fishkin, Shelley. 1993. *Was Huck Black?: Mark Twain and african-American voices*. New York, Oxford: Oxford University Press.
Fishman, Joshua. 2005. Who speaks what language to whom and when? In Li Wei (ed.), *The bilingualism reader*, 89–106. New York: Routledge.
Flege, James Emil. 1995. Second language speech learning. theory, findings, and problems. In Winifred Strange (ed.), *Speech perception and linguistic experience. Issues in cross-language research*, 233–277. Timonium: York Press.
Flynn, Suzanne, Claire Foley & Inna Vinnitskaya. 2004. The cumulative-enhancement model for language acquisition: Comparing adults' and children's patterns of development in first, second and third language acquisition of relative clauses. *International Journal of Multilingualism 1:1*. 3–16.
Fodor, Jerry. 1983. *The modularity of mind. An essay on faculty psychology*. Cambridge Mass.: MIT Press.
Forsberg Lundell, Fanny, Christina Lindqvist & Amanda Edmonds. 2018. Productive collocation knowledge at advanced CEFR levels: Evidence from the development of a test for advanced L2 French. *The Canadian Modern Language Review* 74(4). 627–649. DOI: 10.3138/cmlr.2017-0093.
Frederiksen, Anne T. & Judith F. Kroll. 2022. Regulation and control: What bimodal bilingualism reveals about learning and juggling two languages. *Languages* 7(3). 214. DOI: 10.3390/languages7030214.
Freedman, Morris, Suvarna Alladi, Howard Chertkow, Ellen Bialystok, Fergus I. M. Craik, Natalie A. Phillips, Vasanta Duggirala, Surampudi Bapi Raju & Thomas H. Bak. 2014. Delaying onset of dementia: Are two languages enough? *Behavioural Neurology* 2014. 808137. DOI: 10.1155/2014/808137.
Fry, Stephen. 2005. *Quotation from Friday Night with Jonathan Ross*. Series 9, Episode 8 (Episode 109 overall). BBC One, broadcast 28 October 2005.
Fürst, Guillaume & François Grin. 2018. Multilingualism and creativity: A multivariate approach. *Journal of Multilingual and Multicultural Development* 39(4). 341–355. DOI: 10.1080/01434632.2017.1389948.
Gajo, Laurent. 2007. Linguistic knowledge and subject knowledge: How does bilingualism contribute to subject development? *International Journal of Bilingual Education and Bilingualism* 10(5). 563–581. DOI: 10.2167/beb460.0.

Gallo, Federico, Liliia Terekhina, Yury Shtyrov & Andriy Myachykov. 2024. Neuroplasticity and cognitive reserve effects in the caudate nucleus of young bilingual adults. *Bilingualism: Language and Cognition* 27(1). 107–116. DOI: 10.1017/S1366728923000457.

Ganschow, Leonore & Richard L. Sparks. 1995. Effects of direct instruction in Spanish phonology on the native-language skills and foreign-language aptitude of at-risk foreign-language learners. *Journal of Learning Disabilities* 28(2). 107–120. DOI: 10.1177/002221949502800205.

García, Ofelia & Angel M. Y. Lin. 2017. Translanguaging in bilingual education. In Ofelia García, Angel M. Y. Lin & Stephen May (eds.), *Bilingual and multilingual education*, 117–130. Cham: Springer International Publishing. DOI: 10.1007/978-3-319-02258-1_9.

García, Ofelia & Li Wei. 2014. *Translanguaging. Language, Bilingualism and Education.* London: Palgrave Pivot. DOI: 10.1057/9781137385765.

García, Ofelia & Li Wei. 2018. Translanguaging. In Carol A. Chapelle (ed.), *The Encyclopedia of Applied Linguistics*, 1–7. Hoboken: Wiley. DOI: 10.1002/9781405198431.wbeal1488.

Gardner, Robert C., Paul F. Tremblay & Anne-Marie Masgoret. 1997. Towards a full model of second language learning: An empirical investigation. *Modern Language Journal 81.* 344–362.

Geeraerts, Dirk. 2003. Cultural models of linguistic standardization. In René Dirven & Martin Pütz (eds.), *Cognitive models in language and thought. ideology, metaphors and meanings*, 25–68. Berlin: de Gruyter.

Geipel, Janet, Constantinos Hadjichristidis & Luca Surian. 2015. The foreign language effect on moral judgment: The role of emotions and norms. *PloS one* 10. 1–14. DOI: 10.1371/journal.pone.0131529.

Genesee, Fred, Esther Geva, Cheryl Dressler & Michael L. Kamil. 2008. Cross-linguistic relationships in second-language learners. In Diane August & Timothy Shanahan (eds.), *Developing Literacy in Second-Language Learners: Lessons from the report of the National Literacy Panel on Language-Minority Children and Youth*, 61–94. Mahwah, NJ: Lawrence Erlbaum Associates.

Gerhards, Jürgen, Tim Sawert & Ulrich Kohler. 2019. Des Kaisers alte Kleider: Fiktion und Wirklichkeit des Nutzens von Lateinkenntnissen. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 71(2). 309–326. DOI: 10.1007/s11577-019-00624-8.

GIP ALFA Centre & Réseau régional des Missions locales et PAIO du Centre. 2008. *Fiches pratiques: repérer les situations d'illettrisme. guide du conseiller ML-PAIO.* http://www.alfacentre.org/lr_illettrisme/documents/Guide%5C%20conseiller%5C%20MLPAIO/Fiches_pratiques.pdf (20 May, 2026).

Girard, Grégoire. 1821. *Grammaire des campagnes, à l'usage des écoles rurales du Canton de Fribourg. ouvrage préscrit par le Conseil d'Éducation.* Fribourg: François-Louis Piller.

Givón, Talmy. 1979. *On understanding grammar*. New York: Academic Press.

Godfroid, Aline, Shawn Loewen, Sehoon Jung, Ji-Hyun Park, Susan Gass & Rod Ellis. 2015. Timed and untimed grammaticality judgments measure distinct types of knowledge: Evidence from eye-movement patterns. *Studies in Second Language Acquisition* 37(2). 269–297. DOI: 10.1017/S0272263114000850.

Gogolin, Ingrid. 1994. *Der monolinguale Habitus der multilingualen Schule*. Wiesbaden: Waxman.

Gogolin, Ingrid, Antje Hansen, Sarah McMonagle & Dominique Rauch (eds.). 2020. *Handbuch Mehrsprachigkeit und Bildung*. VS Verlag für Sozialwissenschaften. DOI: 10.1007/978-3-658-20285-9.

Goldfield, Beverly A. & J. Steven Reznick. 1990. Early lexical acquisition: Rate, content, and the vocabulary spurt. *Journal of Child Language* 17(1). 171–183. DOI: 10.1017/S0305000900013167.

Golestani, Narly, Cathy J. Price & Sophie K. Scott. 2011. Born with an ear for dialects? Structural plasticity in the expert phonetician brain. *The Journal of Neuroscience* 31(11). 4213–4220. DOI: 10.1523/JNEUROSCI.3891-10.2011.

Gollan, Tamar H. & Lori-Ann R. Acenas. 2004. What is a TOT? Cognate and translation effects on tip-of-the-tongue states in Spanish-English and Tagalog-English bilinguals. *Journal of Experimental Psychology, Learning, Memory, and Cognition* 30(1). 246–269. DOI: 10.1037/0278-7393.30.1.246.

Gollan, Tamar H., Rosa I. Montoya & Grace A. Werner. 2002. Semantic and letter fluency in Spanish-English bilinguals. *Neuropsychology* 16(4). 562–576. DOI: 10.1037//0894-4105.16.4.562.

Goo, Jaemyung, Gisela Granena, Yucel Yilmaz & Miguel Novella. 2015. Norris & Ortega (2000) revisited and updated: Implicit and explicit instruction in L2 learning. In Patrick Rebuschat (ed.), *Implicit and explicit learning of languages* (Studies in Bilingualism), 443–482. Amsterdam: John Benjamins. DOI: 10.1075/sibil.48.18goo.

Goodwin, Charles & John Heritage. 1990. Conversation analysis. *Annual Review of Anthropology* 19(1). 283–307. DOI: 10.1146/annurev.an.19.100190.001435.

Gooskens, Charlotte. 2024. *Mutual intelligibility between closely related languages*. Berlin: De Gruyter Mouton. DOI: 10.1515/9783111134697.

Gooskens, Charlotte & Wilbert Heeringa. 2014. The role of dialect exposure in receptive multilingualism. *Applied Linguistics Review* 5(1). 247. DOI: 10.1515/applirev-2014-0011.

Green, David W. 1986. Control, activation and resource: A framework and a model for the control of speech in bilinguals. *Brain and Language* (27). 210–223.

Grigorenko, Elena L., Robert J. Sternberg & Madeline E. Ehrman. 2000. A theory-based approach to the measurement of foreign language learning ability: The CANAL-F theory and test. *The Modern Language Journal* 84(3). 390–405. DOI: 10.1111/0026-7902.00076.

Grin, François & Ilaria Masiero. 2024. *Mesurer la valeur du plurilinguisme suisse: concepts, méthodes, estimations*. Lausanne: Épistémé.

Grosjean, François. 1985. The bilingual as a competent but specific speaker-hearer. *Journal of Multilingual and Multicultural Development* 6. 467–477.

Grosjean, François. 1998. Transfer and language mode. *Bilingualism: Language and Cognition 1 (3)* 1(3). 175–176.

Grosjean, François. 2008. *Studying Bilinguals*. Oxford: Oxford University Press.

Grotjahn, Rüdiger. 1992. *Der C-Test: Theoretische Grundlagen und praktische Anwendungen*. Bochum: Universitätsverl. N. Brockmeyer.

Grünert, Matthias. 2011. Varietäten und Sprachkontakt in rätoromanischen SMS. *Linguistik Online* 48(4). 83–113.

Gullberg, Marianne. 2009. Reconstructing verb meaning in a second language: How English speakers of L2 Dutch talk and gesture about placement. *Annual Review of Cognitive Linguistics* 7. 221–244. DOI: 10.1075/arcl.7.09gul.

Gullberg, Marianne, Peter Indefrey & Pieter Muysken. 2009. Research techniques for the study of code-switching. In *The Cambridge Handbook of Linguistic Code-Switching*, 21–39. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511576331.003.

Gumperz, John. 1982. *Discourse strategies*. Cambridge: Cambridge University Press.

Gunnerud, Hilde L., Dieuwer ten Braak, Elin Kirsti Lie Reikerås, Enrica Donolato & Monica Melby-Lervåg. 2020. Is bilingualism related to a cognitive advantage in children? A systematic review and meta-analysis. *Psychological Bulletin* 146(12). No Pagination Specified–No Pagination Specified. DOI: 10.1037/bul0000301.

Gyllstad, Henrik, Pia Sundqvist, Elke Peters, Ulrikke Rindal, Gustaf B. Skar & Nasrin Ulfat. 2025. Young learners' receptive L2 English vocabulary knowledge in relation to extramural English exposure at the onset of formal instruction in Norway. *International Review of Applied Linguistics in Language Teaching*. 1–39. DOI: 10.1515/iral-2024-0289.

Haag, Ludwig & Elsbeth Stern. 2000. Non scholae sed vitae discimus? Auf der Suche nach globalen und spezifischen Transfereffekten des Lateinunterrichts. *Zeitschrift für Pädagogische Psychologie* 14. 146–157.

Haenni Hoti, Andrea & Sibylle Heinzmann. 2009. Zwei Fremdsprachen auf der Primarstufe. *Babylonia* 2/09. 16–24.

Hagège, Claude. 2006. *Combat pour le français. Au nom de la diversité des langues et des cultures*. Paris: Odile Jacob. DOI: 10.3917/oj.hageg.2006.01.

Hakuta, Kenji & Rafael M. Diaz. 1985. The relationship between degree of bilingualism and cognitive ability. In Katherine Nelson (ed.), *Children's Language*, vol. 5, 319–344. Hillsdale: Erlbaum.

Harden, Kathryn P. 2021. *The genetic lottery: Why DNA matters for social equality*. Princeton: Princeton University Press.

Harris, Catherine L., Ayşe Ayçiçeği & Jean Berko Gleason. 2003. Taboo words and reprimands elicit greater autonomic reactivity in a first language than in a second language. *Applied Psycholinguistics* 24(4). 561–579. DOI: 10.1017/S0142716403000286.

Hart, Betty & Todd R. Risley. 1995. *Meaningful differences in the everyday experience of young American children*. Baltimore: Paul H. Brooks.

Hartmann, Stefan, Nikolas Koch & Antje Endesfelder Quick. 2022. Cognitive linguistics meets multilingual language acquisition: What pattern identification can tell us. *Yearbook of the German Cognitive Linguistics Association* 10(1). 239–258. DOI: 10.1515/gcla-2022-0011.

Haspelmath, Martin. 2023. Defining the word. *WORD* 69(3). 283–297. DOI: 10.1080/00437956.2023.2237272.

Haukås, Åsta. 2016. Teachers' beliefs about multilingualism and a multilingual pedagogical approach. *International Journal of Multilingualism* 13(1). 1–18. DOI: 10.1080/14790718.2015.1041960.

Hausen, Guglielm. 1821. *Spirituals mussaments per manar ina christianeivla vita*. Cuera: Christian Pradella.

Hauser, Marc D, Charles Yang, Robert C. Berwick, Ian Tattersall, Michael Ryan, Jeffrey Watumull, Noam Chomsky & Richard Lewontin. 2014. The mystery of language evolution. *Frontiers in Psychology* 5. 1–12. DOI: 10.3389/fpsyg.2014.00401.

Heeringa, Wilbert, Peter Kleiweg, Charlotte Gooskens & John Nerbonne. 2006. Evaluation of string distance algorithms for dialectology. *Proceedings of the Workshop on Linguistic Distances (Sydney)*. 51–62.

Heid, Helmut. 1988. Zur Paradoxie der bildungspolitischen Forderung nach Chancengleichheit. *Zeitschrift für Pädagogik* 34. 1–17.

Heinzmann, Sibylle, Marianne Müller, Marta Oliveira, Andrea Haenni Hoti & Werner Wicki. 2009. *Englisch und Französisch auf der Primarstufe – Verlängerung des NFP-56-Projekts. Schlussbericht*. Tech. rep. Luzern.

Herdina, Philip & Ulrike Jessner. 2002. *A dynamic model of multilingualism: Perspectives of change in psycholinguistics*. Clevedon: Multilingual Matters.

Hermas, Abdelkader. 2010. Language acquisition as computational resetting: Verb movement in L3 initial state. *International Journal of Multilingualism* 7(4). 343–362. DOI: 10.1080/14790718.2010.487941.

Hicks, Nina S. 2021. Exploring systematic orthographic crosslinguistic similarities to enhance foreign language vocabulary learning. *Language Teaching Research*. 2385–2407. DOI: 10.1177/13621688211047353.

Hicks, Nina S. & Thomas Studer. 2024. Language corpus research meets foreign language education: Examples from the multilingual SWIKO corpus. *Babylonia* 2. 26–35.

Hilchey, Matthew & Raymond Klein. 2011. Are there bilingual advantages on nonlinguistic interference tasks? Implications for the plasticity of executive control processes. *Psychonomic Bulletin & Review* 18(4). 625–658. DOI: 10.3758/s13423-011-0116-7.

Hirosh, Zoya & Tamar Degani. 2018. Direct and indirect effects of multilingualism on novel language learning: An integrative review. *Psychonomic Bulletin & Review* 25(3). 892–916. DOI: 10.3758/s13423-017-1315-7.

Hoff, Erika, Cynthia Core, Silvia Place, Rosario Rumiche, Melissa Señor & Marisol Parra. 2012. Dual language exposure and early bilingual development. *Journal of Child Language* 39(01). 1–27. DOI: 10.1017/S0305000910000759.

Hoffman, Eva. 1989. *Lost in translation. A life in a new language*. New York: Penguin.

Hoffmann, Charlotte. 1985. Language acquisition in two trilingual children. *Journal of Multilingual and Multicultural Development* 6(6). 479–495. DOI: 10.1080/01434632.1985.9994222.

Hofweber, Julia, Theodoros Marinis & Jeanine Treffers-Daller. 2020. Experimentally induced language modes and regular code-switching habits boost bilinguals' executive performance: Evidence from a within-subject paradigm. *Frontiers in Psychology* 11. DOI: 10.3389/fpsyg.2020.542326.

Holliday, Adrian. 2006. Native-speakerism. *ELT Journal* 60(4). 385–387. DOI: 10.1093/elt/ccl030.

Hommel, Bernhard, Lorenza S Colzato, Rico Fischer & Ingrid Christoffels. 2011. Bilingualism and creativity: Benefits in convergent thinking come with losses in divergent thinking. *Frontiers in Psychology* 2(273). 1–5. DOI: 10.3389/fpsyg.2011.00273.

Hopf, Diether. 2005. Zweisprachigkeit und Schulleistung bei Migrantenkindern. *Zeitschrift für Pädagogik* 51. 236–251.

Hopp, Holger. 2016. Learning (not) to predict: Grammatical gender processing in second language acquisition. *Second Language Research* 32(2). 277–307. DOI: 10.1177/0267658315624960.

Hopp, Holger & Dieter Thoma. 2021. Effects of plurilingual teaching on grammatical development in early foreign-language learning. *The Modern Language Journal* 105(2). 464–483. DOI: 10.1111/modl.12709.

Hopp, Holger, Markus Vogelbacher, Teresa Kieseier & Dieter Thoma. 2019. Bilingual advantages in early foreign language learning: Effects of the minority and the majority language. *Learning and Instruction* 61. 99–110. DOI: 10.1016/j.learninstruc.2019.02.001.

Hornstein, Norbert & David Lightfoot. 1981. Introduction. In *Explanation in linguistics*, 9–31. London: Longman.

Horst, Marlise. 2010. How well does teacher talk support incidental vocabulary acquisition? *Reading in a Foreign Language* 22(1). 161–180.

Howell, Peter, Stephen Davis & Roberta Williams. 2009. The effects of bilingualism on stuttering during late childhood. *Archives of Disease in Childhood* 94(1). 42–46.

Hu, Marcella Hu & Paul Nation. 2000. Unknown vocabulary density and reading comprehension. *Reading in a Foreign Language* 13(1). 403–430.

Hufeisen, Britta. 2000. A European perspective–Tertiary languages with a focus on German as L3. In J. W. Rosenthal (ed.), *Handbook of Undergraduate Second Language Education: English as a Second Language, Bilingual, and Foreign Language Instruction for a Multilingual World*, 209–229. Mahwah, NJ: Erlbaum.

Hulstijn, Jan. 2015. *Language proficiency in native and non-native speakers: Theory and research* (Language Learning & Language Teaching vol. 41). Amsterdam ; Philadelphia: John Benjamins.

Hulstijn, Jan. 2024. Predictions of individual differences in the acquisition of native and non-native languages: An update of BLC theory. *Languages* 9(5). 173. DOI: 10.3390/languages9050173.

Humphrey, Ad & Virginia Valian. 2012. Multilingualism and cognitive control: Simon and Flanker task performance in monolingual and multilingual young adults. In *Paper presented at the 53rd annual meeting of the Psychonomic society.*

Hunt, Alan & David Beglar. 2005. A framework for developing EFL reading vocabulary. *Reading in a Foreign Language* 17(1). 23–59.

Hymes, Dell. 1976. On communicative competence. In J. B. Pride & Janet Holmes (eds.), *Sociolinguistics. Selected readings*, 5–26. Harmondsworth.

Imgrund, Bettina. 2008. Chancen und Gefahren von Wortschatzarbeit im bilingualen Sachfachunterricht. Erfahrungs- und forschungsbasierte Anmerkungen zum Bereich Lexik im bilingualen Geschichtsunterricht auf der Sekundarstufe I. *Babylonia* 4. 23–27.

Infomaniak. 2025. *Euria: The Sovereign and Free AI Assistant*. Version 1.0. https://euria.infomaniak.com.

Institute of Multilingualism. 2017. *SWIKOweb: the Swiss Learner Corpus SWIKO*. https://ifm-swiko.unifr.ch/ (20 May, 2026).

Irvine, Judith & Susan Gal. 2000. Language ideology and linguistic differentiation. In Paul V. Kroskrity (ed.), *Regimes of language : Ideologies, polities, and identities*, 35–83. Santa Fe, NM: School of American Research Press.

Jansen, Silke, Sonja Higuera del Moral, Jessica S. Barzen, Pia Reimann & Markus Opolka. 2021. *Demystifying bilingualism: How metaphor guides research towards mythification*. Cham: Springer International Publishing. DOI: 10.1007/978-3-030-87063-8.

Jarvis, Scott. 2000. Methodological rigor in the study of transfer: Identifying L1 influence in the interlanguage lexicon. *Language Learning* 50(2). 245–309.

Jarvis, Scott & Aneta Pavlenko. 2008. *Crosslinguistic influence in language and cognition*. Mahwah, NJ: Lawrence Erlbaum Associates.

Jessner, Ulrike. 2008. Teaching third languages: Findings, trends and challenges. *Language Teaching* 41(1). 15–56. DOI: 10.1017/S0261444807004739.

Jiang, Nan. 2000. Lexical representation and development in a second language. *Applied Linguistics* 21. 47–77. DOI: 10.1093/applin/21.1.47.

Johanson, Lars. 2023. *Code copying: The strength of languages in take-over and carry-over roles*. Leiden: Brill. DOI: 10.1163/9789004548459.

Johnson, Matt A. & Adele E. Goldberg. 2013. Evidence for automatic accessing of constructional meaning: Jabberwocky sentences prime associated verbs. *Language and Cognitive Processes* 28(10). 1439–1452. DOI: 10.1080/01690965.2012.717632.

Juska-Bacher, Britta, Ladina Brugger, Rahel Korthus & Christoph Zangger. 2021. Definitionskompetenzen von Erst- und Zweitklässlern. mit einem Ausblick auf die weitere Entwicklung. *Muttersprache* 131(2).

Juska-Bacher, Britta & Sabrina Jakob. 2014. Wortschatzumfang und Wortschatzqualität und ihre Bedeutung im fortgesetzten Spracherwerb. *Zeitschrift für Angewandte Linguistik* 61(1). 49–75. DOI: 10.1515/zfal-2014-0016.

Kaatari, Henrik, Tove Larsson, Ying Wang, Seda Acikara-Eickhoff & Pia Sundqvist. 2023. Exploring the effects of target-language extramural activities on students' written production. *Journal of Second Language Writing* 62. 101062.

Kachru, Yamuna. 1994. Monolingual bias in SLA research. *TESOL Quarterly* 28(4). 795–800. DOI: 10.2307/3587564.

Kang, Carissa & Barbara Lust. 2019. Code-switching does not predict executive function performance in proficient bilingual children: Bilingualism does. *Bilingualism: Language and Cognition* 22(2). 366–382. DOI: 10.1017/S1366728918000299.

Kang, Eun Young, Sarah Sok & ZhaoHong Han. 2019. Thirty-five years of ISLA on form-focused instruction: A meta-analysis. *Language Teaching Research* 23(4). 428–453. DOI: 10.1177/1362168818776671.

Kaushanskaya, Margarita & Kimberly Crespo. 2019. Does exposure to code-switching influence language performance in bilingual children? *Child Development* 90(3). 708–718. DOI: 10.1111/cdev.13235.

Kecskes, Istvan. 2006. Multilingualism: Pragmatic aspects. *Encyclopedia of Language & Linguistics*. 371–375. DOI: 10.1016/B0-08-044854-2/00344-8.

Kellerman, Eric. 1979. Transfer and non-transfer: Where we are now. *Studies in Second Language Acquisition* 2. 37–57.

Kelly, Louis G. 1969. *25 centuries of language teaching. An inquiry into the science, art, and development of language teaching methodology, 500 bc–1969*. Rowley, MA: Newbury House Publishers.

Kemp, Charlotte. 2001. *Metalinguistic awareness in multilinguals: Implicit and explicit grammatical awareness and its relationship with language experience and language attainment*. Edinburgh: University of Edinburgh. (Doctoral dissertation). https://www.era.lib.ed.ac.uk/bitstream/handle/1842/6748/528437.pdf?sequence=1 (9 August, 2017).

Kepinska, Olga, Josue Dalboni da Rocha, Carola Tuerk, Alexis Hervais-Adelman, Florence Bouhali, David W Green, Cathy J Price & Narly Golestani. 2025. Auditory cortex anatomy reflects multilingual phonological experience. *eLife* 12. 1–48. DOI: 10.7554/eLife.90269.

Kharkhurin, Anatoliy V. 2007. The role of cross-linguistic and cross-cultural experiences in bilinguals' divergent thinking. In Istvan Kecskés & Liliana Albertazzi (eds.), *Cognitive Aspects of Bilingualism*, 175–210. Dordrecht: Springer. DOI: 10.1007/978-1-4020-5935-3_6.

Kheder, Souad & Edith Kaan. 2021. Cognitive control in bilinguals: Proficiency and code-switching both matter. *Cognition* 209. 104575. DOI: 10.1016/j.cognition.2020.104575.

Kirk, Neil W., Linda Fiala, Kenneth C. Scott-Brown & Vera Kempe. 2014. No evidence for reduced Simon cost in elderly bilinguals and bidialectals. *Journal of Cognitive Psychology* 26(6). 640–648. DOI: 10.1080/20445911.2014.929580.

Kirschner, Paul A. 2017. Stop propagating the learning styles myth. *Computers & Education* 106(Supplement C). 166–171. DOI: 10.1016/j.compedu.2016.12.006.

Klein, Wolfgang & Clive Perdue. 1997. The basic variety (or: Couldn't natural languages be much simpler?) *Second Language Research* 13(4). 301–347.

Klieme, Eckard. 2006. *Unterricht und Kompetenzerwerb in Deutsch und Englisch. Zentrale Befunde der Studie Deutsch Englisch Schülerleistungen International (DESI)*. Frankfurt am Main: Deutsches Institut für Internationale Pädagogische Forschung.

Kloss, Heinz. 1929. *Nebensprachen. Eine sprachpolitische Studie über die Beziehungen eng verwandter Sprachgemeinschaften*. Wien, Leipzig: Braumüller.

Kloss, Heinz. 1987. Abstandsprache und Ausbausprache. In Ulrich Ammon, Norbert Dittmar & Klaus J. Mattheier (eds.), *Sociolinguistics. An International Handbook of the Science of Language and Society*, 302–308. Berlin: Mouton de Gruyter.

Koç, Didem K. 2022. The effect of multilingualism on learning an additional language. *RumeliDE Dil ve Edebiyat Araştırmaları Dergisi* (Ö11). 492–500. DOI: 10.29000/rumelide.1146693.

Koch, Peter & Wulf Oesterreicher. 1985. Sprache der Nähe–Sprache der Distanz: Mündlichkeit und Schriftlichkeit im Spannungsfeld von Sprachtheorie und Sprachgeschichte. *Romanistisches Jahrbuch 36*. 15–43.

Koizumi, Rie. 2012. Relationships between text length and lexical diversity measures: Can we use short texts of less than 100 tokens? *Vocabulary Learning and Instruction* 1(1). 60–69. DOI: 10.7820/vli.v01.1.koizumi.

Köller, Olaf, M. Knigge & B. Tesch. 2010. *Sprachliche Kompetenzen im Ländervergleich*. Münster: Waxmann.

Kootstra, Gerrit J. 2015. A psycholinguistic perspective on code-switching: Lexical, structural, and socio-interactive processes. In Gerald Stell & Kofi Yakpo (eds.), *Code-switching between structural and sociolinguistic perspectives*, chap. Code-switching Between Structural and Sociolinguistic Perspectives, 39–64. DOI: 10.1515/9783110346879.39.

Korecky-Kröll, Katharina, Kumru Uzunkaya-Sharma, Christine Czinglar & Wolfgang U. Dressler. 2016. Der Input im Elternhaus und Kindergarten als wichtiger Faktor für den Spracherwerb von austrotürkischen Kindern. In Jennifer Carvill Schellenbacher, Julia Dahlvik, Heinz Fassmann & Christoph Reinprecht (eds.), *Migration und Integration–wissenschaftliche Perspektiven aus Österreich*, vol. Band 9 (Migrations- Und Integrationsforschung), 67–88. Wien: V&R Unipress. DOI: 10.14220/9783737005951.67.

Kousaie, Shanna & Natalie A. Phillips. 2012. The bilingual advantage in cognitive control: Behavioural and electrophysiological evidence. *Canadian Journal of Experimental Psychology-Revue Canadienne De Psychologie Experimentale* 66(4). 313–313.

Krashen, Stephen. 1980. The input hypothesis. *Georgetown University Round Table on Languages and Linguistics* 168–180.

Kremin, Lena V., Julia Alves, Adriel John Orena, Linda Polka & Krista Byers-Heinlein. 2022. Code-switching in parents' everyday speech to bilingual infants. *Journal of Child Language* 49(4). 714–740. DOI: 10 . 1017 / S0305000921000118.

Kremin, Lena V., Adriel John Orena, Linda Polka & Krista Byers-Heinlein. 2019. Investigating naturalistic code-switching directed towards infants. *The Journal of the Acoustical Society of America* 145(3_Supplement). 1766. DOI: 10.1121/1.5101473.

Kremmel, Benjamin, Bimali Indrarathne, Judit Kormos & Shungo Suzuki. 2023. Unknown vocabulary density and reading comprehension: Replicating Hu and Nation (2000). *Language Learning* 73(4). 1127–1163. DOI: 10.1111/lang.12622.

Kristiansen, Tore. 1998. The role of standard ideology in the disappearance of the traditional danish dialects. *Folia Linguistica* 32(1-2). 115–130. DOI: 10.1515/flin.1998.32.1-2.115.

Kroll, Judith F. & Erika Stewart. 1994. Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language* 33. 149–174. DOI: 10.1006/jmla.1994.1008.

Kunschak, Claudia. 2020. From pluricentricity to translingual transcultural competence. *Critical Multilingualism Studies* 8(1). 104–134.

Kurrein, Jessie. 2026. *Louis Loewe*. https://www.kurrein.com/Documents/Louis%20Loewe.htm (22 May, 2026).

Labov, William. 1966. *The social stratification of English in New York City*. Washington: Center for Applied Linguistics.

Lado, Robert. 1957. *Linguistics across cultures: Applied linguistics for language teachers*. Ann Arbor: University of Michigan.

Lakoff, George. 1987. *Women, fire, and dangerous things: What categories reveal about the mind*. Chicago, London: The University of Chicago Press.

Langacker, Ronald W. 2005. Construction grammars: Cognitive, radical, and less so. In M. Sandra Peña Cervel & Francisco J. Ruiz de Mendoza Ibáñez (eds.), *Cognitive linguistics: Internal dynamics and interdisciplinary interaction*. Berlin: Mouton de Gruyter.

Langer, Nils & Agnete Nesse. 2012. Linguistic purism. In Juan Manuel Hernández-Campoy & Juan Camilo Conde-Silvestre (eds.), *The handbook of historical sociolinguistics*, chap. 33, 607–625. Hoboken: Wiley. DOI: 10.1002/9781118257227.ch33.

Lanza, Elizabeth. 2001. Bilingual first language acquisition. A discourse perspective on language contact in parent-child interaction. In Jasone Cenoz & Fred Genesee (eds.), *Trends in bilingual acquisition*, 201–229. Amsterdam: John Benjamins.

Lanza, Elizabeth & Rafael Lomeu Gomes. 2020. Family language policy: Foundations, theoretical perspectives and critical approaches. In Andrea C. Schalley & Susana A. Eisenchlas (eds.), *Handbook of home language maintenance and development*, 153–173. Berlin: De Gruyter Mouton. DOI: 10.1515/9781501510175-008.

Lasagabaster Herrarte, David. 1998. *Creatividad y conciencia metalingüística: incidencia en el aprendizaje del inglés como L3*. Lejona: Universidad del País Vasco, Servicio Editorial = Euskal Herriko Unibertsitatea, Argitalpen Zerbitzua.

Laufer, Batia. 2003. The influence of L2 on L1 collocational knowledge and on L1 lexical diversity in free written expression. In Vivian Cook (ed.), *Effects of the second language on the first*, 19–31. Clevedon: Multilingual Matters.

Laufer, Batia. 2021. Lemmas, flemmas, word families, and common sense. *Studies in Second Language Acquisition* 43(5). 965–968. DOI: 10.1017/S0272263121000656.

Laufer, Batia & Jan Hulstijn. 2001. Incidental vocabulary acquisition in a second language: The construct of task-induced involvement. *Applied Linguistics* 22(1). 1–26. DOI: 10.1093/applin/22.1.1.

Laurie, Simon S. 1890. *Lectures on language and linguistic method in school.* Cambridge: Cambridge University Press.

Le Matin. 2016. *Les cantons optimisent l'enseignement du français.* Le Matin, 23 June 2016. https://www.lematin.ch/story/les-cantons-optimisent-l-enseignement-du-francais-751204941179 (20 May, 2026).

Le Page, Robert B. & Andrée Tabouret-Keller. 1985. *Acts of identity. Creole-based approaches to language and ethnicity.* Cambridge, London: Cambridge University Press.

Lefebvre, Claire. 1998. *Creole genesis and the acquisition of grammar : The case of Haitian Creole* (Cambridge Studies in Linguistics 88). Cambridge, UK New York: Cambridge University Press.

Lehtonen, Minna, Anna Soveri, Aini Laine, Janica Järvenpää, Angela de Bruin & Jan Antfolk. 2018. Is bilingualism associated with enhanced executive func-

tioning in adults? A meta-analytic review. *Psychological Bulletin* 144(4). 394–425. DOI: 10.1037/bul0000142.

Leijten, Mariëlle & Luuk Van Waes. 2013. Keystroke logging in writing research: Using Inputlog to analyze and visualize writing processes. *Written Communication* 30(3). 358–392. DOI: 10.1177/0741088313491692.

Leivada, Evelina, Natalia Mitrofanova & Marit Westergaard. 2021. Bilinguals are better than monolinguals in detecting manipulative discourse. *PLoS ONE* 16(9). e0256173. DOI: 10.1371/journal.pone.0256173.

Lemhöfer, Kristin & Mirjam Broersma. 2011. Introducing LexTALE: A quick and valid lexical test for advanced learners of English. *Behavior Research Methods* 44(2). 325–343. DOI: 10.3758/s13428-011-0146-0.

Lenhard, Alexandra, Wolfgang Lenhard, Robert Segerer & Sebastian Suggate. 2015. *Peabody Picture Vocabulary Test – 4. Ausgabe (PPVT-4).* Deutsche Bearbeitung des PPVT-4 von Lloyd M. Dunn & Douglas M. Dunn. Frankfurt am Main: Pearson Assessment.

Lenhard, Wolfgang & Wolfgang Schneider. 2006. *ELFE 1-6. Ein Leseverständnistest für Erst- bis Sechstklässler.* Göttingen: Hogrefe.

Leopold, Werner F. 1949. *Speech development of a bilingual child: A linguist's record. Volume III: Grammar and general problems in the first two years.* Evanston: Northwestern University Press.

Leow, Ronald P. 2000. Study of the role of awareness in foreign language behavior. *Studies in Second Language Acquisition* 22. 557–584.

Levshina, Natalia. 2017. Online film subtitles as a corpus: An n-gram approach. *Corpora* 12(3). 311–338. DOI: 10.3366/cor.2017.0123. https://www.euppublishing.com/doi/10.3366/cor.2017.0123.

Li, Shaofeng. 2019. Six decades of language aptitude research: A comprehensive and critical review. In Zhisheng E. Wen, Peter Skehan, Andriana Biedron, Shaofeng Li & Richard L. Sparks (eds.), *Language aptitude. Advancing theory, testing, research and practice* (SLA Research Series), 78–96. London: Routledge.

Libération. n.d. *Libération.* https://www.liberation.fr (20 May, 2026).

Lichtman, Karen & Bill VanPatten. 2021. Was Krashen right? Forty years later. *Foreign Language Annals* 54(2). 283–305. DOI: 10.1111/flan.12552.

Lieven, Elena V., Julian M. Pine & Gillian Baldwin. 1997. Lexically-based learning and early grammatical development. *Journal of Child Language* 24. 187–219.

Linck, Jared A., Meredith M. Hughes, Susan G. Campbell, Noah H. Silbert, Medha Tare, Scott R. Jackson, Benjamin K. Smith, Michael F. Bunting & Catherine J. Doughty. 2013. Hi-LAB: A new measure of aptitude for high-level language proficiency. *Language Learning* 63(3). 530–566. DOI: 10.1111/lang.12011.

Lindstromberg, Seth. 2019. Intentional L2 vocabulary learning. In Stuart Webb (ed.), *The Routledge Handbook of Vocabulary Studies*, 240–254. London: Routledge.

Lingolia. n.d. *Nouns in Esperanto*. https://esperanto.lingolia.com/en/grammar/nouns (20 May, 2026).

Long, Michael H. 2007. *Problems in SLA*. Mahwah, NJ; London: Lawrence Erlbaum Associates.

Lorenz, Eliane, Sharareh Rahbari, Ulrike Schackow & Peter Siemund. 2020. Does bilingualism correlate with or predict higher proficiency in L3 English? A contrastive study of monolingual and bilingual learners. *Journal of Multilingual Theories and Practices* 1(2). 185–217. DOI: 10.1558/jmtp.15517.

Lowie, Wander. 2017. Emergentism: Wide ranging theoretical framework or just one more meta-theory? *Recherches en didactique des langues et des cultures.* 14(1). DOI: 10.4000/rdlc.1140.

Lyons, John. 1968. *Introduction to theoretical linguistics*. Cambridge: Cambridge University Press.

Lyster, Roy & Leila Ranta. 1997. Corrective feedback and learner uptake: Negotiation of form in communicative classrooms. *Studies in Second Language Acquisition* 19(1). 37–66. DOI: 10.1017/S0272263197001034.

Lyster, Roy & Kazuya Saito. 2010. Oral feedback in classroom SLA: A meta-analysis. *Studies in Second Language Acquisition* 32(2). 265–302. DOI: 10.1017/S0272263109990520.

Macaro, Ernesto W. 2003. *Teaching and learning a second language. A guide to recent research and its applications*. London: Continuum International Publishing Group.

Macnamara, Brooke N. & Andrew R. A. Conway. 2014. Novel evidence in support of the bilingual advantage: Influences of task demands and experience on cognitive control and working memory. *Psychonomic Bulletin & Review* 21(2). 520–525. DOI: 10.3758/s13423-013-0524-y.

MacNamara, John. 1966. *Bilingualism and primary education*. Edinburgh: Edinburgh University Press.

MacSwan, Jeff. 2000. The threshold hypothesis, semilingualism, and other contributions to a deficit view of linguistic minorities. *Hispanic Journal of Behavioral Sciences* 22(1). 3–45. DOI: 10.1177/0739986300221001.

MacSwan, Jeff. 2009. Generative approaches to code-switching. In Almeida Jacqueline Toribio & Barbara E. Bullock (eds.), *The Cambridge handbook of linguistic code-switching* (Cambridge Handbooks in Language and Linguistics), 309–335. Cambridge: Cambridge University Press. DOI: 10 . 1017 / CBO9780511576331.019.

Madlener, Karin. 2015. *Frequency effects in instructed second language acquisition*. Berlin, Boston: De Gruyter Mouton.

Madlener-Charpentier, Karin & Giulio Pagonis. 2022. *Aufmerksamkeitslenkung und Bewusstmachung in der Sprachvermittlung: Kognitive und didaktische Perspektiven auf Deutsch als Erst-, Zweit- und Fremdsprache*. Tübingen: Narr Francke Attempto Verlag.

Mady, Callie. 2015. Examining immigrants' English and French proficiency in French immersion: *Journal of Immersion and Content-Based Language Education* 3(2). 268–284. DOI: 10.1075/jicb.3.2.05mad.

Magnusson, Kristoffer. 2023. *Interpreting correlations: an interactive visualization (version 0.7.1) [Web app]*. https://rpsychologist.com/correlation/ (20 May, 2026).

Mahdi, Hassan Saleh. 2018. Effectiveness of mobile devices on vocabulary learning: A meta-analysis. *Journal of Educational Computing Research* 56(1). 0735633117698826. DOI: 10.1177/0735633117698826.

Malik-Moraleda, Saima, Olessia Jouravlev, Maya Taliaferro, Zachary Mineroff, Theodore Cucu, Kyle Mahowald, Idan A Blank & Evelina Fedorenko. 2024. Functional characterization of the language network of polyglots and hyperpolyglots with precision fMRI. *Cerebral Cortex* 34(3). 1–17. DOI: 10.1093/cercor/bhae049.

Maluch, Jessica T., Marko Neumann & Sebastian Kempert. 2016. Bilingualism as a resource for foreign language learning of language minority students? Empirical evidence from a longitudinal study during primary and secondary school in Germany. *Learning and Individual Differences* 51. 111–118. DOI: 10.1016/j.lindif.2016.09.001.

Manhardt, Francie, Susanne Brouwer & Aslı Özyürek. 2021. A tale of two modalities: Sign and speech influence each other in bimodal bilinguals. *Psychological Science* 32(3). 424–436. DOI: 10.1177/0956797620968789.

Manno, Giuseppe & Lukas Bleichenbacher. 2020. Lesekompetenz in einer mehrsprachigen Perspektive: Ein Systemvergleich am Ende der 7. Klasse in Französisch als Fremdsprache unter Berücksichtigung der Schulsprache Deutsch. In Giuseppe Manno, Mirjam Egli Cuenat, Christine Le Pape Racine & Christian Brühwiler (eds.), *Schulischer Mehrsprachenerwerb am Übergang zwischen Primarstufe und Sekundarstufe I*, 1. Edition. Münster: Waxmann Verlag GmbH.

Marian, Viorica. 2023. *The power of language: How the codes we use to think, speak, and live transform our minds*. London: Penguin.

Marshall, Chloe, Aurora Bel, Sannah Gulamani & Gary Morgan. 2020. How are signed languages learned as second languages? 15(1). 1–17. DOI: 10.1111/lnc3.12403.

Martin-Jones, Marilyn & Catherine Jones. 2000. *Multilingual literacies: Reading and writing different worlds*. Amsterdam: John Benjamins.

Martin-Jones, Marilyn & Suzanne Romaine. 1986. Semilingualism–a half-baked theory of communicative competence. *Applied Linguistics* 7(1). 26–38.

Matras, Yaron. 2009. *Language contact* (Cambridge Textbooks in Linguistics). Cambridge: Cambridge University Press.

Matras, Yaron. 2022. Structural outcomes of language contact. In Anna Maria Escobar & Salikoko Mufwene (eds.), *The Cambridge handbook of language contact: Volume 2: Multilingualism in population structure* (Cambridge Handbooks in Language and Linguistics), 593–617. Cambridge: Cambridge University Press. DOI: 10.1017/9781009105965.029.

Matras, Yaron & Jeanette Sakel. 2007. Investigating the mechanisms of pattern replication in language convergence. *Studies in Language* 31(4). 829–865. DOI: 10.1075/sl.31.4.05mat. https://www.jbe-platform.com/content/journals/10.1075/sl.31.4.05mat.

Matzat, Wilhelm. 2007. *Krebs, Emil (1867–1930), Dolmetscher in Peking und Tsingtau–Das "Sprachwunder"*. https://tsingtau.org/das-sprachwunder-emil-krebs/ (18 May, 2026).

Mbodj-Pouye, Aïssatou & Cécile Van den Avenne. 2007. "C'est bambara et français mélangés." Analyser des écrits plurilingues à partir du cas de cahiers villageois recueillis au Mali. *Langage et société* 120(2). 99–127. DOI: 10.3917/ls.120.0099.

McCarthy, Philip M. & Scott Jarvis. 2010. MTLD, vocd-D, and HD-D: A validation study of sophisticated approaches to lexical diversity assessment. *Behavior Research Methods* 42(2). 381–392. DOI: 10.3758/BRM.42.2.381.

McLelland, Nicola. 2021. Language standards, standardisation and standard ideologies in multilingual contexts. *Journal of Multilingual and Multicultural Development* 42(2). 109–124. DOI: 10.1080/01434632.2019.1708918.

McMurray, Bob. 2007. Defusing the childhood vocabulary explosion. *Science* 317(5838). 631. DOI: 10.1126/science.1144073.

McWhorter, John H. 2001. *The power of Babel: A natural history of language*. New York: Times Books.

Meara, Paul. 2018. *V_Words 2.02*. https://www.lognostics.co.uk/tools/V_Words/V_Words.htm (20 May, 2026).

Meara, Paul & Imma Miralpeix. 2018. *D_Tools 2.21*. https://www.lognostics.co.uk/tools/D_Tools/D_Tools.htm (20 May, 2026).

Meara, Paul & Imma Miralpeix. n.d. *Lognostics tools*. http://www.lognostics.co.uk/tools/index.htm (20 May, 2026).

Meara, Paul M. 2005. *LLAMA Language Aptitude Tests*. Swansea: Lognostics.

Meara, Paul M. & Imma Miralpeix. 2016. *Tools for researching vocabulary*. Bristol: Multilingual Matters.

Mendez, Mario F. 2019. Bilingualism and dementia: Cognitive reserve to linguistic competency. *Journal of Alzheimer's Disease* 71(2). 377–388. DOI: 10.3233/JAD-190397.

Meuter, Renata F. I. 2009. Language selection and performance optimisation in multilinguals. In Ludmila Isurin, Donald Winford & Kees de Bot (eds.), *Multidisciplinary approaches to code switching*, 27–51. Amsterdam: John Benjamins.

Meuter, Renata F. I. & Alan Allport. 1999. Bilingual language switching in naming: Asymmetrical costs of language selection. *Journal of Memory and Language* 40(1). 25–40. DOI: 10.1006/jmla.1998.2602.

Michalke, Meik. 2020. *koRpus: An R Package for Text Analysis*. https://reaktanz.de/?c=hacking&s=koRpus (18 May, 2026).

Michel, Sister V. 1936. Prognosis in German. *Modern Language Journal* 20. 275–287.

Missler, Bettina. 1999. *Fremdsprachenlernerfahrungen und Lernstrategien: Eine empirische Untersuchung*. Tübingen: Stauffenburg.

Mondria, Jan-Arjen. 2007. Myths about vocabulary acquisition. *Babylonia* 2. 63–69.

Monsrud, May-Britt, Veslemøy Rydland, Esther Geva, Anne Cathrine Thurmann-Moe & Solveig-Alma Halaas Lyster. 2022. The advantages of jointly considering first and second language vocabulary skills among emergent bilingual children. *International Journal of Bilingual Education and Bilingualism* 25(1). 42–58. DOI: 10.1080/13670050.2019.1624685.

Montanari, Simona. 2019. Facilitated language learning in multilinguals. In Simona Montanari & Suzanne Quay (eds.), *Multidisciplinary perspectives on multilingualism: The fundamentals*, 299–324. Berlin: De Gruyter Mouton. DOI: 10.1515/9781501507984.

Montero-Perez, Maribel, Elke Peters, Geraldine Clarebout & Piet Desmet. 2014. Effects of Captioning on Video Comprehension and Incidental Vocabulary Learning. *Language Learning and Technology* 18(1). 118–141.

Montero-Perez, Maribel, Wim Van Den Noortgate & Piet Desmet. 2013. Captioned video for L2 listening and vocabulary learning: A meta-analysis. *System* 41(3). 720–739. DOI: 10.1016/j.system.2013.07.013.

Montrul, Silvina A. 2008. *Incomplete acquisition in bilingualism. Re-examining the age factor*. Amsterdam: John Benjamins.

Moser, Urs, Nicole Bayer & Martin J. Tomasik. 2017. Language skill transfer effects: Moving from heritage language to school language in kindergarten. In Raphael Berthele & Amelia Lambelet (eds.), *Heritage and school language liter-*

acy development in migrant children: Interdependence or independence? (Second Language Acquisition), 119–140. Clevedon: Multilingual Matters.

Mufwene, Salikoko S. 2009. Restructuring, hybridization, and complexity in language evolution. In Enoch O. Aboh & Norval Smith (eds.), *Complex processes in new languages* (Creole Language Library), 367–400. Amsterdam: John Benjamins. DOI: 10.1075/cll.35.23muf.

Mukadam, Naaheed, Andrew Sommerlad & Gill Livingston. 2017. The relationship of bilingualism compared to monolingualism to the risk of cognitive decline or dementia: A systematic review and meta-analysis. *Journal of Alzheimer's Disease* 58(1). 45–54. DOI: 10.3233/JAD-170131.

Müller, Stefan, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig. 2021. *Head-Driven Phrase Structure Grammar: The handbook*. Berlin: Language Science Press. DOI: 10.5281/zenodo.5543318.

Musolino, Julien, Gitana Chunyo & Barbara Landau. 2010. Uncovering knowledge of core syntactic and semantic principles in individuals with Williams syndrome. *Language Learning and Development : The official journal of the Society for Language Development* 6(2). 126–161. DOI: 10.1080/15475440903507772.

Musumeci, Diane. 2009. The history of language teaching. In Michael H. Long & Catherine J. Doughty (eds.), *The Handbook of Language Teaching*, 24–62. Chichester, U.K. ; Malden, MA: Wiley-Blackwell.

Muysken, Pieter C. 2000. *Bilingual speech: A typology of code-mixing*. Cambridge: Cambridge University Press.

Myers-Scotton, Carol. 1993. *Duelling languages: Grammatical structure in code-switching*. Oxford: Clarendon Press.

Nation, Paul. 2003. Vocabulary. In David Nunan (ed.), *Practical English language teaching*, 129–152. Columbus: McGraw Hill.

Nation, Paul. 2016. *Making and using word lists for language learning and testing*. Amsterdam: John Benjamins.

Nation, Paul. 2022. *Learning Vocabulary in Another Language*. Cambridge: Cambridge University Press. DOI: 10.1017/9781009093873.

Nation, Paul, Robert Waring & Norbert Schmitt. 1997. Vocabulary size, text coverage and word lists. In Norbert Schmitt & Michael McCarthy (eds.), *Vocabulary: Description, acquisition, and pedagogy*, 6–19. Cambridge: Cambridge University Press.

Nelson, Christina. 2020. The younger, the better? Speech perception development in adolescent vs. adult L3 learners. In *Yearbook of the Poznań linguistic meeting*, vol. 6, 27–58. DOI: 10.2478/yplm-2020-0005.

Nelson, Christina, Iga Krzysik, Halina Lewandowska & Magdalena Wrembel. 2021. Multilingual learners' perceptions of cross-linguistic distances: A proposal for a visual psychotypological measure. *Language Awareness* 30(2). 176–194. DOI: 10.1080/09658416.2021.1897132.

New, Boris & Christophe Pallier. n.d. *Lexique*. http://www.lexique.org/ (20 May, 2026).

Newport, Elissa L. 1990. Maturational constraints on language learning. *Cognitive Science* 14. 11–28.

Newton, Jonathan. 2019. Approaches to learning vocabulary inside the classroom. In Stuart Webb (ed.), *The Routledge Handbook of Vocabulary Studies*. London: Routledge.

Ng, Bee Chin & Gillian Wigglesworth. 2007. *Bilingualism. An advanced resource book*. London: Routledge.

Nichols, Emily S., Conor J. Wild, Bobby Stojanoski, Michael E. Battista & Adrian M. Owen. 2020. Bilingualism affords no general cognitive advantages: A population study of executive function in 11,000 people. *Psychological Science* 31(5). 548–567. DOI: 10.1177/0956797620903113.

Ning, Siqi, Sayuri Hayakawa, James Bartolotti & Viorica Marian. 2020. On language and thought: Bilingual experience influences semantic associations. *Journal of Neurolinguistics* 56. 100932. DOI: 10.1016/j.jneuroling.2020.100932.

Noort, Maurits, Esli Struys, Peggy Bosch, Lars Jaswetz, Benoît Perriard, Sujung Yeo, Pia Barisch, Katrien Vermeire, Sook-Hyun Lee & Sabina Lim. 2019. Does the bilingual advantage in cognitive control exist and if so, what are its modulating factors? A systematic review. *Behavioral Sciences* 9. 27. DOI: 10.3390/bs9030027.

Norris, John M. & Lourdes Ortega. 2000. Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language Learning* 50(3). 417–528.

Northbrook, Julian, David Allen & Kathy Conklin. 2022. 'Did You See That?'—The Role of Repetition and Enhancement on Lexical Bundle Processing in English Learning Materials. *Applied Linguistics* 43(3). 453–472. DOI: 10.1093/applin/amab063.

Nowicki, Stephen & Bonnie R. Strickland. 1973. A locus of control scale for children. *Journal of Consulting and Clinical Psychology* 40(1). 148–154. DOI: 10.1037/h0033978.

Odlin, Terence. 1989. *Language transfer: Cross-linguistic influence in language learning*. Cambridge: Cambridge University Press.

OECD. 2020. *Pisa 2018 results (Volume VI): Are students ready to thrive in an interconnected world?* Paris: OECD Publishing. 330. DOI: 10.1787/d5f68679-en.

Olulade, Olumide A., Nasheed Jamal, Daniel Koo, Charles Perfetti, Carol Lasasso & Guinevere Eden. 2016. Neuroanatomical evidence in support of the bilingual advantage theory. *Cerebral Cortex* 26(7). 3196–3204. DOI: 10.1093/cercor/bhv152.

Ortega, Lourdes. 2009. *Understanding second language acquisition*. London: Hodder Education.

Ortega, Lourdes. 2015. Usage-based SLA: A research habitus whose time has come. In Teresa Cadierno & Søren Wind Eskildsen (eds.), *Usage-based perspectives on second language learning*, 353–374. Berlin: De Gruyter Mouton. DOI: 10.1515/9783110378528-016.

Oschwald, Jessica, Alisa Schättin, Claudia C. von Bastian & Alessandra S. Souza. 2018. Bidialectalism and bilingualism: Exploring the role of language similarity as a link between linguistic ability and executive control. *Frontiers in Psychology* 9. 1997. DOI: 10.3389/fpsyg.2018.01997.

Otwinowska, Agnieszka, Małgorzata Foryś-Nogala, Weronika Kobosko & Jakub Szewczyk. 2020. Learning orthographic cognates and non-cognates in the classroom: Does awareness of cross-linguistic similarity matter? *Language Learning* 70(3). 685–731. DOI: 10.1111/lang.12390.

PA Media. 2023. *Cardiff crash victims had been drinking and inhaling nitrous oxide, court papers show*. The Guardian, 9 August 2023. https://www.theguardian.com/uk-news/2023/aug/09/cardiff-crash-victims-had-been-drinking-and-inhaling-nitrous-oxide-court-papers-show (20 May, 2026).

Paap, Kenneth R. 2019. The bilingual advantage debate: Quantity and quality of the evidence. In *The handbook of the neuroscience of multilingualism*, 701–735. Hoboken: Wiley. DOI: 10.1002/9781119387725.ch34.

Paap, Kenneth R. & Zachary I. Greenberg. 2013. There is no coherent evidence for a bilingual advantage in executive processing. *Cognitive Psychology* 66(2). 232–258. DOI: 10.1016/j.cogpsych.2012.12.002.

Paap, Kenneth R., Hunter A. Johnson & Oliver Sawi. 2015. Bilingual advantages in executive functioning either do not exist or are restricted to very specific and undetermined circumstances. *Cortex* 69. 265–278. DOI: 10.1016/j.cortex.2015.04.014.

Pallotti, Gabriele. 2021. Cratylus' silence: On the philosophy and methodology of complex dynamic systems theory in SLA. *Second Language Research* 38(3). 1–13. DOI: 10.1177/0267658321992451.

Pančíková, Marta & Alexander Horák. 2020. Transfer in related Slavic languages. *Acta Universitatis Lodziensis. Kształcenie Polonistyczne Cudzoziemców* 27. 81–92.

Paradis, Michel. 2009. *Declarative and procedural determinants of second languages*. Amsterdam: John Benjamins.

Parafita Couto, Maria del Carmen, Kate Bellamy & Felix K. Ameka. 2023. Theoretical linguistic approaches to multilingual code-switching. In Adel Chaouch-Orozco, Eloi Puig-Mayenco, Jason Rothman, Jennifer Cabrelli, Jorge González Alonso & Sergio Miguel Pereira Soares (eds.), *The Cambridge handbook of third language acquisition* (Cambridge Handbooks in Language and Linguistics), 403–436. Cambridge: Cambridge University Press. DOI: 10.1017/9781108957823.017.

Parafita Couto, Maria del Carmen & Marianne Gullberg. 2019. Code-switching within the noun phrase: Evidence from three corpora. *International Journal of Bilingualism* 23(2). 695–714. DOI: 10.1177/1367006917729543.

Park-Johnson, Sunny K. 2020. Teachers' attitudes and beliefs about code-mixing by bilingual students. *Educational Studies* 56(2). 125–144. DOI: 10.1080/00131946.2019.1694026.

Parry, Thomas S & Charles W. Stansfield. 1990. *Language aptitude reconsidered*. Englewood, NJ: Prentice Hall Regents.

Pashler, Harold, Mark McDaniel, Doug Rohrer & Robert Bjork. 2008. Learning styles: Concepts and evidence. *Psychological Science in the Public Interest* 9(3). 105–119. DOI: 10.1111/j.1539-6053.2009.01038.x.

Pattemore, Anastasia & Ferran Gesa (eds.). 2025. *Foreign language learning from audiovisual input: The role of original version television*. Cham: Springer.

Pavlenko, Aneta. 2009. *The bilingual mental lexicon: Interdisciplinary approaches*. Bristol: Multilingual Matters.

Pavlenko, Aneta. 2015. *The dark side of the recent polyglot hype*. https://www.psychologytoday.com/intl/blog/life-bilingual/201507/the-dark-side-the-recent-polyglot-hype (16 September, 2018).

Pavlenko, Aneta & Scott Jarvis. 2002. Bidirectional transfer. *Applied Linguistics* 23. 190–214.

Peal, Elizabeth & Wallace Lambert. 1962. The relation of bilingualism to intelligence. *Psychological Monographs: General and Applied 127 (27)* 76(27). 546–580. DOI: 10.1080/00207590143000036.

Perani, Daniela & Jubin Abutalebi. 2015. Bilingualism, dementia, cognitive and neural reserve. *Current Opinion in Neurology* 28(6). 618–625. DOI: 10.1097/WCO.0000000000000267.

Perez, Montero, Elke Peters & Piet Desmet. 2018. Vocabulary learning through viewing video: The effect of two enhancement techniques. *Computer Assisted Language Learning* 31(1-2). 1–26. DOI: 10.1080/09588221.2017.1375960.

Perquin, Magali, Michel Vaillant, Anne-Marie Schuller, Jessica Pastore, Jean-François Dartigues, Marie-Lise Lair & Nico Diederich. 2013. Lifelong exposure to multilingualism: New evidence to support cognitive reserve hypothesis. *PLoS ONE* 8(4). 1–7. DOI: 10.1371/journal.pone.0062030.

Petermann, Franz & Ulrike Petermann. 2007. *Hamburg-Wechsler-Intelligenztest für Kinder – IV. Übersetzung und Adaption des WISC_IV von David Wechsler*. Bern: Huber.

Peters, Elke. 2019. The effect of imagery and on-screen text on foreign language vocabulary learning from audiovisual input. *TESOL Quarterly* 53(4). 1008–1032. DOI: 10.1002/tesq.531.

Peters, Elke, Ann-Sophie Noreillie, Kris Heylen, Bram Bulté & Piet Desmet. 2019. The impact of instruction and out-of-school exposure to foreign language input on learners' vocabulary knowledge in two languages. *Language Learning* 69(3). 747–782. DOI: 10.1111/lang.12351.

Petersen, Calvin R. & Antoine R. Al-Haik. 1976. The development of the defense language aptitude battery (DLAB). *Educational and Psychological Measurement* 36(2). 369–380. DOI: 10.1177/001316447603600216.

Peyer, Elisabeth, Mirjam Andexlinger, Karolina Kofler & Peter Lenz. 2016. *Projekt Fremdsprachenevaluation BKZ. Schlussbericht zu den Sprachkompetenztests*. Tech. rep. Freiburg/Fribourg: Kompetenzzentrum Mehrsprachigkeit.

Peyer, Elisabeth, Gabriela Lüthi & Nadia Ravazzini. 2023. Formative Beurteilung des Sprechens im DaF-Unterricht: Praktiken und Überzeugungen von Lehrpersonen der Sekundarstufe i. *Informationen Deutsch als Fremdsprache* 50(5). 492–504. DOI: 10.1515/infodaf-2023-0082.

Pfau, Roland, Markus Steinbach & Bencie Woll. 2012. *Sign language: An international handbook*. Berlin: De Gruyter Mouton.

Pfenninger, Simone & David Singleton. 2017. *Beyond age effects in instructional L2 learning: Revisiting the age factor*. Bristol: Multilingual Matters.

Pimsleur, Paul. 1966. *Language aptitude battery*. New York: Harcourt Brace.

Pimsleur, Paul, Daniel J. Reed & Charles W. Stansfield. 2004. *Pimsleur language aptitude battery: Manual, 2004 edition*. Princeton: Second Language Testing, Inc.

Pinker, Steven. 1989. *Learnability and cognition: The acquisition of argument structure*. Cambridge, MA: MIT Press.

Pinker, Steven. 1995. *The language instinct*. London: Penguin.

Pizzuto, Elena & Maria Cristina Caselli. 1992. The acquisition of Italian morphology: Implications for models of language development. *Journal of Child Language* 19(3). 491–557.

Plato. 1931. *The dialogues of Plato in 5 volumes. Volume II.* Trans. by Benjamin Jowett. Oxford: Humphrey Milford.

Plomin, Robert. 2019. *Blueprint, with a new afterword: How DNA makes us who we are.* London: Penguin Books.

Poarch, Gregory J., Janet G. Van Hell & Judith F. Kroll. 2015. Accessing word meaning in beginning second language learners: Lexical or conceptual mediation? *Bilingualism: Language and Cognition* 18(3). 357–371. DOI: 10.1017/S1366728914000558.

Poarch, Gregory J. & Janeg G. van Hell. 2012. Executive functions and inhibitory control in multilingual children: Evidence from second-language learners, bilinguals, and trilinguals. *Journal of Experimental Child Psychology* 113(4). 535–551. DOI: 10.1016/j.jecp.2012.06.013.

Poarch, Gregory J., Jan Vanhove & Raphael Berthele. 2018. The effect of bidialectalism on executive function. *International Journal of Bilingualism* 23(2). DOI: 10.1177/1367006918763132.

Poplack, Shana. 1980. Sometimes I'll start a sentence in Spanish y termino en español: Toward a typology of code-switching. 18(7-8). 581–618. DOI: 10.1515/ling.1980.18.7-8.581.

Posner, Roland. 1991. Der polyglotte Dialog. Ein Humanistengespräch über Kommunikation im mehrsprachigen Europa. Aufgezeichnet und ins Hochdeutsche gebracht. *Sprachreport 3*. 6–10.

Pozníček, Yannik. 2023. Lehrmittelwahl im Fach Französisch: Reaktionen von Lehrpersonen und Schulleitungen der Schulkreise 6-13 auf das Wahlobligatorium im Kanton Bern. unpublished term paper, University of Fribourg. Fribourg/Freiburg.

Pressley, Michael, Joel R Levin & Gloria E Miller. 1982. The keyword method compared to alternative vocabulary-learning strategies. *Contemporary Educational Psychology* 7(1). 50–60. DOI: 10.1016/0361-476X(82)90007-8.

Prior, Anat & Tamar H. Gollan. 2011. Good language-switchers are good task-switchers: Evidence from Spanish–English and Mandarin–English bilinguals. *Journal of the International Neuropsychological Society* 17(4). 682–691. DOI: 10.1017/S1355617711000580.

Proctor, C. Patrick, Diane August, Catherine Snow & Christopher D. Barr. 2010. The interdependence continuum: A perspective on the nature of Spanish–English bilingual reading comprehension. *Bilingual Research Journal* 33(1). 5–20. DOI: 10.1080/15235881003733209.

Pujadas, Geòrgia & Carmen Muñoz. 2019. Extensive viewing of captioned and subtitled TV series: A study of L2 vocabulary learning by adolescents. *The Language Learning Journal* 47(4). 479–496. DOI: 10.1080/09571736.2019.1616806.

Pulido, Manuel F. 2024. Optimizing the input for learning of L2-specific constructions: The roles of Zipfian and balanced input, explicit rules and working memory. *Studies in Second Language Acquisition* 46(2). 379–403. DOI: 10.1017/S0272263124000081.

Purpura, David J. 2019. Language clearly matters; methods matter too. *Child Development* 90(6). 1839–1846. DOI: 10.1111/cdev.13327.

Pyers, Jennie E. & Karen Emmorey. 2008. The face of bimodal bilingualism: Grammatical markers in American Sign Language are produced when bilinguals speak to English monolinguals. *Psychological Science* 19(6). 531–535. DOI: 10.1111/j.1467-9280.2008.02119.x.

Qi, Peng, Yuhao Zhang, Yuhui Zhang, Jason Bolton & Christopher D. Manning. 2020. Stanza: A Python natural language processing toolkit for many human languages. In *Proceedings of the 58th annual meeting of the association for computational linguistics: System demonstrations*, 101–108. DOI: 10.18653/v1/2020.acl-demos.14.

Raj, Stuart Jay. 2007. *Part 2 – Stuart Jay Raj – multilingual interpreting*. YouTube video, uploaded 1 March 2007. https://www.youtube.com/watch?v=sd1nNTyNAhw (20 May, 2026).

Rampinini, Alessandra, Irene Balboni, Narly Golestani & Raphael Berthele. 2024. A behavioural exploration of language aptitude and experience, cognition and more using graph analysis. *Brain Research* 1842. 1–23. DOI: 10.1016/j.brainres.2024.149109.

Rampton, Ben. 1995. *Crossing: Language and ethnicity among adolescents*. London, New York: Longman.

Reinders, Hayo & Rod Ellis. 2009. The effects of two types of input on intake and the acquisition of implicit and explicit knowledge. In Rod Ellis, Shawn Loewen, Catherine Elder, Rosemary Erlam, Jenefer Philp & Hayo Reinders (eds.), *Implicit and Explicit Knowledge in Second Language Learning, Testing and Teaching*, 263–281. Bristol: Multilingual Matters. DOI: 10.21832/9781847691767-014.

Reiser, Elisabeth & Raphael Berthele. 2023. Trilingual children's narratives: A longitudinal study of lexical development. *International Journal of Multilingualism* 21(4). 2182–2197. DOI: 10.1080/14790718.2023.2232394.

Ricciardelli, Lina A. 1992. Creativity and bilingualism. *Journal of Creative Behavior* 26(4). 242–254.

Riener, Cedar & Daniel Willingham. 2010. The myth of learning styles. *Change: The Magazine of Higher Learning* 42(5). 32–35. DOI: 10.1080/00091383.2010.503139.

Rimfeld, Kaili, Philip S. Dale & Richard Plomin. 2015. How specific is second language-learning ability? A twin study exploring the contributions of first language achievement and intelligence to second language achievement. *Translational Psychiatry* 5. e638.

Ritchie, Stuart. 2020. *Science fictions: How fraud, bias, negligence, and hype undermine the search for truth*. New York: Metropolitan Books.

Robinson, Peter. 1995. Attention, memory, and the "noticing" hypothesis. *Language Learning* 45(2). 283–331. DOI: 10.1111/j.1467-1770.1995.tb00441.x.

Robinson, Peter. 2002. *Individual differences and instructed language learning*. Amsterdam: John Benjamins.

Roehr-Brackin, Karen. 2024. Explicit and implicit knowledge and learning of an additional language: A research agenda. *Language Teaching* 57(1). 68–86. DOI: 10.1017/S026144482200026X.

Rosch, Eleanor H. 1973. Natural categories. *Cognitive Psychology* 4(3). 328–350. DOI: 10.1016/0010-0285(73)90017-0.

Rothman, Jason. 2010. L3 syntactic transfer selectivity and typological determinacy: The typological primacy model. *Second Language Research* 27(1). 107–127. DOI: 10.1177/0267658310386439.

Rothman, Jason, Michael Iverson & Tiffany Judy. 2011. Introduction: Some notes on the generative study of L3 acquisition. *Second Language Research* 27(1). 5–19. DOI: 10.1177/0267658310386443.

Rousse-Malpat, Audrey, Rasmus Steinkrauss, Martijn Wieling & Marjolijn Verspoor. 2022. Communicative language teaching: Structure-based or dynamic usage-based? *Journal of the European Second Language Association* 6(1). 20–33. DOI: 10.22599/jesla.86.

Roussel, Stéphanie, Danielle Joulia, André Tricot & John Sweller. 2017. Learning subject content through a foreign language should not ignore human cognitive architecture: A cognitive load theory approach. *Learning and Instruction* 52. 69–79. DOI: 10.1016/j.learninstruc.2017.04.007.

Ruck, Julia. 2020. The politics and ideologies of pluricentric German in L2 teaching. *Critical Multilingualism Studies* 8(1). 17–50.

Rumlich, Dominik. 2017. CLIL theory and empirical reality – two sides of the same coin?: A quantitative-longitudinal evaluation of general EFL proficiency and affective-motivational dispositions in CLIL students at German secondary schools. *Journal of Immersion and Content-Based Language Education* 5(1). 110–134. DOI: 10.1075/jicb.5.1.05rum.

Ruoss, Emanuel & Juliane Schröter. 2020. *Schweizerdeutsch: Sprache und Identität von 1800 bis heute*. Basel: Schwabe.

Saer, David J. 1923. An inquiry into the effect of bilingualism upon the intelligence of young children. *Journal of Experimental Psychology* 6. 232-240 and 266–274.

Sánchez, Laura. 2020. Multilingualism from a language acquisition perspective. In Camilla Bardel & Laura Sánchez (eds.), *Third language acquisition* (EuroSLA Studies), 15–41. Berlin: Language Science Press.

Sanders, Marianne & Guust Meijers. 1995. English as L3 in the elementary school. *ITL Review of Applied Linguistics* 107. 59–78.

Schendl, Herbert. 2012. Literacy, multilingualism and code-switching in early English written texts. In *Language mixing and code-switching in writing : Approaches to mixed-language written discourse*. Mark Sebba, Shahrzad Mahootian & Carla Jonsson (eds.). London: Routledge. 27–43.

Schepens, Job. 2014. *Bridging linguistic gaps: The effects of linguistic distance on the adult learnability of Dutch as an additional language*. Utrecht: Utrecht University. (Doctoral dissertation). https://hdl.handle.net/2066/140015.

Schepens, Job, Roeland van Hout & T. Florian Jaeger. 2020. Big data suggest strong constraints of linguistic similarity on adult language learning. *Cognition* 194. 104056. DOI: 10.1016/j.cognition.2019.104056.

Schlatter Gappisch, Katja. 2022. *Korrektives Feedback im DaZ-Unterricht. Eine empirische Untersuchung zur Gestaltung mündlicher Reparaturen sowie deren Rezeption durch Schüler:innen der 2. und 3. Primarklasse*. Freiburg/Fribourg: Universität Freiburg/Fribourg. (Doctoral dissertation). DOI: 10.51363/unifr.lth.2022.012. https://folia.unifr.ch/global/documents/322892 (18 August, 2025).

Schmid, Helmut. 1995. Improvements in part-of-speech tagging with an application to German. In *Proceedings of the ACL SIGDAT-Workshop*. Dublin, Ireland.

Schmid, Helmut. n.d. *TreeTagger: a part-of-speech tagger for many languages*. https://cis.uni-muenchen.de/~schmid/tools/TreeTagger/ (20 May, 2026).

Schmid, Stephan. 2010. Segmental features of Swiss German ethnolects. In *Proceedings of the Workshop Sociophonetics, at the crossroads of speech variation, processing and communication*, 69–72. Pisa: Edizioni della normale. DOI: 10.5167/uzh-60156.

Schmidt, Richard. 2012. Attention, awareness, and individual differences in language learning. In Wai Meng Chan, Kwee Nyet Chin, Sunil Bhatt & Izumi Walker (eds.), *Perspectives on Individual Characteristics and Foreign Language Education*, 27–50. Berlin: De Gruyter Mouton.

Schmitt, Norbert. 2008. Review article: Instructed second language vocabulary learning. *Language Teaching Research 12/3* 12(3). 329–363. DOI: 10.1177/1362168808089921.

Schwarz, Albert. 1976. *Deutsche Sprachlehre*. Zürich: Lehrmittelverlag des Kantons Zürich.

Sebba, Mark, Shahrzad Mahootian & Carla Jonsson. 2012. *Language mixing and code-switching in writing : Approaches to mixed-language written discourse*. London: Routledge.

Selinker, Larry. 1972. Interlanguage. *International Review of Applied Linguistics* 10. 209–231.

Shuy, Roger. 1978. Problems in assessing language ability in bilingual education programs. In Hernan Lafontaine, Barry Persky & Leonard H. Golubchick (eds.), *Bilingual education*, 376–381. Wayne NJ: Avery.

Siegel, Jeff. 2010. *Second dialect acquisition*. Cambridge: Cambridge University Press. DOI: 10.1017/CBO9780511777820.

Siegler, Jo. 2015. *Frühenglisch: Es bringt nichts*. Einstein Online. Schweizer Radio und Fernsehen (SRF), 2 July 2015. https://www.srf.ch/sendungen/einstein/einstein/fruehenglisch-es-bringt-nichts (20 May, 2026).

Siemund, Peter. 2023. *Multilingual development*. Cambridge University Press.

Silva, Breno B., Katarzyna Kutyłowska & Agnieszka Otwinowska. 2024. Learning academic words through writing sentences and compositions: Any signs of an increase in cognitive load? *Language Teaching Research* 28(3). 1143–1175. DOI: 10.1177/13621688211020421.

Silva-Corvalán, Carmen. 2014. *Bilingual language acquisition: Spanish and English in the first six years*. Cambridge: Cambridge University Press.

Sinclair, Stéfan & Geoffrey Rockwell. 2016. *Voyant Tools*. https://voyant-tools.org/ (20 May, 2026).

Singh, Lisa & Daniel Elmiger. 2017. *Externe Evaluierung der Pilotphase des Französisch und Englischunterrichts nach Passepartout*. Tech. rep. Neuchâtel: IRDP.

Singleton, David & Lisa Ryan. 2004. *Language acquisition: The age factor*. Clevedon: Multilingual Matters.

Skehan, Peter. 2002. Theorising and updating aptitude. In Peter Robinson (ed.), *Individual differences and instructed language learning*, 69–93. Amsterdam: John Benjamins.

Skehan, Peter. 2019. Language aptitude implicates language and cognitive skills. In Peter Skehan, Andriana Biedron, Shaofeng Li & Richard L. Sparks (eds.), *Rethinking language aptitude: Contemporary insights and emerging trends* (SLA Research Series), 56. London: Routledge.

Slabakova, Roumyana. 2017. The scalpel model of third language acquisition. *International Journal of Bilingualism* 21(6). 651–665. DOI: 10.1177/1367006916655413.

Slobin, Dan I. 1985. *The crosslinguistic study of language acquisition. Vol. 1: The data, Vol. 2: Theoretical issues*. Hillsdale NJ: Lawrence Erlbaum.

Smith, Neil, Ianthi Tsimpli, Gary Morgan & Bencie Woll. 2010. *The signs of a savant: Language against the odds*. Cambridge: Cambridge University Press.

Snedeker, Jesse, Joy Geren & Claire Shafto. 2007. Starting over. International adoption as a natural experiment in language development. *Psychological Science* 18(1). 79–87.

Sparks, Richard L. & Leonore Ganschow. 2001. Aptitude for learning a foreign language. *Annual Review of Applied Linguistics* 21. 90–111.

Sparks, Richard L., Leonore Ganschow & Jane Pohlman. 1989. Linguistic coding deficits in foreign language learners. *Annals of Dyslexia* 39(1). 177–195.

Sparks, Richard L., Nancy Humbach, Jon Patton & Leonore Ganschow. 2011. Subcomponents of second-language aptitude and second-language proficiency. *The Modern Language Journal* 95(2). 253–273. DOI: 10.1111/j.1540-4781.2011.01176.x.

Sparks, Richard L., Jon Patton, Leonore Ganschow, Nancy Humbach & James Javorsky. 2006. Native language predictors of foreign language proficiency and foreign language aptitude. *Annals of dyslexia* 56(1). 129–60.

Sperry, Douglas E., Linda L. Sperry & Peggy J. Miller. 2019. Reexamining the verbal environments of children from different socioeconomic backgrounds. *Child Development* 90(4). 1303–1318. DOI: 10.1111/cdev.13072.

Spolsky, Bernard. 1995. Prognostication and language aptitude testing, 1925-62. *Language Testing* 12(3). 321–340. DOI: 10.1177/026553229501200304.

Stanat, Petra, Katrin Böhme, S. Schipolowski & Nicole Haag. 2016. *IQB-Bildungstrend 2015. Sprachliche Kompetenzen am Ende der 9. Jahrgangsstufe im zweiten Ländervergeich*. Münster: Waxmann.

Stankovic, Michelle, Britta Biedermann & Takeshi Hamamura. 2022. Not all bilinguals are the same: A meta-analysis of the moral foreign language effect. *Brain and Language* 227. 105082. DOI: 10.1016/j.bandl.2022.105082.

Stanovich, Keith E. 2000. *Progress in understanding reading: Scientific foundations and new frontiers*. New York: Guilford Press.

Stavans, Anat & Virginia Swisher. 2006. Language switching as a window on trilingual acquisition. *International Journal of Multilingualism* 3(3). 193–220. DOI: 10.2167/ijm020.0.

Stocker, Ladina & Raphael Berthele. 2020. The roles of Language mode and dominance in French–German bilinguals' motion event descriptions. *Bilingualism: Language and Cognition* 23(3). 1–13. DOI: 10.1017/S1366728919000294. https://www.cambridge.org/core/journals/bilingualism-language-and-cognition/article/roles-of-language-mode-and-dominance-in-frenchgerman-bilinguals-motion-event-descriptions/3E61E4BB2CB741D0BC4BD7D8540817E8 (28 May, 2019).

Stork, Antje. 2003. *Vokabellernen. Eine Untersuchung zur Effizienz von Vokabellernstrategien*. Tübingen: Narr.

Stromswold, Karin. 2001. The heritability of language: A review and metaanalysis of twin, adoption, and linkage studies. *Language* 77(4). 647–723. DOI: 10.1353/lan.2001.0247.

Struys, Esli, Wouter Duyck & Evy Woumans. 2018. The role of cognitive development and strategic task tendencies in the bilingual advantage controversy. *Frontiers in Psychology* 9. 1–11.

Sun, He, Siew Chin Ng, Beth Ann O'brien & Tom Fritzsche. 2020. Child, family, and school factors in bilingual preschoolers' vocabulary development in heritage languages. *Journal of Child Language* 47(4). 817–843. DOI: 10.1017/S0305000919000904.

Sundqvist, Pia. 2009. *Extramural English matters: Out-of-school English and its impact on Swedish ninth graders' oral proficiency and vocabulary*. Karlstad University. (Doctoral dissertation).

Suter, Lea, Raphael Berthele & Anita Thomas. 2024. L'apprentissage du vocabulaire en français L2 avec Netflix : Effet des activités de pré-/post-visionnage. *Journal of French Language Studies* 34(2). 227–248. DOI: 10.1017/S0959269523000273.

Suzuki, Yuichi & Robert M. DeKeyser. 2017. The interface of explicit and implicit knowledge in a second language: Insights from individual differences in cognitive aptitudes. *Language Learning* 67(4). 747–790. DOI: 10.1111/lang.12241.

Sylvén, Liss K. & Pia Sundqvist. 2012. Gaming as extramural English L2 learning and L2 proficiency among young learners. *ReCALL* 24(3). 302–321.

Szagun, Gisela. 2006. *Sprachentwicklung beim Kind. Vollständig überarbeitete Neuausgabe.* Weinheim: Belz.

Tabouret-Keller, Andrée. 2011. *Le bilinguisme en procès, cent ans d'errance*. Limoges: Editions Lambert-Lucas.

Takakuwa, Mitsunori. 2005. Lessons from a paradoxical hypothesis: A methodological critique of the threshold hypothesis. In James Cohen, Kara T. McAlister, Kellie Rolstad & Jeff MacSwan (eds.), *ISB4: Proceedings from the 4th International Symposium on Bilingualism*, 2222–2232. Somerville, MA: Cascadilla.

Tare, Medha & Jared A. Linck. 2011. Exploring bilingual cognitive advantages when controlling for background variables. *52nd Annual meeting of the Psychonomic Society, Seattle, WA*.

Tarone, Elaine & Martha Bigelow. 2005. Impact of literacy on oral language processing: Implications for second language research. *Annual Review of Applied Linguistics* 25. 77–97. DOI: 10.1017/S0267190505000048.

Thomas, Jacqueline. 1988. The role played by metalinguistic awareness in second and third language learning. *Journal of Multilingual and Multicultural Development* 9(3). 235–246. DOI: 10.1080/01434632.1988.9994334.

Thomas, Jacqueline. 1992. Metalinguistic awareness in second- and third-language learning. In Richard Jackson Harris (ed.), *Advances in psychology*, vol. 83, 531–545. Amsterdam: North-Holland.

Thomas, Samuel E. 1881. *Celebrities of the day, British and foreign*. London: W. Poole.

Thomason, Sarah. 2020. Contact explanations in linguistics. In *The handbook of language contact*, 31–49. Hoboken: Wiley. DOI: 10.1002/9781119485094.ch1.

Thomason, Sarah G. 2001. *Language contact*. Edinburgh: Edinburgh University press.

Thorndike, Edward L. & Robert S. Woodworth. 1901. The influence of improvement in one mental function upon the efficiency of other functions: III. functions involving attention, observation and discrimination. *Psychological Review* 8(6). 553–564.

Tomasello, Michael. 2000. The item-based nature of children's early syntactic development. *Trends in Cognitive Sciences* 4(4). 156–163.

Tomasello, Michael. 2005. *Constructing a language: A usage-based theory of language acquisition*. Cambridge, Mass.: Harvard University Press.

Tomasello, Michael & Patricia Brooks. 1999. Early syntactic development. A Construction Grammar approach. In Martyn D. Barrett (ed.), *The development of language*, 161–190. Hove: Psychology Press.

Toribio, Almeida J. 2004. Convergence as an optimization strategy in bilingual speech: Evidence from code-switching. *Bilingualism: Language and Cognition* 7(2). 165–173. DOI: 10.1017/S1366728904001476.

Treffers-Daller, Jeanine. 2024. Translanguaging: What is it besides smoke and mirrors? *Linguistic Approaches to Bilingualism* 15(1). 1–26. DOI: 10.1075/lab.24015.tre.

Treffers-Daller, Jeanine, Patrick Parslow & Shirley Williams. 2018. Back to basics: How measures of lexical diversity can help discriminate between CEFR levels. *Applied Linguistics* 39(3). 302–327. DOI: 10.1093/applin/amw009.

Trentman, Emma & Sonia Shiri. 2020. The mutual intelligibility of Arabic Dialects: Implications for the language classroom. *Critical Multilingualism Studies* 8(1). 104–134.

Udry, Isabelle. 2018. *Mehrsprachigkeit und kreative Kognition: divergentes und konvergentes Denken bei mehrsprachigen und monolingualen Primarschulkindern*. Fribourg/Freiburg, Schweiz: Université de Fribourg/Universität Freiburg. (MA Thesis).

Udry, Isabelle & Raphael Berthele. 2021. The smart, the motivated and the self-confident: The role of language aptitude, cognition, and affective variables in early instructed foreign language learning. In Raphael Berthele & Isabelle Udry (eds.), *Individual differences in early instructed language learning: The role of language aptitude, cognition, and motivation* (EuroSla Studies Series), 71–90. Berlin: Language Science Press.

Udry, Isabelle & Raphael Berthele. 2025. Language aptitude and affective dispositions in young EFL learners with special educational needs. In María del Pilar García Mayo (ed.), *Investigating attention to form and individual differences: Research with EFL children*, 260–290. Berlin: Springer Nature.

Udry, Isabelle, Raphael Berthele & Carina Steiner. 2021. Language aptitude at primary school (LAPS): Theoretical framework of the project. In Raphael Berthele & Isabelle Udry (eds.), *Individual differences in early instructed language learning: The role of language aptitude, cognition, and motivation* (EuroSla Studies Series), 1–50. Berlin: Language Science Press.

Udry, Isabelle, Wioletta Kucharska & Raphael Berthele. 2022. *Digital Learning: Digital technology and vocabulary learning*. Project website, Institute of Multilingualism, University of Fribourg. https://digitalvocabulary.wordpress.com/ (20 May, 2026).

Uhl, Patricia, Anja K. Steinlen & Thorsten Piske. 2023. Elementary school first graders' acquisition of productive L2 French grammar in regular and CLIL programs. *Languages* 8(2). 138. DOI: 10.3390/languages8020138.

Ullman, Michael T. 2025. The Declarative/Procedural Model: A neurobiologically motivated theory of first and second language. In Bill VanPatten, Gregory D. Keating & Stefanie Wulff (eds.), *Theories in second language acquisition: An introduction*, Fourth edition. (Second Language Acquisition Research Series), 121–156. New York: Routledge.

Unuabonah, Foluke Olayinka & Rotimi O. Oladipupo. 2018. "You're not staying in Island sha o": *O, sha* and *abi* as pragmatic markers in Nigerian English. *Journal of Pragmatics* 135. 8–23. DOI: 10.1016/j.pragma.2018.07.007.

Urban, Klaus K. 2005. Assessing creativity: The Test for Creative Thinking–Drawing Production (TCT-DP). *International Education Journal* 6(2). 272–280.

Valdés Kroff, Jorge, Souad Kheder, Aleksandra Tomić & Edith Kaan. 2023. Psycholinguistics of multilingual code-switching. In Adel Chaouch-Orozco, Eloi Puig-Mayenco, Jason Rothman, Jennifer Cabrelli, Jorge González Alonso & Sergio Miguel Pereira Soares (eds.), *The Cambridge handbook of third language acquisition* (Cambridge Handbooks in Language and Linguistics), 437–465. Cambridge: Cambridge University Press. DOI: 10.1017/9781108957823.018.

Valian, Virginia. 2015. Bilingualism and cognition. *Bilingualism: Language and Cognition* 18(1). 3–24. DOI: 10.1017/S1366728914000522.

van den Avenne, Cécile. 2013. Écrits plurilingues. In Jacky Simonin & Sylvie Wharton (eds.), *Sociolinguistique du contact: Dictionnaire des termes et concepts*, 245–262. Lyon: ENS Éditions.

van den Noort, Maurits, Esli Struys, Peggy Bosch, Lars Jaswetz, Benoît Perriard, Sujung Yeo, Pia Barisch, Katrien Vermeire, Sook-Hyun Lee & Sabina Lim. 2019. Does the bilingual advantage in cognitive control exist and if so, what are its modulating factors? A systematic review. *Behavioral Sciences* 9(3). 27. DOI: 10.3390/bs9030027.

van der Slik, Frans, Job Schepens, Theo Bongaerts & Roeland van Hout. 2022. Critical period claim revisited: Reanalysis of Hartshorne, Tenenbaum, and Pinker (2018) suggests steady decline and learner-type differences. *Language Learning* 72(1). 87–112. DOI: 10.1111/lang.12470.

van der Slik, Frans, Roeland van Hout & Job Schepens. 2017. The role of morphological complexity in predicting the learnability of an additional language: The case of La (additional language) Dutch. *Second Language Research* 35(1). 47–70. DOI: 10.1177/0267658317691322.

van Dijk, Chantal, Elise van Wonderen, Elly Koutamanis, Gerrit J. Kootstra, Ton Dijkstra & Sharon Unsworth. 2022. Cross-linguistic influence in simultaneous and early sequential bilingual children: A meta-analysis. *Journal of Child Language* 49(5). 897–929.

van Heuven, Walter J. B., Pawel Mandera, Emmanuel Keuleers & Marc Brysbaert. 2014. Subtlex-uk: A new and improved word frequency database for British English. *Quarterly Journal of Experimental Psychology* 67(6). 1176–1190. DOI: 10.1080/17470218.2013.850521.

van Patten, Bill. 2002. Processing instruction: An update. *Language Learning* 52(4). 755–803.

Vandeloise, Claude. 1986. *L'espace en français*. Paris: Seuil.

Vangsnes, Øystein A., Göran B. W. Söderlund & Morten Blekesaune. 2017. The effect of bidialectal literacy on school achievement. *International Journal of Bilingual Education and Bilingualism* 20(3). 346–361. DOI: 10.1080/13670050.2015.1051507.

Vanhove, Jan. 2014. *Receptive multilingualism across the lifespan: Cognitive and linguistic factors in cognate guessing*. Fribourg/Freiburg: University of Fribourg. (Doctoral dissertation).

Vanhove, Jan. 2016. *What Data Patterns Can Lie behind a Correlation Coefficient? – Jan Vanhove*. https://janhove.github.io/posts/2016-11-21-what-correlations-look-like/ (18 May, 2026).

Vanhove, Jan. 2026. Does multilingualism really protect against accelerated ageing? Critical comments on Amoruso et al. (2025). *Journal of Multilingual and Multicultural Development* 0(0). 1–10. DOI: 10.1080/01434632.2026.2626158.

Vanhove, Jan & Raphael Berthele. 2013. Factoren bij het herkennen van cognaten in onbekende talen: Algemeen of taalspecifiek? *Taal en Tongval* 65. 171–210.

Vanhove, Jan & Raphael Berthele. 2015a. Item-related determinants of cognate guessing in multilinguals. In Gessica de Angelis, Ulrike Jessner & Marijana Kresić (eds.), *Crosslinguistic influence and crosslinguistic interaction in multilingual language learning*, 95–118. New York: Bloomsbury Academic.

Vanhove, Jan & Raphael Berthele. 2015b. The lifespan development of cognate guessing skills in an unknown related language. *International Review of Applied Linguistics in Language Teaching* 53(1). 1–38. DOI: 10.1515/iral-2015-0001.

Vanhove, Jan, Audrey Bonvin, Amelia Lambelet & Raphael Berthele. 2019. Predicting human lexical richness ratings of short French, German, and Portuguese texts using text-based indices. *Journal of Writing Research* 10(3). 499–525. DOI: 10.17239/jowr-2019.10.03.04.

Vega-Mendoza, Mariana, Holly West, Antonella Sorace & Thomas H. Bak. 2015. The impact of late, non-balanced bilingualism on cognitive performance. *Cognition* 137. 40–46. DOI: 10.1016/j.cognition.2014.12.008.

Vilkaitė-Lozdienė, Laura & Norbert Schmitt. 2019. Frequency as a guide for vocabulary usefulness: High-, mid-, and low-frequency words. In Stuart Webb (ed.), *The Routledge Handbook of Vocabulary Studies*, 81–96. London: Routledge.

Villameriel, Saúl, Brendan Costello, Marcel Giezen & Manuel Carreiras. 2022. Cross-modal and cross-language activation in bilinguals reveals lexical competition even when words or signs are unheard or unseen. *Proceedings of the National Academy of Sciences* 119(36). DOI: 10.1073/pnas.2203906119.

Volterra, Virginia & Traute Taeschner. 1978. The acquisition and development of language by bilingual children. *Journal of Child Language* 5. 311–326.

Wandruszka, Mario. 1975. Mehrsprachigkeit. In *Sprachwissenschaft und Sprachdidaktik. Jahrbuch 1974 des Instituts für deutsche Sprache*, 321–350. Düsseldorf: Schwann.

Ware, Anna T., Melissa Kirkovski & Jarrad A. G. Lum. 2020. Meta-analysis reveals a bilingual advantage that is dependent on task and age. *Frontiers in Psychology* 11. 1458. DOI: 10.3389/fpsyg.2020.01458.

Wattendorf, Elise, Birgit Westermann, Daniela Zappatore, Rita Franceschini, Georges Lüdi, Ernst-Wilhelm Radü & Cordula Nitsch. 2001. Different languages activate different subfields in Broca area. *NeuroImage* 13(6). 624. DOI: 10.1016/S1053-8119(01)91967-6.

Webb, Stuart. 2021. The lemma dilemma: How should words be operationalized in research and pedagogy? *Studies in Second Language Acquisition* 43(5). 941–949. DOI: 10.1017/S0272263121000784.

Webb, Stuart, Ana Pellicer-Sánchez & Andi Wang. 2025. Lexical coverage and reading comprehension revisited. *Reading in a Foreign Language* 37(1). 1–21.

Webb, Stuart, Akifumi Yanagisawa & Takumi Uchihara. 2020. How effective are intentional vocabulary-learning activities? A meta-analysis. *The Modern Language Journal* 104(4). 715–738. DOI: 10.1111/modl.12671.

Wegera, Klaus-Peter. 1977. *Kontrastive Grammatik: Osthessisch-Standardsprache : Eine Untersuchung zu mundartbedingten Sprachschwierigkeiten von Schülern am Beispiel des "Fuldaer Landes"* (Deutsche Dialektographie Bd 103). Marburg: N.G. Elwert.

Weinreich, Max. 1945. Der Yiṿo un di problemen fun undzer tsayṭ. A rede gehalṭn oyf der efenung-zitsung fun der nayntsnṭer yoriḳer ḳonferents fun yiṿo. *Yiṿobleter* 25(1). 3–18.

Weinreich, Uriel. 1953. *Languages in contact. findings and problems*. The Hague: Mouton.

Weisgerber, Leo. 1966. Vorteile und Gefahren der Zweisprachigkeit. *Wirkendes Wort* 16(2). 273–289.

Weiss, Rudolf H. 2006. *CFT 20-R mit WS/ZF-R - Grundintelligenztest Skala 2*. Hogrefe. Bern: Hogrefe Verlagsgruppe Göttingen.

Wen, Zhisheng E., Adriana Biedroń & Peter Skehan. 2017. Foreign language aptitude theory: Yesterday, today and tomorrow. *Language Teaching* 50(1). 1–31. DOI: 10.1017/S0261444816000276.

Wenk, Anne Kathrin, Nicole Marx, Lars Rüssmann & Torsten Steinhoff. 2016. Förderung bilingualer Schreibfähigkeiten am Beispiel Deutsch-Türkisch. *Zeitschrift für Fremdsprachenforschung* 27(2). 151–179.

Wesche, Marjorie B. 1981. Language aptitude measures in streaming, matching students with methods, and diagnosis of learning problems. In Karl C. Diller (ed.), *Individual differences and universals in language learning aptitude*, 119–154. Rowley: Newbury House.

Wesche, Marjorie B. & T. Sima Paribakht. 1996. Assessing second language vocabulary knowledge: Depth versus breath. *Canadian Modern Language Review* 53. 13–40.

Westergaard, Marit, Natalia Mitrofanova, Roksolana Mykhaylyk & Yulia Rodina. 2017. Crosslinguistic influence in the acquisition of a third language: The linguistic proximity model. *International Journal of Bilingualism* 21(6). 666–682. DOI: 10.1177/1367006916648859.

Weth, Constanze. 2008. *Mehrsprachige Schriftpraktiken in Frankreich: Eine ethnographische und linguistische Untersuchung zum Umgang mehrsprachiger Grundschüler mit Schrift …* Stuttgart: ibidem-Verlag. 348 pp.

Weth, Constanze. 2009. Die Komplexität von Schriftsprache: Schul- und Familiensprachen marokkanischer Kinder in Frankreich. In Karen Schramm & Christoph Schröder (eds.), *Empirische Zugänge zu Spracherwerb und Sprachförderung in Deutsch als Zweitsprache.* 221–238. Münster: Waxmann.

White, Lydia. 2003. On the nature of interlanguage representation. In Catherine J. Doughty & Michael H. Long (eds.), *The handbook of second language acquisition*, 18–42. Malden: Blackwell Publishing.

Wichmann, Søren, Cecil H. Brown & Eric W. Holman (eds.). 2016. *The ASJP database.* Jena: Max Planck Institute for the Science of Human History.

Wijffels, Jan. 2018. *UDPIPE tokenization, parts of speech tagging, lemmatization and dependency parsing with the 'UDPIPE' 'NLP' toolkit.* https://CRAN.R-project.org/package=udpipe.

Wikipedia. 2026. *List of Dictionaries by Number of Words.* https://en.wikipedia.org/w/index.php?title=List_of_dictionaries_by_number_of_words&oldid=1354094286 (20 May, 2026).

Williams, John & Patrick Rebuschat. 2023. *Implicit learning and second language acquisition.* 1st edition. London: Routledge.

Williams, Sarah & Björn Hammarberg. 1998. Language switches in L3 production: Implications for a polyglot speaking model. *Applied Linguistics* 19(3). 295–333.

Willingham, Daniel T. 2009. *Why don't students like school?: A cognitive scientist answers questions about how the mind works and what it means for the classroom.* Hoboken: Wiley.

Willingham, Daniel T. 2012. *When can you trust the experts? How to tell good science from bad in education.* Hoboken: Wiley.

Willingham, Daniel T. 2018. *The "debunking" of hart & risley and how we use science.* http://www.danielwillingham.com/1/post/2018/06/the-debunking-of-hart-risley-and-how-we-use-science.html. (15 October, 2018).

Witkin, Herman A., Philip K. Oltman, Evelyn Raskin, Stephen A. Karp & Jack Demick. 2014. *Group embedded figures test (geft) manual.*

Wood, David. 2019. Classifying and identifying formulaic language. In Stuart Webb (ed.), *The Routledge Handbook of Vocabulary Studies*, 30–45. London: Routledge.

Wray, Alison & George W. Grace. 2007. The consequences of talking to strangers: Evolutionary corollaries of socio-cultural influences on linguistic form. *Lingua* 117(3). 543–578. DOI: 10.1016/j.lingua.2005.05.005.

Wray, Alison & Michael R. Perkins. 2000. The functions of formulaic language: An integrated model. *Language & Communication* 20(1). 1–28. DOI: 10.1016/S0271-5309(99)00015-4.

Wrembel, Magdalena. 2015. *In search of a new perspective: Cross-linguistic influence in the acquisition of third language phonology*. Poznań: Wydawnictwo Naukowe UAM.

Wulff, Stefanie & Nick C. Ellis. 2018. Usage-based approaches to second language acquisition. In David Miller, Fatih Bayram, Jason Rothman & Ludovica Serratrice (eds.), *Bilingual cognition and language: The state of the science across its subfields*, 37–56. Amsterdam: John Benjamins.

Wulff, Stefanie, Nick C. Ellis & Jason Rothman. 2026. Dichotomies as points of departure: A response to Truscott and Sharwood Smith (2024). *Second Language Research* 42(1). 165–174. DOI: 10.1177/02676583251389445.

Wyss, Dominik, Simon Beste & André Bächtiger. 2015. A decline in the quality of debate? The evolution of cognitive complexity in Swiss parliamentary debates on immigration (1968–2014). *Swiss Political Science Review* 21(4). 636–653. DOI: 10.1111/spsr.12179.

Yanagisawa, Akifumi & Stuart Webb. 2022. Involvement load hypothesis plus: Creating an improved predictive model of incidental vocabulary learning. *Studies in Second Language Acquisition* 44(5). 1279–1308. DOI: 10.1017/S0272263121000577.

Yelland, Gregory W., Jacinta Pollard & Anthony Mercuri. 1993. The metalinguistic benefits of limited contact with a second language. *Applied Psycholinguistics* 14. 423–444.

Zehetner, Ludwig G. 1977. *Bairisch. Dialekt/Hochsprache kontrastiv. Sprachhefte für den Deutschunterricht*. Düsseldorf: Schwann.

Zimmermann, Kerstin. 2012. Sprachlerneignung–eine Perspektive für den Fremdsprachenunterricht? In Evelyn Röttger & Kerstin Zimmermann (eds.), *Entwicklungstendenzen in Deutsch als Fremd- und Zweitsprache. Zweitspracherwerb und Unterricht–Lehrwerke–Projekte*, 33–52. Frankfurt am Main: Peter Lang.

Zobl, Helmut. 1992. Prior linguistic knowledge and the conservation of the learning procedure: Grammaticality judgments of unilingual and multilingual learners. In Susan M. Gass & Larry Selinker (eds.), *Language transfer in language learning*, 176–196. Rowley: Newbury House. DOI: 10.1075/lald.5.12zob.

Zumbach, David & Benjamin Gföhler. 2026. *Swissparl: Interface to Swiss Parliament Web Services and the 'OpenParlData' API*. Version 0.3.0. https://cran.r-project.org/web/packages/swissparl/index.html (18 May, 2026).

Zúñiga, Fernando. 2019. Polysynthesis: A review. *Language and Linguistics Compass* 13(4). e12326. DOI: 10.1111/lnc3.12326.

Name index

Abrahamsson, Niclas, 68
Abutalebi, Jubin, 271, 273
Acenas, Lori-Ann R., 281
Adesope, Olusola O., 273
Adger, David, 62
Adichie, Chimamanda Ngozi, 116
Aitchison, Jean, 129
Al-Haik, Antoine R., 247
Alderson, J. Charles, 135
Allgäuer-Hackl, Elisabeth, 286
Allport, Alan, 121
Ameel, Eef, 29
Ammon, Ulrich, 266
Amoruso, Lucia, 271
Amunts, Katrin, 10
Andringa, Sible, 17, 47, 50–52
Anthropic, 6
Antón, Eneko, 274
Antoniou, Kyriakos, 273
Antoniou, Mark, 287
Auer, Peter, 112, 115

Bachmann, Thomas, 212
Backus, Ad, 112
Bak, Thomas H., 273
Baker, Colin, 224
Bakker, Dik, 207
Balke-Aurell, Gudrun, 285
Ball, Cathy, 137
Bandia, Paul, 116
Barbour, Stephen, 211
Barcroft, Joe, 199
Bardel, Camilla, 69
Barras, Malgorzata, 232
Bates, Elizabeth, 162
Beacco, Jean-Claude, 27, 227
Becker, Angelika, 175
Beglar, David, 200
Beisbart, Claus, 38
Benazzo, Sandra, 95, 108
Berchio, Giulia, 102, 103
Bergen, Benjamin K., 156
Bernhardt, Elizabeth B., 284
Berninger, Virginia, 254
Bernstein, Basil, 225
Berthele, Raphael, 1, 17, 20–24, 29, 57, 116, 123, 125, 134, 140, 164, 167, 168, 176, 199, 205–208, 211, 213–216, 218, 219, 228, 229, 231, 234, 236, 240, 252, 253, 256, 259, 262, 264, 281, 282, 285, 288, 293
Bertschy, Ida, 187
Bialystok, Ellen, 47, 48, 122, 269, 271–273, 285, 286
Bickerton, Derek, 110
Bigelow, Martha, 53
Bild, Eva-Rebecca, 284
Birdsong, David, 69
Blanchet, Philippe, 213, 275
Bleichenbacher, Lukas, 285
Bley-Vroman, Robert, 94, 247
Bloomfield, Leonard, 132
Bogaards, Paul, 129, 132

Bonvin, Audrey, 102, 135, 146, 147, 151, 282
Booton, Sophie A., 276
Bornstein, Marc H., 162
Bourdieu, Pierre, 260
Bowerman, Melissa, 175, 176
Broersma, Mirjam, 135
Bronckart, Jean-Paul, 76
Brooks, Patricia, 79
Brown, Amanda, 124
Bruck, Maggie, 286
Brysbaert, Marc, 135, 171, 172
Buson, Laurence, 205
Byers-Heinlein, Krista, 83, 120

Carroll, John B., 235, 245, 246, 254
Carroll, Susanne E., 68, 167
Caselli, Maria Cristina, 77
Cenoz, Jasone, 124, 284
Chan, Angel, 283, 285
Chertkow, Howard, 271
Chevrot, Jean-Pierre, 205, 214
Chomsky, Noam, 63, 65, 91
Christiner, Markus, 248
Cobb, Tom, 137, 151
Collier, Virginia P., 226
Conway, Andrew R. A., 272
Cook, Vivian, 33, 47, 174
Costa, Albert, 121, 157, 266, 269, 280
Cox, Simon R., 273
Craik, Fergus I. M., 271, 273
Crespi, Bernard J., 273, 289
Crespo, Kimberly, 120
Critten, Rory G., 115, 242
Croft, William, 76
Cummins, Jim, 225–227, 233, 284

D'Angelo, Francesca, 40, 284
Dabrowska, Eva, 78
Daller, Helmut, 143
de Bot, Kees, 107, 282
de Bot, Kees, 9
de Bruin, Angela, 274
de Cat, Cecile, 166
de Saussure, Ferdinand, 76
Degani, Tamar, 227
DeKeyser, Robert M., 53, 248, 249
Del Giudice, Marco, 273, 289
Delsing, L., 215, 282
DeLuca, Vincent, 215
Dentella, Vittoria, 274, 280
Deuber, Fabienne, 199
Deuchar, Margaret, 112
Dewaele, Jean-Marc, 157, 280
Dherbey Chapuis, Nathalie, 57, 58
Diaz, Rafael M., 269
Diessel, Holger, 78
Dijkstra, Ton, 172
Dimroth, Christine, 94, 95, 102, 104, 105
Diogo, Cédric, 239, 286
Dolz, Joaquim, 76
Dörnyei, Zoltán, 252
Doughty, Catherine J., 54, 55, 109
Duden Wörterbuch, 133
Dunn, Douglas M., 135
Dunn, Lloyd M., 135, 165
Dutton, Elisabeth, 115, 242
Duyck, Wouter, 171, 172

Edwards, John, 281
Egli Cuenat, Mirjam, 285
Eisenbeiss, Sonja, 63, 91
El Euch, S., 286
Ellis, Nick C., 50, 56, 84–88, 91
Ellis, Rod, 45, 48, 49
Elmiger, Daniel, 188
Elsner, Daniela, 285

Emmorey, Karen, 124
Engel, Gaby, 285
Erard, Michael, 9, 11–13, 247
Esser, Hartmut, 235

Falk, Ylva, 69
Fehlen, Fernand, 210
Feleke, Tekabe Legesse, 282
Felix, Sascha W., 251
Ferguson, Charles A., 205
Festman, Julia, 5
Fibbi, Rosita, 140
Fillmore, Charles J., 76
Fisher Fishkin, Shelley, 116
Fishman, Joshua, 114
Flege, James Emil, 5
Flynn, Suzanne, 33, 70, 72
Fodor, Jerry, 65
Forsberg Lundell, Fanny, 180
Frederiksen, Anne T., 124, 272
Freedman, Morris, 271
Fry, Stephen, 129
Fürst, Guillaume, 276, 277

Gajo, Laurent, 109, 124, 197
Gal, Susan, 213
Gallo, Federico, 288
Ganschow, Leonore, 248
García, Ofelia, 21, 123, 213
Gardner, Robert C., 36, 37
Geeraerts, Dirk, 213
Geipel, Janet, 280
Genesee, Fred, 232, 235, 286
Gerhards, Jürgen, 206
Gesa, Ferran, 192
Gföhler, Benjamin, 113
Ghimenton, Anna, 205, 214
Girard, Grégoire, 211–213
Givón, Talmy, 110, 225
Godfroid, Aline, 17, 46
Gogolin, Ingrid, 224, 260
Goldberg, Adele E., 81
Goldfield, Beverly A., 162
Golestani, Narly, 248–250
Gollan, Tamar H., 272, 281
Goo, Jaemyung, 56
Good, Bruno, 212
Goodwin, Charles, 114
Gooskens, Charlotte, 215
Gorter, Durk, 124
Grace, George W., 110
Green, David W., 33
Greenberg, Zachary I., 270–272, 274
Grigorenko, Elena L., 247
Grin, François, 276, 277
Grosjean, François, 33, 164, 204, 283
Grotjahn, Rüdiger, 237
Grünert, Matthias, 82, 118
Gullberg, Marianne, 31, 112, 119
Gumperz, John, 115
Gunnerud, Hilde L., 274
Gyllstad, Henrik, 197

Haag, Ludwig, 206
Haenni Hoti, Andrea, 284
Hagège, Claude, 117
Hakuta, Kenji, 269
Hammarberg, Björn, 27
Harden, Kathryn P., 250
Harris, Catherine L., 156, 157
Hart, Betty, 134, 135
Hartmann, Stefan, 78, 83
Haspelmath, Martin, 132
Haukås, Åsta, 124
Hausen, Guglielm, 177
Hauser, Marc D, 74
Heeringa, Wilbert, 207, 215
Heid, Helmut, 261

Heinzmann, Sibylle, 284, 285
Herdina, Philip, 33, 35, 227, 228, 283
Heritage, John, 114
Hermas, Abdelkader, 69
Hicks, Nina S., 114, 239, 286
Hilchey, Matthew, 271
Hirosh, Zoya, 227
Hoff, Erika, 165–167, 282
Hoffman, Eva, 156
Hoffmann, Charlotte, 169
Hofweber, Julia, 122
Holliday, Adrian, 94
Hommel, Bernhard, 276, 279, 281
Hopf, Diether, 235, 240
Hopp, Holger, 5, 239, 285
Horák, Alexander, 282
Hornstein, Norbert, 64
Horst, Marlise, 191, 192
Howell, Peter, 281
Hu, Marcella Hu, 186, 187
Hufeisen, Britta, 33, 36
Huhta, Ari, 135
Hulstijn, Jan, 190, 191, 225, 235, 236
Humphrey, Ad, 271
Hunt, Alan, 200
Hyltenstam, Kenneth, 68
Hymes, Dell, 76

Imgrund, Bettina, 197
Irvine, Judith, 213

Jakob, Sabrina, 160
Jansen, Silke, 268, 287
Jarvis, Scott, 24, 144, 283
Jessner, Ulrike, 26, 33, 35, 37–39, 44, 107, 227, 228, 283, 284, 286
Jiang, Nan, 172, 173
Johanson, Lars, 24, 82, 115
Johnson, Matt A., 81
Jones, Catherine, 284
Juska-Bacher, Britta, 160, 161

Kaan, Edith, 122
Kaatari, Henrik, 197
Kachru, Yamuna, 30
Kamil, Michael L., 284
Kang, Carissa, 122
Kang, Eun Young, 56
Kaushanskaya, Margarita, 120
Kay, Paul, 76
Kecskes, Istvan, 5
Kellerman, Eric, 74
Kelly, Louis G., 55
Kemp, Charlotte, 286
Kepinska, Olga, 288
Kharkhurin, Anatoliy V., 276
Kheder, Souad, 122
Kirk, Neil W., 274
Kirschner, Paul A., 249
Klein, Raymond, 271
Klein, Wolfgang, 95, 96, 100, 101, 107–109
Klieme, Eckard, 284
Kloss, Heinz, 208, 220
Koç, Didem K., 284
Koch, Peter, 225
Koizumi, Rie, 144
Köller, Olaf, 285
Kootstra, Gerrit J., 112
Korecky-Kröll, Katharina, 135
Kousaie, Shanna, 271
Krashen, Stephen, 47
Kremin, Lena V., 120
Kremmel, Benjamin, 187
Kristiansen, Tore, 213
Kroll, Judith F., 124, 170, 272
Kunschak, Claudia, 213
Kurrein, Jessie, 12

Labov, William, 205
Lado, Robert, 220
Lakoff, George, 21, 293
Lambelet, Amelia, 134, 140, 215, 216, 228, 229, 282, 285
Lambert, Wallace, 268, 269
Langacker, Ronald W., 77
Langer, Nils, 117
Lanza, Elizabeth, 83, 120
Lasagabaster Herrarte, David, 276
Laufer, Batia, 25, 136, 190, 191, 283
Laurie, Simon S., 267
Le Page, Robert B., 205
Lefebvre, Claire, 174, 178
Lehtonen, Minna, 274
Leijten, Mariëlle, 195
Leivada, Evelina, 279
Lemhöfer, Kristin, 135
Lenhard, Alexandra, 135
Lenhard, Wolfgang, 237, 254
Leopold, Werner F., 212, 285
Leow, Ronald P., 49
Levshina, Natalia, 147
Li, Shaofeng, 235, 247, 262, 263
Lichtman, Karen, 52
Lieven, Elena V., 77, 78
Lightfoot, David, 64
Lin, Angel M. Y., 123
Linck, Jared A., 247, 272
Lindblad, Torsten, 285
Lindstromberg, Seth, 199
Lomeu Gomes, Rafael, 83
Long, Michael H., 109
Lorenz, Eliane, 234, 235, 285
Lowie, Wander, 39
Lundin Åkesson, K., 215, 282
Lust, Barbara, 122
Lyons, John, 172
Lyster, Roy, 56, 57
Macaro, Ernesto W., 128
Macnamara, Brooke N., 272
MacNamara, John, 268
MacSwan, Jeff, 112, 284
Madlener, Karin, 189
Madlener-Charpentier, Karin, 55
Mady, Callie, 284
Magnusson, Kristoffer, 278
Mahdi, Hassan Saleh, 200
Malik-Moraleda, Saima, 11
Maluch, Jessica T., 285
Manhardt, Francie, 31, 32
Manno, Giuseppe, 285
Marian, Viorica, 266
Marshall, Chloe, 32
Martin-Jones, Marilyn, 235, 284
Masiero, Ilaria, 276
Matras, Yaron, 24, 29, 33, 82, 117, 119, 282
Matzat, Wilhelm, 10
Mbodj-Pouye, Aïssatou, 112, 118
McCarthy, Philip M., 144
McLelland, Nicola, 213
McMurray, Bob, 163, 164
McWhorter, John H., 96, 97
Meara, Paul, 137, 144, 152
Meara, Paul M., 151, 246, 254
Meijers, Guust, 285
Mendez, Mario F., 271
Meuter, Renata F. I., 121
Michalke, Meik, 144, 152
Michel, Sister V., 243
Miralpeix, Imma, 144, 151, 152
Missler, Bettina, 286
Mondria, Jan-Arjen, 193
Monsrud, May-Britt, 165, 166, 282
Montanari, Simona, 40, 284
Montero-Perez, Maribel, 192
Montrul, Silvina A., 174

Moser, Urs, 240
Mufwene, Salikoko S., 31
Mukadam, Naaheed, 271, 273
Müller, Stefan, 76
Muñoz, Carmen, 192
Musolino, Julien, 65
Musumeci, Diane, 55
Muysken, Pieter C., 119, 123
Myers-Scotton, Carol, 112, 118

Nation, Paul, 159, 181, 186, 187, 190, 191, 198, 200
Nelson, Christina, 5, 74
Nesse, Agnete, 117
New, Boris, 147, 182
Newport, Elissa L., 162
Newton, Jonathan, 187
Ng, Bee Chin, 269
Nichols, Emily S., 274
Ning, Siqi, 276
Noort, Maurits, 273
Norris, John M., 56, 201
Northbrook, Julian, 180, 192
Nowicki, Stephen, 254

Odlin, Terence, 24
Oesterreicher, Wulf, 225
Oladipupo, Rotimi O., 117
Olulade, Olumide A., 272
Ortega, Lourdes, 49, 56, 188, 201
Oschwald, Jessica, 274
Otwinowska, Agnieszka, 286

Paap, Kenneth R., 270–272, 274
Pagonis, Giulio, 55
Pallier, Christophe, 147, 182
Pallotti, Gabriele, 39
Pančíková, Marta, 282
Paradis, Michel, 52
Parafita Couto, Maria del Carmen, 119
Paribakht, T. Sima, 159
Park-Johnson, Sunny K., 124
Parry, Thomas S, 252
Pashler, Harold, 249
Pattemore, Anastasia, 192
Pavlenko, Aneta, 13, 15, 173, 283
Peal, Elizabeth, 268, 269
Pederson, Eric, 175, 176
Perani, Daniela, 271, 273
Perdue, Clive, 95, 96, 100, 101, 107–109
Perez, Montero, 192
Perkins, Michael R., 79
Perquin, Magali, 271
Petermann, Franz, 160
Petermann, Ulrike, 160
Peters, Elke, 186, 187, 192, 196
Petersen, Calvin R., 247
Peyer, Elisabeth, 128, 207, 218
Pfau, Roland, 31
Pfenninger, Simone, 197
Phillips, Natalie A., 271
Pimsleur, Paul, 246, 254
Pinker, Steven, 63, 69
Pizzuto, Elena, 77
Plomin, Robert, 250, 251
Poarch, Gregory J., 171, 272, 273
Poplack, Shana, 112, 113, 118
Posner, Roland, 116
Pozníček, Yannik, 188
Pressley, Michael, 198
Prior, Anat, 272
Proctor, C. Patrick, 236, 283
Pujadas, Geòrgia, 192
Pulido, Manuel F., 189
Purpura, David J., 134
Pyers, Jennie E., 124

Qi, Peng, 152

Raj, Stuart Jay, 14
Rampinini, Alessandra, 263
Rampton, Ben, 214
Ranta, Leila, 56
Rebuschat, Patrick, 47
Reinders, Hayo, 49
Reiser, Elisabeth, 1, 167, 168
Reiterer, Susanne, 248
Reznick, J. Steven, 162
Ricciardelli, Lina A., 279
Riener, Cedar, 249, 262
Rimfeld, Kaili, 250
Risley, Todd R., 134, 135
Ritchie, Stuart, 280
Robinson, Peter, 50, 248
Rockwell, Geoffrey, 152
Roehr-Brackin, Karen, 45, 46, 54, 56, 59, 248
Romaine, Suzanne, 235
Rosch, Eleanor H., 21
Rothman, Jason, 33, 65–67, 69, 70
Rousse-Malpat, Audrey, 36
Roussel, Stéphanie, 197
Ruck, Julia, 211
Rumlich, Dominik, 197
Ruoss, Emanuel, 211
Ryan, Lisa, 69

Saer, David J., 268
Sagarra, Nuria, 88
Saito, Kazuya, 57
Sakel, Jeanette, 29
Sánchez, Laura, 40
Sanders, Marianne, 285
Santesteban, Mikel, 121
Sapon, Stanley M., 235, 245, 246, 254
Schendl, Herbert, 116
Schepens, Job, 219, 220, 285
Schlatter Gappisch, Katja, 57
Schmid, Helmut, 143, 152
Schmid, Stephan, 214
Schmidt, Richard, 49
Schmitt, Norbert, 180, 181, 191, 194, 198, 200
Schneider, Wolfgang, 237, 254
Schröter, Juliane, 211
Schwarz, Albert, 212
Sebastián-Gallés, Núria, 266, 269
Sebba, Mark, 115
Selinker, Larry, 94
Shiri, Sonia, 215
Shuy, Roger, 226
Siegel, Jeff, 214
Siegler, Jo, 44
Siemund, Peter, 284
Silva, Breno B., 194
Silva-Corvalán, Carmen, 167
Sinclair, Stéfan, 152
Singh, Lisa, 188
Singleton, David, 69, 197
Skehan, Peter, 247, 251
Slabakova, Roumyana, 33, 70
Slobin, Dan I., 96
Smith, Neil, 32, 65
Snedeker, Jesse, 162, 163
Sparks, Richard L., 247, 248, 252
Sperry, Douglas E., 134
Spolsky, Bernard, 243–245
Stanat, Petra, 285
Stankovic, Michelle, 280
Stanovich, Keith E., 200
Stansfield, Charles W., 252
Stavans, Anat, 169
Stern, Elsbeth, 206
Stevenson, Patrick, 211
Stewart, Erika, 170

Stocker, Ladina, 164
Stork, Antje, 198
Strickland, Bonnie R., 254
Stromswold, Karin, 250
Struys, Esli, 273
Studer, Thomas, 114
Sun, He, 167
Sundqvist, Pia, 197
Suter, Lea, 192
Suzuki, Yuichi, 53, 248
Swain, Merrill, 284
Swisher, Virginia, 169
Sylvén, Liss K., 197
Szagun, Gisela, 163

Tabouret-Keller, Andrée, 164, 205, 268, 280, 287
Taeschner, Traute, 212
Takakuwa, Mitsunori, 235
Tare, Medha, 272
Tarone, Elaine, 53
Thoma, Dieter, 239
Thomas, Jacqueline, 284, 286
Thomas, Samuel E., 12
Thomason, Sarah, 31
Thomason, Sarah G., 31, 174
Thorndike, Edward L., 206
Tomasello, Michael, 77–79, 90
Toribio, Almeida J., 282
Treffers-Daller, Jeanine, 123, 136, 143, 144, 146, 152
Trentman, Emma, 215

Udry, Isabelle, 194, 236, 245, 252, 253, 264, 278, 279, 285
Uhl, Patricia, 197
Ullman, Michael T., 54
Unuabonah, Foluke Olayinka, 117
Urban, Klaus K., 254, 278

Valdés Kroff, Jorge, 112, 121
Valencia, Jose F., 284
Valian, Virginia, 271, 273
Van den Avenne, Cécile, 112, 118
van den Avenne, Cécile, 112
van den Noort, Maurits, 273
van der Slik, Frans, 69, 218
van Dijk, Chantal, 282
van Hell, Janeg G., 272
van Heuven, Walter J. B., 86, 172
van Patten, Bill, 109
Van Waes, Luuk, 195
Vandeloise, Claude, 175
Vangsnes, Øystein A., 279
Vanhove, Jan, 145, 151, 208, 215, 229, 231, 271, 278, 282, 285
VanPatten, Bill, 52
Vega-Mendoza, Mariana, 272
Vilkaitė-Lozdienė, Laura, 181
Villameriel, Saúl, 171
Volterra, Virginia, 212

Wandruszka, Mario, 209
Ware, Anna T., 273
Wattendorf, Elise, 11
Webb, Stuart, 136, 187, 191, 198
Wegera, Klaus-Peter, 211
Wei, Li, 21, 213
Weinreich, Max, 205
Weinreich, Uriel, 204
Weisgerber, Leo, 164, 268
Weiss, Rudolf H., 237, 254
Wen, Zhisheng E., 247
Wenk, Anne Kathrin, 239
Wesche, Marjorie B., 159, 248, 262
Westergaard, Marit, 33, 70, 72, 73
Weth, Constanze, 224, 284
White, Lydia, 62, 91
Wichmann, Søren, 207

Wigglesworth, Gillian, 269
Wijffels, Jan, 152
Williams, Jessica, 109
Williams, John, 47
Williams, Sarah, 27
Willingham, Daniel, 249, 262
Willingham, Daniel T., 18, 135, 206, 250
Witkin, Herman A., 254
Wood, David, 180
Woodworth, Robert S., 206
Wray, Alison, 79, 110
Wrembel, Magdalena, 5
Wright, Wayne E., 224
Wulff, Stefanie, 56, 84–87, 91
Wyss, Dominik, 115

Yanagisawa, Akifumi, 191
Yelland, Gregory W., 286

Zehetner, Ludwig G., 211
Zimmermann, Kerstin, 262
Zobl, Helmut, 283
Zumbach, David, 113
Zúñiga, Fernando, 131

Multilingualism

Many people use several languages and dialects in their daily lives. What are the current scholarly models for and insights into this stunning capacity of the human mind? The book discusses research into multilingual practices and multiple language learning, from both cognitive and sociolinguistic angles. Discussion focuses on the repertoires of multilinguals and the processes of cross-linguistic influence, transfer and convergence that are typically observed on the levels of linguistic patterns and matter. Multilingualism is here construed as a continuous, multidimensional phenomenon including more or less linguistically similar subsystems evolving on different skill levels depending on multilinguals' needs and affordances. The most important theoretical views that shape the field are discussed and compared, and evidence from different contexts considered: tutored and untutored learning, minority language settings, multimodal repertoires with sign languages and multilingualism fostered by foreign language instruction. Moreover, different types of learners are discussed, from hyperpolyglots via bidialectals to 'ordinary' second language users. The book scrutinizes scholarly insights and debates with respect to their relevance for language policy and instructed language learning.