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**Cross-linguistic influence in bilingual
motion event encoding: The role of
language dominance and language
mode**

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Abstract

Patterns of cross-linguistic influence can be traced in bilingual speakers' speech. If a speaker is bilingual in two typologically different languages, his or her lexicalization patterns can show convergence of two distinct systems for different linguistic aspects. Drawing on previous studies, the extent of cross-linguistic influence can depend on factors such as dominance configurations between the languages and the state of language activation (i.e. the language mode).

Cross-linguistic differences between French and (Swiss-)German have been documented extensively in the domain of motion. These differences go beyond the lexical and grammatical levels and concern semantic-structural aspects of language. A striking semantic-structural difference between the languages can be found in *MANNER* and *PATH* of motion, i.e. the way a figure moves and the path he or she covers. In French, a Verb-framed language, the *PATH* of a motion event tends to be expressed in the verb, the *MANNER* of motion is typically expressed in adverbial elements. In (Swiss-)German, a Satellite-framed language, the description of motion events usually show the mapping of the *MANNER* component on the verb and the mapping of the *PATH* component on verb-external elements. Patterns of semantic convergence manifest in, for instance, an increasing number of manner verbs in French constructions or an increasing use of path verbs in German.

This thesis sets out to combine a set of interrelated questions on the role of dominance constellation between a person's languages, the role of language mode and how these factors can have an effect on cross-linguistic influence in motion event descriptions. In this way, the study aims to connect fundamental questions of bilingual production with questions on semantic convergence and variation within motion event description.

To this end, oral descriptions of motion events from 154 bilingual speakers have been elicited by means of video clips showing self-propelled motion events. The speakers show varying degrees of language dominance, which is assessed via an online questionnaire. They were asked to describe 60 animated video clips, 30 critical items (translational motion events) and 30 filler items (caused motion events) in four conditions: a monolingual mode in German, a monolingual mode in French,

a bilingual mode once with critical items in French and filler items in German and a bilingual mode with critical items in German and filler items in French.

The results indicate that — in line with previous studies — dominance configurations show an effect on certain variables, but do not influence both languages to the same degree. The manipulation of language mode, however, does not lead to the patterns expected in the present study. The outcomes further demonstrate that besides cross-linguistic influence, certain patterns may be attributed to general patterns of bilingual encoding. Finally, it will be argued that a mix of factors contribute to variations in bilingual motion event encoding — factors, which are problematic to unravel and should be modeled simultaneously.

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Abbreviations

AIC	Akaike information criterion
AoA	Age of acquisition
BC	Boundary-crossing
BCC	Boundary-Crossing Constraint
BDS	Bilingual Dominance Scale
BIA	Bilingual Interactive Activation
bide	Bilingual German mode
bifr	Bilingual French mode
BIMOLA	Bilingual Model of Lexical Access
BLP	Bilingual Language Profile
CLI	Cross-linguistic influence
de	Monolingual German mode
ES	Effect size
GLMM	Generalized linear mixed models
FLA	First Language Acquisition
fr	Monolingual French mode
IC	Inhibitory Control
LT	LexTALE
LoR	Length of Residence
PP	Prepositional phrase

REFL	Reflexive verb construction
SLA	Second Language Acquisition
SE	Standard error
SES	Socio-economic status
S-Language	Satellite-framed language
TFS	Thinking-for-Speaking
TLA	Third Language Acquisition
TTR	Type-Token Ratio
V-language	Verb-framed language

Introduction

Juggling between typologically different language systems presents linguistic and cognitive challenges on different levels. When it comes to language production, a cascade of interrelated factors can determine lexicalization patterns of speakers who are bilingual in two typologically different languages. These patterns can follow the typical patterns of one language or show constructional variants and traces of the other language — not only at the phonological, lexical or structural level but also in semantic aspects. The extent to which the typical or atypical language pattern is used can depend on a mix of factors. Among these factors are language-related factors, such as the topic, the context of production and the degree of language activation, and speaker-related factors, such as preferences for certain constructions, or idiosyncrasies, modulated by language dominance configurations. Related to these determining factors are degrees of cross-linguistic influence, general developmental patterns and phenomena of bilingualism.

Scope

This thesis is embedded in a bilingual framework following interrelated lines of inquiry. On the one hand, questions about how language dominance configurations of two languages influence the production patterns of individual bilingual speakers of both languages are addressed. Language dominance is thus considered an important factor contributing to variation. On the other hand, the study investigates these production patterns in light of theoretical propositions on language activation — the language mode at the moment of production (Grosjean, 1998a, 2008).

The study of how speakers verbally express the concept of motion in space has revealed interesting insights not only regarding lexical and structural, but also in terms of semantic differences between languages. The domain of motion therefore constitutes an important field of inquiry for the challenges of handling two typologically different language systems that has been the focus of a great number of empirical studies (see Matsumoto & Slobin, 2012 for an extensive list of contrastive motion event studies).

Motion forms part of the overarching concept of space. The domain of space is a vast field that has gained interdisciplinary interest. This interest is due to the fact that space and spatial relationships constitute an ontological universal and are thus the subject of inquiry of different approaches and research traditions in the fields of philosophy, biology, psychology and linguistics. The linguistic expression of motion in particular has been investigated from interrelated approaches such as cognitive linguistics, linguistic typology, spatial linguistics and psycholinguistics in the broadest sense (Hickmann & Robert, 2006, p. 1). While the bulk of studies of motion event encoding are concerned with the relationship between language and cognition, the present work focuses exclusively on the verbal expression of motion events. Hence, the scope of this study is delineated by production patterns and does not intend to investigate conceptualization processes or make claims about mental construal.

Motion events can refer to different types of movement. The type of motion event that the present examination investigates is dynamic, voluntary and translational (see section 1.2 for definitions) and has gained particular theoretical and empirical attention. The cross-linguistic differences previous studies have identified pertain primarily to the semantic components of *MANNER* and *PATH* of movement, i.e. the manner a figure moves and the way a figure covers. While these differences are gradual and not categorical, previous research has identified such systematic cross-linguistic differences in the domain of motion between French and (Swiss-)German — the language pair this study focuses on.

The present work thus tries to investigate the two fundamental factors of language dominance and the degree of language activation in bilingual productions of voluntary motion events.

Aim and contribution

The overarching goal of this thesis is to shed light on how bilingual language dominance configurations and language mode can account for variations in motion event descriptions.

Many questions in the face of linguistic variation, particularly the ways in which individual bilingual speakers vary, remain controversial and unanswered. While the present study does not pursue all these questions, it aims to cover some of the research gaps and limitations in previous studies — both on theoretical and methodological grounds. Variation has been shown to not only pertain to typologically-motivated differences between languages and language varieties, but also between and within subjects and between and within different motion events

(i.e. stimuli). In connecting questions about variation in motion event encoding with fundamental questions of bilingual production, the project aims to broaden the scope of inquiry in these domains. The overarching concerns in the analyses and approaches to explain linguistic variation are bilingual speaker-related differences. Bilingual speakers have shown varying degrees of cross-linguistic influence in their production patterns. However, approaches to assess language dominance and to control for this factor in the motion domain have remained scarce. Moreover, while theoretical propositions of language mode hypotheses have been developed and often cited, an experimental manipulation of language activation to examine these propositions has not yet been conducted with regard to semantic aspects of language.

Along with tackling the effects and interplay of these factors, this work aims to contribute to the understanding of bilingual production patterns and phenomena of semantic convergence by adopting methods that account for speaker- and stimuli-related differences.

Research questions

Based on the theoretical framework and previous empirical studies, this thesis sets out to investigate four interrelated and interdependent sets of research questions.

The first set of questions that are investigated focus on whether the general cross-linguistic differences identified in previous studies appear in the present project. More specifically, are there differences in the encoding of semantic elements, such as *MANNER* and *PATH* of motion, between French and German descriptions? How are those language-specific factors reflected in both languages of a bilingual speaker? What kinds of semantic convergence patterns are visible in these motion event constructions?

Second, how do the bilingual speakers' dominance configurations influence the linguistic description of motion events? Which structures and motion components are affected and to what degree? Do dominance effects depend on language, i.e. are there differences between (Swiss-)German and French in terms of dominance effects?

The third set of research questions investigates the effect of language mode on bilingual motion event production. Does an experimental manipulation of language activation lead to differences in lexicalization patterns? More specifically, how and to what degree do deliberate manipulations of the language mode — i.e. the activation of both languages (bilingual mode) vs. a partial deactivation of one language (monolingual mode) — differently affect motion event encoding? Is the language mode effect more present in French? In (Swiss-)German? Or, are both languages affected to the same degree?

The last set relates the second and third sets. Is there an interaction between the speakers' dominance configurations and language mode manipulation? Does the effect of language mode depend on the speakers' language dominance configurations? Does this vary between French and German?

Organization

This dissertation is divided in three main sections. Chapters 1–3 provide the theoretical backdrop for the empirical investigation outlined in chapters 4–8 and chapter 9 discusses the study's results and general implications. The theoretical chapters begin with an introduction to the field of motion event research (chapter 1). The second chapter addresses the terminological complexity in studying bilingual lexicalization patterns (chapter 2). The final theoretical chapter (chapter 3) combines the two backgrounds and provides a brief literature review on relevant empirical investigations in the field. Based on this literature review, the methodology for the present investigation is outlined in chapter 4. Chapter 5–8 are organized following the research questions outlined in the previous section. In this way, chapter 5 provides a primary data inspection and investigates the global differences between French and (Swiss-)German constructions. The subsequent chapter addresses the second research question on the effect of language dominance configurations (chapter 6). The next chapter (chapter 7) addresses the third question on language mode, and chapter 8 shows the result for the fourth research question on interaction effects — connected to the preceding questions. Finally, chapter 9 closes with a general discussion, implications and limitations of the thesis as well as avenues for further inquiries.

Chapter 1

Motion event encoding

The encoding of motion events has been a central focus of cognitive linguistics. Cross-linguistic analyses of lexicalization patterns laid the groundwork for an impressive body of research in cognitive and spatial semantics. The study of cognitive semantics raises questions about the relation between cognition and language in general and goes hand in hand with the discussion on linguistic relativity. Associated with the domain of motion events, Slobin's *Thinking-for-Speaking (TFS)*-hypothesis and more fundamental views on the relation between language and non-verbal cognition, have been sources of divergent theoretical debates and series of empirical studies deploying different methodologies. Since the present study exclusively deals with the 'speaking' part, the discussion on linguistic relativity will be rather 'straitjacketed'. Moreover, the scope of this chapter exclusively deals with dynamic, self-propelled and translational motion events (see section 1.2). The definition of and distinction between different semantic components of a motion event (section 1.3) lead to the development of the motion typology outlined in section 1.4 that is primarily associated with Leonard Talmy's seminal work *Toward a Cognitive Semantics*, but that is alluded to, explored and developed from different perspectives and traditions. Following a vast body of empirical investigations of these typological distinctions, a series of critiques and redefinitions emerged (section 1.5). The languages of the present study (section 1.7) largely follow typological patterns and constraints (section 1.6), but show considerable variation and language variety-related idiosyncrasies (section 1.7).

1.1 The study of space, language and cognition

Conceptualizing and communicating space and spatial relations is crucial for the survival of various species and is one of the most basic human behaviors. Without the ability to mentally represent and talk about spatiality, we would be unable to

locate objects or move in space (Hickmann & Robert, 2006, p. 4). Consequently, all languages must somehow show linguistic devices to express spatial relations. Linguistic systems provide speakers with means to distinguish between static and dynamic situations and mark different types and aspects of motion. Although considered a *sine qua non* and thus a universal characteristic, the linguistic patterns to express spatiality show considerable variation across the world languages. For these reasons, there is particular interest in exploring the relationship between language and cognition, which is the focus of cognitive linguistics. In the domain of space, cognitive linguistics embodies an array of related disciplines and sub-disciplines, such as spatial linguistics, spatial cognition or linguistic relativity, which address questions on what spatial language reveals about spatial cognition and what spatial cognition reveals about language. As a part of cognitive linguistics, cognitive semantics refers to meaning as a cognitive phenomenon. Talmy (2000a, p. 4) defines “cognitive semantics” as follows:

“[...] the word “semantic” simply refers to the specifically linguistic form of the more generic notion “conceptual”. Thus, general conception — that is, thought — includes linguistic meaning within its greater compass. [...] Thus, research on cognitive semantics is research on conceptual content and its organization in language and, hence, on the nature of conceptual content in general.”

In this view, the expression of meaning is intrinsically linked to human cognition and is not regarded as an autonomous cognitive faculty (Cadierno, 2008, p. 241). From this constructivist point of view, linguistic meaning is a central part of grammar. Examining the linguistic representation of conceptual structure, Talmy proposes a typology primarily based on motion event constructions (1972, 1985) and later extends this to event constructions in general and particularly to constructions with resulting states (1991, 2000a, 2000b).

In contrast to previous typologies, the focus is not on formal linguistic aspects like morphology or syntax, but rather on semantic aspects of event encoding. Central to his typological distinction is the notion of *lexicalization patterns* or *conflation patterns* which refer to the ways experience is expressed in languages through the semantic content of linguistic forms. The relationships between meaning and form can also be termed *conceptualization patterns* (e.g. Bylund & Jarvis, 2011; Flecken, 2011). The proposition that typological categories can be built according to systematic differences between lexicalization patterns is rooted in the fact that languages differ in the amount and type of information they convey in the foreground and in the background. In Talmy’s terminology, the process of foregrounding information (i.e.

explicitly mentioning the information) or backgrounding information (i.e. omitting the information) is referred to as *windowing for attention* (2000a, p. 257). The degree to which a semantic component is foregrounded or backgrounded in terms of attention is called *salience* and is defined by its type of linguistic representation (Talmy, 2000b, p. 128).

Hence, in the course of information selection, filters and channels are employed at different levels. In other words, a speaker filters the experience of the world into verbalized events governed not only by her or his individual choice and perspective but also by the language(s) she or he speaks. The question on whether this ‘filter’ of language may have an impact on thought or cognition in general has a long and hotly debated history. In the paradigm of linguistic relativity, proponents argue for a causal link between language and thought. While the proposition that language determines thought (strong version of the Sapir-Whorf-hypothesis — although never suggested by Whorf) has become scientifically obsolete, interest in the proposition that language influences thought (weaker version of the Sapir-Whorf-hypothesis) has diminished due to controversies and limited empirical evidence. Due to a growing interest in questions on language, cognition and space, however, there has been a resurgence of interest in linguistic relativity (Hohenstein, 2005, p. 404). The opposing views that still hold in current discussions on the relation between language and thought are summarized by Bylund and Athanasopoulos (2015, p. 2):

“On the one side, there is the universalist camp, which holds that human cognitive processes are guided by universal perceptual biases, and on the other side, the relativist camp, according to which human cognition is indeed influenced by language.”

In the domain of space, the *universal camp* advocates that linguistic and non-linguistic spatial representations are relatively independent from one another, the *relativist camp* assumes that they are intimately related (Hickmann & Robert, 2006, p. 10). Contemporary experimental research on the relationship between language and thought are characterized by two lines of inquiry differing in their definitions of ‘thought’ and the methodologies they deploy (Bylund & Athanasopoulos, 2015, p. 2). One line of inquiry relates language to non-verbal behavior and is associated with Whorf’s (1956) legacy. The studies advocating this view basically elicit non-verbal data by means of sorting, categorizing or recognizing memory tasks not intended to imply overt speech production or comprehension. While the effects of language on non-verbal cognition have been documented in the domain of motion (e.g. Gennari, Sloman, Malt, & Fitch, 2002; Kersten et al., 2010; Filipović, 2011; Athanasopoulos & Bylund, 2013; Montero-Melis, Jaeger, & Bylund, 2016), they remain rather weak,

and methodological differences between the studies render it difficult to compare their results (Montero-Melis et al., 2016). Proponents of this Neo-Whorfian view cautiously formulate the links between language and cognition in that language may influence “certain cognitive processes” under “certain circumstances” depending on factors such as the characteristics of the perceptual domain, the linguistic category under investigation and the experimental task (Bylund & Athanasopoulos, 2015, p. 2). The other line of inquiry is associated with the work of Dan Slobin. Related to the aforementioned ‘windowing for attention’, in the process of speaking, speakers of a given language direct the attention to the elements of the experience that are linguistically coded. According to Slobin (1996, p. 75), the ‘thinking’ tied to language is carried out “on-line” and “in the process of speaking”. Based on his research on narrative productions, Slobin (1987, p. 435) formulated the TFS-hypothesis in the following terms:

“The activity of thinking takes on a particular quality when it is employed in the activity of speaking. In the evanescent of time frame of constructing utterances in discourse, one fits one’s thoughts into available linguistic forms. A particular utterance is never a direct reflection of “objective” or perceived reality or of an inevitable and universal mental representation of a situation. This is evident within any given language, because the same situation can be described in different ways; and it is evident across languages, because each language provides a limited set of options for the grammatical encoding of characteristics of objects and events. “Thinking for speaking” involves picking those characteristics that (a) fit some conceptualization of the event, and (b) are readily encodable in the language.”

Even though Slobin uses the term “speaking” in his formulation, he notes that the framework embraces all forms of linguistic production and reception as well as a range of mental processes (cf. Slobin, 2003, p. 160). In other words, “speaking” can be replaced by “writing”, “listening” or “understanding”. In the motion event domain, a series of studies within the TFS-framework investigate not only verbal, but also co-verbal behavior which refers to “behaviour concurrent with speech, such as visual attention allocation and gesture” (Bylund & Athanasopoulos, 2015, p. 2) (see e.g. Slobin & Hoiting, 1994, on sign language; Gullberg, Hendriks, & Hickmann, 2008, on gestures; Papafragou, Hulbert, & Trueswell, 2008; Carroll, Weimar, Flecken, Lambert, & von Stutterheim, 2012, on allocating visual attention to entities when verbally describing them). However, Slobin’s TFS-hypothesis does not claim that language influences thought or non-verbal behavior. Slobin rather replaces the two abstract

terms “thought” and “language” with ‘thinking’ and ‘speaking’ respectively (1996, p. 71). These terms denote activities, and a more dynamic and less fundamental stance is thus adopted on linguistic relativity.¹

When it comes to First Language Acquisition (FLA), Slobin formulates the idea that “the child learns particular ways of thinking for speaking” (1996, p. 76). This idea has been investigated in a series of cross-linguistic studies using the picture storybook *Frog, where are you?* (Mayer, 1969) (e.g. Slobin, 2004). As for Second Language Acquisition (SLA), Slobin (1996, p. 89) hypothesizes the presence of particular difficulties when a typologically different language is acquired:

“In brief, each native language has trained its speakers to pay different kinds of attention to events and experiences when talking about them. This training is carried out in childhood and is exceptionally resistant to restructuring in second-language acquisition.”

Following this proposition, there is a potential influence of the L1 on the L2 when they are typologically different. In recent years, several scholars have approached the question of what happens, linguistically and cognitively, when a second language is acquired. Based on cross-linguistic studies showing the different lexicalization patterns across languages, Cadierno and Lund (2004, p. 145) hypothesize that during SLA, a speaker must learn “another way of thinking for speaking”, especially when the L2 diverges typologically from the L1. Patterns of cross-linguistic influence in terms of the ‘speaking’ part in motion event descriptions have been attested in several SLA-studies. As for the ‘thinking’ part, there have been fewer studies investigating the influence of a typologically different language on mental construal in SLA (see chapter 3). In a bilingualism framework (see section 2.1 for definitions), bilingual convergence in mental construal has been documented in a number of empirical studies (e.g. Cook, Bassetti, Kasai, Sasaki, & Takahashi, 2006; Bassetti, 2007; Jarvis & Pavlenko, 2008; Cook & Bassetti, 2011; Athanasopoulos, 2011; Pavlenko, 2011; Aveledo & Athanasopoulos, 2015).

The study of spatial language and cognition constitutes a source of fundamental debates concerning the existence of universals as well as challenging questions concerning the relation between language and thought. Given that the focus here is not on mental construal and the study exclusively discusses the dimension of ‘speaking’ and not ‘thinking’, this thesis does not intend to make any claims concerning the linguistic relativity debate, and further discussions on linguistic relativity are outside the scope of this work.

¹ For more and recent contributions on linguistic relativity, see e.g. Wolff & Holmes, 2011; Gleitman & Papafragou, 2013.

1.2 Defining motion events and types of movement

In the domain of space, the lexicalization patterns of aspects of the spatial universe that can be investigated are vast. Hendriks, Hickmann, and Lindner (2010, p. 183) argue for two types of sub-spaces: static space and dynamic space. Both dimensions are central to spatial representations, and all languages provide means to express static and dynamic information. Whereas the static space refers to the localization of entities in relation to other entities, the dynamic space refers to motion and involves different types of motion. The most cited definition of *motion event* by Talmy, formerly termed “translatory situation” (Talmy, 1972, p. 10), incorporates both sub-spaces: “a situation containing movement or the maintenance of a stationary location” (e.g. Talmy, 2000b, p. 25). Given that the present study exclusively focuses on dynamic motion, static events are excluded from this definition, and thus only include a “situation that involves displacement of an object in relation to a reference point” (Bylund & Athanasopoulos, 2015, p. 3) is considered a motion event. Among the types of dynamic motion events, there must be made a distinction between translational and self-contained motion. In Talmy’s terms, translational motion refers to motion in which “the location of the Figure changes in the time period under consideration” (Talmy, 2000b, p. 25). In contrast to self-contained motion such as rotation, oscillation or dilation, there is a change of location, a translocation, a trajectory that is covered. Translational motion may further be divided into voluntary motion and caused motion. While caused motion involves an external force, voluntary motion refers to self-propelled motion. This type of motion can be agentive or non-agentive. Grammatically, when motion is expressed through a verb, caused motion is usually encoded in the transitive form involving a direct object; whereas, self-propelled motion usually implies an intransitive verb with no direct object. In more recent studies on motion events, there has been a growing interest in fictive motion (e.g. Tomczak & Ewert, 2015). Figurative or fictive motion refers to “motion with no physical occurrence” (Talmy, 2000a, p. 99) as for instance in the case of sensory paths encoded by perception verbs such as ‘I looked toward the valley’ (cf. Cadierno & Ruiz, 2006, p. 197). In this study, however, the focus is on real motion or what Talmy calls “factive motion”. Factive motion implies an overlap with reality and is “used with reference to a concrete, overt (explicit) movement of some entity through a three-dimensional space” (Tomczak & Ewert, 2015, p. 51). In summary, the notion of a *motion event* refers to dynamic, translational, voluntary and factive motion in this thesis.

1.3 Semantic components of motion events

In a motion event, different semantic information can be mapped on different lexical and syntactic elements. Observations on these semantic distributions have been made from different angles, resulting in a terminological complexity. Although the present thesis adopts the mainstream terminology in motion event research, primarily based on the work of Leonard Talmy, similar ideas have been expressed and developed before and after Talmy. Hence, subsection 1.3.1 presents the main components of event integration, primarily based on Talmy's terminology, and subsequently explores these semantic components in light of different frameworks and ideas upon which these terms are based.

1.3.1 Event integration

Talmy (2000b, pp. 213-221) argues that in the underlying conceptual organization of language, events are encoded in internal structures with varying degrees of complexity. Semantically and syntactically complex properties of an event can be conveyed in a macro-event. A macro-event can be expressed by a single clause, but its content and structure resembles that of a complex event. A single clause's expression of a complex event is called *event integration* and is greatly constrained in terms of the categories that can be integrated. The macro-event incorporates the main-event, or framing-event, and the subordinate-event(s) or co-event(s). The framing-event determines the overarching conceptual framework of the macro-event. In contrast, the co-event constitutes an event of circumstance in relation to the macro-event and supports the framing-event. In other words, a co-event can "fill in, elaborate, add to, or motivate the framing event" (Talmy, 2000b, p. 220). The framing-event comprise four components: The Figural and Ground entity, the activating process and the association function. The activating process depicts the process whereby the Figure makes a transition in relation to the Ground in the case of a dynamic event, and it refers to the motion component of a motion event. The association function contributes to the core schema of the event and refers to the path component of a motion event (Talmy, 2000b, p. 118). The co-event can conflate with the activating process (Fortis, 2010, p. 4) as in the case of a manner verb in a motion event. The example in Figure 1.1 depicts the conceptual structure of a macro-event.²

² Figure 1.1 is adapted from Berthele (2004a, p. 95) which is based on Talmy (1991, p. 485) and Talmy (2000b, p. 221).

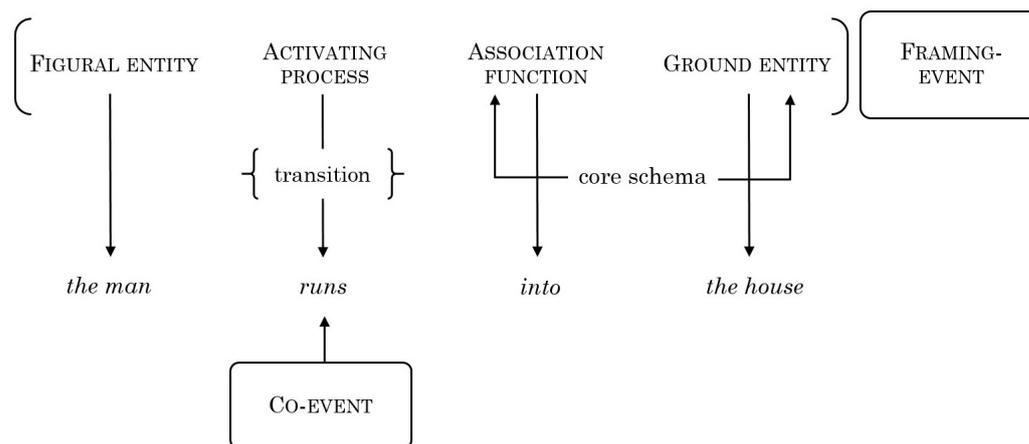


Figure 1.1: The conceptual structure of a macro-event

As indicated above, among the domains to which the notion of macro-event applies is the domain of space. In the domain of space, a framing-event refers to a basic motion event (Fortis, 2010, p. 4). According to Talmy (2000b, p. 25), a motion event typically comprises five parameters: the FIGURE (the Figurative entity), the GROUND (the Ground entity), the MOTION (the Association Process), the PATH (the Association Function) and any associated CO-EVENTS. The encoding of these semantic elements is distributed over open-class lexical items, closed-class grammatical items and syntactic structures of phrase elements (i.e. surface elements) (Talmy, 2000a, p. 178).

The FIGURE is an object that can potentially be moved or that moves and covers a particular trajectory in a dynamic motion event. In other words, the FIGURE moves (or is moved) in relation to the GROUND. The GROUND is a stationary reference event, that is relative to a reference frame (usually along the temporal axis). The FIGURE's temporal location is characterized with respect to this reference frame (Talmy, 2000a, p. 320). However, FIGURE and GROUND are closely interrelated (Talmy, 2000a, p. 289). In other terms, the FIGURE requires anchoring, and the GROUND anchors it (Talmy, 2000a, p. 331).³

The component of MOTION refers to “the presence per se of motion or locatedness in the event” (Talmy, 2000b, p. 25). That is, dynamic motion events refer to translational motion in which the location of the FIGURE changes over time. Hence, it does not refer to kinesis in general, as it does not encompass other types of motion such as self-contained motion (Talmy, 2000b, p. 26). Finally, the fourth semantic component and the core entity of a motion event is the PATH. As mentioned above, this component is seen as the core schema of the motion event in the Talmyan approach (Talmy, 2000b, p. 225). Whereas the CO-EVENT can be omitted, the core schema is

³ For more details on the characterization and relation between FIGURE and GROUND see Talmy, 2000a, pp. 311-344.

seen as critical to a motion sentence (Talmy, 2009, p. 390).

Although a Co-EVENT can bear a range of support relations to the motion event⁴, MANNER and cause are the most frequent and most widely investigated (Talmy, 2000b, p. 26). CAUSE of motion is not relevant to the present study, as none of the critical items intend to trigger the expression of cause. MANNER of motion is considered highly relevant. Together with the component of PATH, MANNER is regarded crucial for typological distinction (section 1.4). Following studies elaborating on this Co-EVENT, the category of MANNER can be subdivided, according to its semantic complexity, into more general MANNERS such as *walk*, *run* or *fly* or more specific distinctions such as *limp*, *sprint* or *swoop* (Slobin, 2004, p. 6). This partition, elsewhere referred to as “manner tiers”, indicates MANNER elaboration and contributes to a typological distinction (Slobin, 1997, 2004, 2006; Jessen, 2014a) (cf. subsection 1.5.1).

1.3.2 Overlapping and divergent semantic distinctions

Distinctions between the semantic units of a motion event have been noticed in different approaches — both dependent on and independent from each other. Labeling the distinction between the semantic components of what Talmy calls MANNER and PATH can at least be traced back to Malblanc (1966, p. 66) who builds upon the ideas and observations of German (e.g. Strohmeyer, 1910) and Romance philologists (e.g. Bally, 1932). In *Stylistique comparée*, Malblanc employs the expression *la direction du mouvement* to refer primarily to French verbs expressing PATH and *la nature du mouvement* to refer to German verbs expressing MANNER (1966, p. 66). Lucien Tesnière (1969) builds on this distinction and re-labels and further develops these semantic elements. In *Éléments de syntaxe structurale*, he distinguishes between *mouvement* ‘movement’ and *déplacement* ‘displacement’ (1969, pp. 307-310). *Mouvement* is regarded as an intrinsic component that depends on the FIGURE’s corporal structure and possibilities and can be expressed in an undefined number of specific verbs such as *trotter* ‘to trot’, *galoper* ‘to gallop’ or *sauter* ‘to jump’. *Déplacement*, on the other hand, is extrinsic, is not centered on the FIGURE and exclusively delineates space.

The terms FIGURE and GROUND are adopted from Gestalt psychology. In Gestalt psychology, Figure refers to the main object that is perceived whereas Ground refers to the background that garners less attention. Although the semantic interpretation

⁴ In a foreword to a recent book edited by Iraide Ibarretxe-Antuñano, *Motion and space across languages and applications* (2017), Talmy notes several aspects that have been underexplored. Among these parameters are the different relations that a co-event can have to a motion event: precursion, enablement, onset causation, extended causation, manner, concomitance, concurrent result and subsequence.

of these entities is different when adopted in motion event terminology (Talmy, 1985, p. 6; 2000a, p. 25) and is far more complex in the field of Gestalt psychology, the basic idea of the GROUND as a reference object and the FIGURE as an object that needs anchoring remains the same (Thiering, 2011, p. 248). This asymmetric relationship between FIGURE and GROUND is employed similarly in Langacker’s (1987) distinction between *trajector* and *landmark*. Langacker defines *trajector* as “the figure within a relational profile” (1987, p. 494) and the *landmark* as “a salient substructure other than the trajectory of a relational predication or the profile of a nominal predication” (1987, p. 490). Yet other terms to refer to the FIGURE and GROUND distinction include *Thema* and *Relatum*, respectively (e.g. Becker, 1994), and other terms to refer to PATH and MANNER of motion are *Vialer und Modaler Aspekt der Bewegung* (Staub, 1949) or *Route* and *Manner* (Wälchli, 2009). Table 1.1⁵ summarizes the terminological complexity of the main semantic units of a motion event.

Table 1.1: Terminological correspondences for the main semantic dimensions of a motion event

Reference	FIGURAL ENTITY	GROUND ENTITY	ASSOCIATION FUNCTION	CO-EVENT
Staub, 1949			Vialer Aspekt der Bewegung	Modaler Aspekt der Bewegung
Malblanc, 1966			direction du mouvement	nature du mouvement
Tesnière, 1969			déplacement	mouvement
Talmy, 1985, 2000a, 2000b	Figure	Ground	Path	Manner
Langacker, 1987	trajector	landmark		
Becker, 1994	Thema	Relatum		
Wälchli, 2009	Shape of Figure	Shape of Ground	Route	Manner

1.4 Motion typology

Although Talmy’s framing approach (see below) is the most widely acknowledged typological distinction in the domain of motion and has been called ‘the Talmyan typology’ (e.g. Ferrari & Batoréo, 2016), there have been important precursors to

⁵ The table is based on Wälchli (2009, p. 8) and Berthele (2006, p. 10).

Leonard Talmy with similar ideas and observations. In the European context⁶, these pre-Talmyan observations have primarily been ascribed to contrastive linguistics rather than linguistic typology (Wälchli & Sölling, 2013, p. 5; Stolova, 2015, p. 21). However, these stylistic observations laid the groundwork for motion typology. The present chapter demonstrates the development from observations in contrastive stylistics to the establishment of a widely-anchored typology.

1.4.1 Development of a motion typology

In the European context, several authors in comparative stylistics and structuralistics have noticed that there is a prominent difference in expression between Germanic and Romance languages in the domain of motion. In the early 20th century, several German and Romance philologists remark that German has a range of specific verbs, whereas French is more restricted in the domain of motion (e.g. Strohmeyer, 1910; Bally, 1932). To illustrate this difference of motion verb specification, Strohmeyer's (1910, pp. 217-218) observation deserves to be quoted here⁷:

Ganz besonders zeigt sich die Abneigung des Franzosen gegen das Spezialisieren der Begriffe bei den **Ausdrücken der Bewegung**. *Aller* heisst bekanntlich alles: "gehen", "fahren", "reiten", "fliegen", "segeln", "steigen", "sinken" usw. [...] Dasselbe hat sich nun auch mehr oder minder auf die anderen Verben der Bewegung übertragen, besonders auf *entrer* [...], *sortir*, *arriver*, *venir*, *revenir*, *retourner*, *descendre*, *traverser*, *suivre*, *précéder* usw. Ob die Rede ist von einem Zuge, der *einfährt* und *ausfährt*, von einem Boote, das *hineingleitet* und *herausgleitet*, von einer Biene, die in den Stock *hineinfliegt* und wieder *herausfliegt*, von einem Bergmann, der in den Schacht *hineinsteigt* und wieder *heraussteigt*, von einem federnden Maschinenteil, der in sein Lager *hineinspringt* und wieder *herausspringt*, dem Franzosen genügt überall ein einfaches *entrer* und *sortir*.⁸

Building on these ideas of German's verbal richness in the expression of motion and French's verbal simplicity, Malblanc (1966, p. 66) notes that for the French verb

⁶ Beyond the European context, similar observations have been made in contrasting Japanese to Romance languages (Miyajima, 1984, cited in Matsumoto, 2003, p. 407).

⁷ The emphases are adopted from the original. All the German and French quotes in this chapter are translated freely by the author of this thesis.

⁸ *Translation*: The French reluctance toward specifying notions is particularly prominent in **motion expressions**. *To go*(French) can, as is known, mean everything: "going", "driving", "riding", "flying", "sailing", "ascending", "sinking" etc. [...] The same is true for the other motion verbs, in particular *enter*, [...] *exit*, *arrive*, *come*, *come back*, *return*, *descend*, *cross*, *follow*, *precede* etc. If there is talk of a train, which *runs in* and *leaves*, of a boat which *floats in* and *floats out*, of a bee, which, *flies in* and *flies out of* a hive, of a miner, who *descends* and *ascends* the mine, of a springy machine component, which *hops in* and *hops out of* the stock, for The French, a simple *enter* and *exit* suffices.

entrer 'to enter', the German translation would use several different verbs such as *laufen* 'to walk', *treten* 'to step' and *fliegen* 'to fly'. He explains this difference in verbal specification in the following words (Malblanc, 1966, p. 66):

Le français n'a qu'un seul verbe, parce qu'il a, dans ce verbe, retenu seulement la direction du mouvement qui est la même dans les trois cas. L'allemand a trois verbes composés, parce que, en même temps que la direction du mouvement, il indique la nature de celui-ci, nature qui, différente dans les trois cas, est exprimée par le verbe proprement dit. La particule, exprimant le sens du mouvement, se retrouve la même ou presque, puisque ce sens reste le même.⁹

Tesnière (1969, pp. 307-310) elaborates on this perception of verbal confinement by referring to geometrical confinement of space. The notions describing *déplacement* are limited in number, as they are only meant to describe the axes of three dimensions: up and down, left and right, and back and forth. Tesnière provides some examples of verbs expressing *déplacement* in French (*entrer* 'to enter' and *sortir* 'to exit' or *monter* 'to ascend' and *descendre* 'to descend') and some examples of prepositions in German (*auf* 'up' and *ab* 'down' or *hin* 'hither' and *her* 'thither') and remarks that due to the geometrical axes, these verbs and prepositions usually come in opposing pairs. The observation that PATH (or *der viale Aspekt der Bewegung*) is expressed outside the verb in German, can also be found in the contrastive work of Staub (1949, p. 21) (as cited in Jokinen, 2005, p. 54):

Im allgemeinen scheint der implizite Richtungsgehalt des einfachen deutschen Verbum schwach und vor allem in der Umgangssprache selten. Der Bedeutungskern des Verbum liegt in der Bewegung, im modalen Aspekt der Bewegung. Die Richtung dieser Bewegung, ihr Verlauf im Raume, ihr vialer Aspekt, wird ausserhalb des Verbum festgelegt, im Adverb, im adverbialen Präfix, in der adverbialen Ergänzung.¹⁰

Tesnière (1969, p. 309) notices that even though the dimension of PATH (or *le déplacement*) can be expressed outside the verb slot in French such as in the

⁹ *Translation:* French has only one verb, because it has, in this verb, only kept the direction of motion, which is the same in the three cases. German has three compound verbs, because, at the same time as the direction of motion, it indicates the nature of it. The nature, which is different in the three cases is expressed by the actual verb. The particle, which expresses the direction of motion, is there or nearly, as its meaning remains the same.

¹⁰ *Translation:* In general, the implicit meaning of direction of the simple verb seems weak and — particularly in vernacular language — rare. The core meaning of the verb lies in the motion, in the modal aspect of the motion. The direction of this motion, its progress in space, its vial aspect, is specified verb-externally, in an adverb, in an adverbial prefix, in an adverbial complement.

preposition *à travers* in example 1, it would not convey the resultative meaning as in the German translation *über* in example 2, which allows a straightforward way to express change of location.

- (1) *Antoine nage à travers le fleuve.*
 ‘Antoine swims across the river.’
- (2) *Anton schwimm über den Fluss.*
 ‘Anton swims across the river.’

Therefore, the PATH must be expressed in the verb in French to convey a resultative meaning. As for the dimension of MANNER (or *mouvement*), Tesnière (1969, p. 309) notices that in French, this constituent is either expressed in a substantive (example 3) or in a gérondif (example 4), because the verb slot is reserved for the expression of PATH:

- (3) *Antoine traverse le fleuve à la nage.*
 ‘Antoine crosses the river at the swim.’
- (4) *Antoine traverse le fleuve en nageant.*
 ‘Antoine crosses the river by swimming.’

These contrastive stylistic observations on the syntactic distribution of the semantic dimensions of a motion event correspond precisely to the phenomenon on which Leonard Talmy bases his semantic motion typology. According to Talmy, there are two approaches to classifying languages: focusing on a grammatical locus such as the verb root and observing which semantic element it most often expresses, and taking a semantic component as a starting point and observing by which syntactic elements it is most frequently encoded. The former approach is termed *actuating typology* (Talmy, 2000b, chapter 1) and fixes on the main verb root by analyzing the semantic component it expresses. In his dissertation (1972), Talmy compares the polysynthetic language Atsugewi with English and Spanish and carves out a three-way classification according to this actuating approach. Whereas the English motion verb typically expresses a CO-EVENT, the Atsugewi verb conflates MOTION and FIGURE, and the Spanish verb conflates PATH and MOTION (Talmy, 2000b, p. 57). In his later publications, Talmy focuses on the latter approach which is called *framing typology* (Talmy, 2000b, chapter 3) and which is adopted by most researcher working on motion event descriptions. The semantic component taken as the starting point is the PATH or core schema of the motion event. Following the language specific conflation of PATH and MOTION, he establishes a two-way classification. One way to encode the PATH component is in the main *verb* root (viz. verb-framed language). The other way to lexicalize PATH is to express this entity in grammatical constituents such

as prepositions, particles, adverbs, which all fall under the umbrella term *satellite*¹¹ (viz. satellite-framed language). Among Indo-European languages, the verb-framed type is generally represented by Romance languages, while the satellite-framed type is represented by Germanic and Slavic languages.

It must be mentioned that Talmy speaks of *tendencies*, i.e. patterns that are “most colloquial in style, frequent in occurrence, and pervasive across different types of constructions” (Talmy, 2017, p. 4, or also Talmy, 1985, p. 62; 2000b, p. 27). Hence, the typological classification should not be regarded as rigorous dichotomy, but a set of preferences for certain lexicalization patterns. In this way, languages can only be classified by quantitative empirical research (Berthele, 2006, p. 25).

1.4.2 Satellite-framed languages

The status of satellite-framed language (S-language) is ascribed to Germanic and Slavic languages (Slobin, 2004). As outlined in the previous section, the location of PATH is framed in satellites in this language type. Satellites are defined by Talmy (1991, p. 486) as “the grammatical category of any constituent other than a nominal complement that is in a sister relation to the verb root”. A satellite, either a bound affix or a free form, can encompass different grammatical forms, such as German separable or inseparable verb prefixes, English verb particles or Russian verb prefixes. Forms that function as satellites often overlap with forms in a grammatical category. For instance, English satellites often overlap with prepositions, and satellites in Mandarin often overlap with verb roots (Talmy, 2000b, p. 102). These various grammatical forms have semantic and syntactic commonalities, which is the function of the core schema of a typological category of languages (viz. satellite-framed languages) (Talmy, 1991, p. 486)¹². In the satellite-framing pattern, the CO-EVENT is then characteristically mapped onto the verb, which is thus termed co-event verb (Talmy, 2000b, p. 222). The syntactic mapping of the macro-event is illustrated in Figure 1.2¹³.

¹¹ See subsection 1.5.3 for problems with this term.

¹² Cf. subsection 1.5.3 for critiques of and revision to this definition.

¹³ The figure is adapted from Talmy (2000b, p. 223).

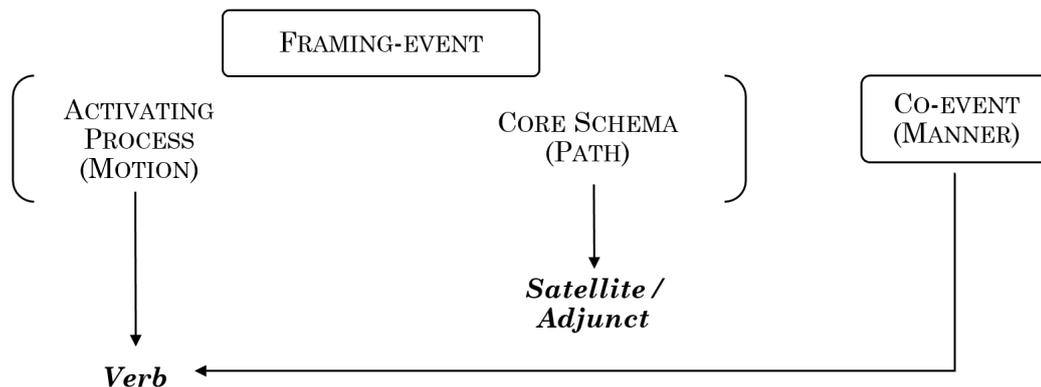


Figure 1.2: Syntactic mapping of macro-event in a satellite-framed language

Drawing on (Swiss-)German data from the present project, examples 5 through 7 correspond to this characteristic satellite-framed mapping of MANNER on the main verb and the PATH component verb-externally¹⁴:

- (5) *es oranges männkli hüpfet in es huus* (31-K2-de-IV)
 ‘an orange manikin hops into a house’
- (6) *er dreht schich us em hüüs us* (127-K1-de-IV)
 ‘he turns himself-REFL out a house out-of’
- (7) *der mann hüpfet glücklich in ein haus hinein* (20-K2-de-III)
 ‘the man hops happily in a house into’

In example 5, the PATH component is mapped on the preposition *in*, while the MANNER of movement is expressed in the verb *hüpfen*. Example 6 illustrates a syntactic distribution of the PATH component on two grammatical elements: the path preposition *us* (‘aus’) and the path particle *us* (‘heraus’). This case of *distributed spatial semantics* is discussed in subsection 1.5.1 and subsection 1.5.3. In example 7, the speaker specifies the MANNER of motion, which is already expressed in the verb *hüpfen* with an additional MANNER element expressed in the adverb *glücklich*.

However, as mentioned above, the focus in the framing-typology is on “tendencies” or “characteristic patterns of conflation” (Talmy, 1985, p. 62; Talmy, 2000b, p. 27). Hence, alternative conflation patterns can occur where PATH is not expressed in satellites, but rather in the main verb root. This pattern would correspond to typical verb-framing lexicalization. Such a verb-framing lexicalization in S-languages is shown in example 8:

¹⁴ Throughout this thesis, all examples taken from the data are followed by a code indicating the ID-number of the participant, the item, the language mode and the number of the session (see Appendix C for further explanation of these codes). The items are described in section A.1.

- (8) *er verlohnt s huus mit dreihende bewegige* (80-K1-de-IV)
'he leaves the house with revolving movements'

The finite verb *verlohnt* expresses the PATH whereas the prepositional phrase *mit dreihende bewegige* expresses the MANNER of motion. Constructional variations and expressions with neither PATH nor MANNER mapping in the finite verb are discussed in subsection 1.5.3. S-languages can differ in their tendencies to express PATH or MANNER in the verb. In German, for instance, the PATH is less often expressed in the verb than it is in English, because English shows a great number of Latinate path verbs¹⁵ (Carroll & von Stutterheim, 1993; Hendriks, 2005; Carroll et al., 2012). Such intratypological differences are discussed in subsection 1.5.2.

Due to the tendency to express the MANNER component in the main verb slot, it is more likely to describe the optional Co-EVENT in S-languages than in verb-framed languages (Slobin, 2004, 2006). Therefore, S-languages show not only different rhetorical styles (Slobin, 1996, 1997) but also greater specificity and lexical diversity (Berman & Slobin, 1994; Slobin, 2004; Cappelle, 2012; Slobin, Ibarretxe-Antuñano, Kopecka, & Majid, 2014). This observation has also led Slobin (2004, p. 26) to propose a typology based on MANNER salience rather than a binary division based on the mapping of the PATH (cf. subsection 1.5.1).

1.4.3 Verb-framed languages

Verb-framed languages (V-languages) are represented by Romance languages, but also a range of other, non-Indo-European languages have been investigated empirically and identified as V-languages such as Japanese (Wienold & Schwarze, 2002; Bauer, 2010) or Korean (Choi & Bowerman, 1991). In contrast to S-languages, the PATH element is characteristically encoded in the main verb root in V-languages. Drawing again from data in the present project, examples 9 and 10 show the typical pattern for the V-language French:

- (9) *il sort d'une maison* (3-K1-bjfr-III)
'he exits from-a house'
- (10) *le robot sort de la maison en dansant* (21-K1-bjfr-IV)
'the robot exits from the house by dancing'

In example 9, the PATH element is mapped on the main verb *sortir* and the event description lacks a lexicalization of the Co-EVENT. As discussed in the previous section, compared to S-languages, V-languages are said to show a lower tendency to express the optional Co-EVENT component. However, V-languages display a variety

¹⁵ Talmy (1985, p. 72) has already noted such differences due to diachronic reasons. However, he remarks that these verb forms are borrowings from Romance languages and are not original English verb forms.

of means to express MANNER in constituents other than the verb (Özçalışkan & Slobin, 2003) such as in the gérondif in French (see example 9), ideophones in Japanese (Sugiyama, 2005; Bauer, 2010) and even gestural depictions (Slobin, 2004; Gullberg et al., 2008). As in S-languages, the tendency to encode the MANNER component is language dependent. Ohara (2002) and Sugiyama (2005), for instance, argue that Japanese provides more means to express MANNER and thus shows a higher tendency to express MANNER than other V-languages do (cf. subsection 1.5.2). The possibility to express MANNER in the finite verb however, is far more restricted. Examples 11 and 12 illustrate how French speakers express MANNER of motion in the verb constituent:

- (11) *il court dans une maison* (30-K2-bjfr-I)
 'he runs in a house'
- (12) *il saute joyeusement dans une maison* (20-K2-fr-III)
 'he hops happily in a house'

In examples 11 and 12, the finite verbs *court* and *saute* express the Co-EVENT whereas in both cases, the PATH element is encoded in the preposition *dans*. However, these constructions are ambiguous since the prepositional phrase (PP) *dans une maison* may be read with either a directional or a locative meaning. In contrast to French, German is vested with grammatical means to distinguish the former type from the latter. Hence, *dans une maison* would translate to a directional meaning by means of an accusative ('in ein Haus') or to a locative by means of a dative ('in einem Haus'). To unambiguously convey the directional meaning, the main verb slot should not be occupied with the MANNER constituent in case of a boundary-crossing situation¹⁶. Example 12 shows a MANNER elaboration in the verb and a specification in the adverb *joyeusement*, which demonstrates that MANNER elaboration shows up in V-languages, as well. The characteristic mapping of the motion components on the syntactic structure of a V-language is illustrated in Figure 1.3¹⁷.

¹⁶ This constraint of lexicalization is termed *Boundary-Crossing Constraint* and is discussed in section 1.6 at its length.

¹⁷ The figure is adapted from Talmy (2000b, p. 223).

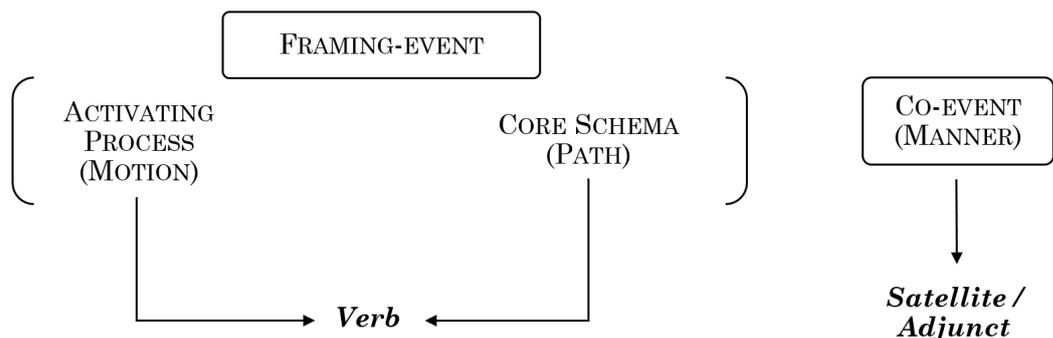


Figure 1.3: Syntactic mapping of a macro-event in a verb-framed language

1.5 Critique and redefined typologies

As Pourcel and Kopecka (2005, p. 143) put it, “typologies leak in general and languages do not always afford a tight fit into typological classifications”. Empirical research based on Talmy’s typology has been extensively produced, and more and more languages and language varieties have been added to either the list of verb-framed or satellite-framed languages (cf. list of Frog Story studies in the Appendix of Strömquist & Verhoeven, 2004, pp. 487-518). However, as this list of studies has grown, more critiques have arisen and more examples of languages that do not fit in either typological category have been discussed. Berman and Slobin (1994, p. 118) point out, “as a general caveat, it should be remembered that typological characterizations often reflect tendencies rather than absolute differences between languages.” Even though this fact is recognized by Talmy (1985, p. 62; 2000a, p. 27) and already Malblanc (“toutefois, rien d’absolu” Malblanc, 1966, p. 69), some scholars (Wälchli, 2001, 2009; Matsumoto, 2003; Narasimhan, 2003; Slobin, 2004, 2008c; Zlatev & Yangklang, 2004; Bohnemeyer et al., 2007; Beavers, Levin, & Wei Tham, 2010; Croft, Barðdal, Hollmann, Sotirova, & Taoka, 2010; Grinevald, 2011; Pavlenko & Volynsky, 2015) have still been unsatisfied with the typologies as they stand and have expanded and proposed improvement to them. The most important points and concerns for the languages in the present study are discussed in the following sections.

1.5.1 Dichotomy, trichotomy or a continuum?

Based on Talmy’s classification of languages and language families according to their lexicalization pattern preferences, a number of scholars have empirically investigated his propositions. While he proposes a two-way typology, Talmy (2000b, pp. 64-67) also points out that within the language groups, there are split systems, parallel

systems and intermixed systems of conflation. In the *split systems*, languages exhibit different conflation types for different types of motion events. This applies to V-languages such as Spanish or French in the case of a boundary-crossing situation (cf. section 1.6). In the *parallel system of conflation*, also called *alternate framing* (Fortis, 2010, p. 24), different conflation patterns can be used for the same event. The *intermixed framing pattern* applies to languages that exhibit no consistent pattern for some types of motion events, but rather intermix various forms of conflation. These different systems of conflation did not receive much attention initially, but have been revisited in recent years (Goschler & Stefanowitsch, 2013, p. 3). Talmy (2012, p. 1) refers to them as “minor typological categories” and treats them as alternative patterns within his dichotomous framework. With the study of serial languages such as Mandarin, which Talmy (1985, p. 68) and more recent studies again (Fong, 2016) have classified as an S-language, it has been noted that this type of language does neither correspond to an S-language nor a V-language pattern of conflation. In fact, Mandarin has a pervasive verbal system in that at least two verb slots can be encountered in a single clause, and MANNER can be mapped on the one slot whereas PATH can be mapped on the other (Zlatev & Yangklang, 2004; Chen & Guo, 2009, 2010). As both MANNER and PATH are expressed by “equipollent” elements, or “elements that are equal in formal linguistic terms, and appear to be equal in force or significance” (2004, p. 226), Slobin proposes a third category of languages to Talmy’s dichotomy.¹⁸ This tripartite typology, however, has been criticized for different reasons. Several scholars argue for the classification of serial languages as S-languages, even though they do not show the typical satellite-framed pattern (Talmy, 2000b, 2009; Peyraube, 2006; Lambert-Brétière, 2009; Fong, 2016).

Croft et al. (2010, p. 208) argue for the expansion of Talmy’s binary typology by focusing on construction types rather than on individual grammatical elements and propose a more fine-grained distinction of types. They describe verb-framed and satellite-framed constructions as asymmetric since the semantic components of PATH and MANNER are not encoded within the same grammatical elements. In order to account for symmetric constructions like serial verb constructions, compound constructions or coordinate constructions¹⁹, they propose to include the

¹⁸ Equipollently-framed language refers not only to serial languages where a path verb and a manner verb are expressed in the same clause, but also to systems with bipartite verbs (i.e. a verb-complex of two morphemes, one expressing MANNER, the other PATH) or to systems where generic verbs are combined with co-verbs encoding PATH and MANNER (Slobin, 2004, p. 228). Hence, equipollent-like framing can be found in languages otherwise classified as satellite-framed or verb-framed such as English with its *go/come-and-V* and *go/come-V* constructions (Goschler & Stefanowitsch, 2013, p. 4).

¹⁹ Compound constructions can be found in indigenous North American languages such as Kiowa, in which two forms are morphologically bound or are more tightly integrated than in serial verb constructions but can occur independently as verbs in the language. Coordinate constructions refer to a combination of semantic components such as PATH and deictic meaning, which can be found in

category *symmetrical-framing*. Furthermore, they include the category *double-framing* for constructions where the PATH component occurs twice — in the verb root and in a satellite. This construction appears in both French and German and has been recognized by different scholars. Therefore, different labels exist for this phenomenon such as *double marking* (Bohnenmeyer et al., 2007, pp. 512, 514), *pleonastic* or *redundant constructions* (Olsen, 1996 in Berthele, 2004b, 2006) or it can be considered as a form of *distributed spatial semantics* (Sinha & Kuteva, 1995). This type of construction will be treated as constructional variation and is discussed further in subsection 1.5.2. Croft et al. (2010, p. 230) argue that an entire language should not be classified to one type, but can rather make use of these constructional alternatives depending on the type of motion event; all languages are therefore “mixed”. Besides two-way, three-way or multiple construction based classifications, several scholars hold for a continuous classification. Slobin himself has criticized a trichotomic distinction in the same paper he proposes it, favoring a continuous classification of languages according to their degree of MANNER saliency (Slobin, 2004, p. 223):

“it is more useful to rank languages on a cline of manner salience than to allocate them to one of several distinct typological categories.”

The idea of a continuous classification has been considered by others (Berman & Slobin, 1994; Ibarretxe-Antuñano, 2009; Ibarretxe-Antuñano & Hijazo-Gascón, 2012; Hijazo-Gascón & Ibarretxe-Antuñano, 2013; Fanego, 2012; Filipović, 2007, 2013). Slobin later again proposes and elaborates on the trichotomy (2006) and the tripartite distinction has continued to be embraced in comparative studies (Bohnenmeyer et al., 2007; Chen & Guo, 2009, 2010). However, the continuous classification has gained widespread approval especially in studies facing intratypological variation (cf. subsection 1.5.2).

In the cline of MANNER salience paradigm, Slobin (2004, p. 250) ranks languages from high-MANNER salient to low-MANNER salient. In high-MANNER salient languages, there is an accessible slot for the expression of the MANNER of motion such as the main verb in S-languages, manner verbs in serial languages, MANNER morphemes in bipartite verbs, coverbs or ideophones. In low-MANNER salient languages on the other hand, MANNER is subordinate to PATH or is left out altogether. As a consequence, speakers of high-MANNER salient languages show a richer manner verb inventory and tend to provide MANNER-related information more regularly than speakers of low-MANNER salient languages. In low-MANNER salient languages, the semantic component of MANNER is only expressed when it is foregrounded (Talmy, 1985, p. 72;

Amele, a Papuan language (Croft et al., 2010, p. 207).

Talmy, 2000b, p. 128; Slobin, 2004, p. 450). The foregrounding or backgrounding of information has led scholars to hypothesize that there are cognitive differences in encoding patterns between different language types (Cadierno, 2008, p. 245) (cf. section 1.1). Furthermore, the degree of MANNER saliency depends on the type of motion event. As MANNER of motion tends to be expressed less frequently in certain language types when a spatial boundary is traversed, boundary-crossing contexts are crucial for typological distinctions (cf. section 1.6).

While Slobin proposes allocating languages on a continuum with respect to MANNER saliency, other scholars note that the degree of elaboration metric can also be applied to PATH (Ibarretxe-Antuñano, 2004b, 2004a; Ibarretxe-Antuñano & Hijazo-Gascón, 2009; Filipović, 2007, 2013) or GROUND (Ibarretxe-Antuñano, 2009) and languages can thus be ranked on a cline of saliency of the different semantic components of motion.

Fortis (2010, p. 10) identifies several problems with the continuous classifications. First, it involves factors such as the number of manner verbs or the frequency of MANNER specification which do not necessarily covary. Second, different strategies of motion description are collapsed as criterial parameters (e.g. encoding of PATH in the verb) and are not distinguished from typical features (e.g. low GROUND specification). Considering the proposed cline of MANNER saliency, he claims that it is “as dichotomous as the typology it sought to replace” (Fortis, 2010, p. 10) since the classification of high and low-MANNER salient languages is still binary. Fortis (2010, p. 10) further claims that Slobin (2004, 2005, 2006) corroborates Talmy’s typology, because he correlates the verb-framed and satellite-framed dichotomy with MANNER saliency and PATH elaboration, but obfuscates the status of languages that are atypical with respect to these correlations. Similarly, several scholars (Matsumoto, 2003; Wälchli, 2009; Goschler & Stefanowitsch, 2013; Berthele, 2013) argue that it is not justified to equate S-languages with high manner-saliency. While S-languages may not express the PATH in the verb, they do not have to conflate MANNER in the main verb slot and may choose neutral or deictic verbs, instead.

Along these lines, it must be noted that the idea of a cline of MANNER saliency or PATH saliency has been misinterpreted in several papers (e.g. Pourcel, 2004, p. 350) in that it is interpreted as ranging from MANNER-salient to PATH-salient, instead of from high-MANNER salient to low-MANNER salient, which presents problems on different levels. For instance, German tends to show more elaboration of both MANNER and PATH in comparison to French (cf. Berman & Slobin, 1994, pp. 118-119). Hence, less elaboration of the MANNER component does not imply greater elaboration of the PATH component, which again calls into question whether both dimensions belong to the same semantic domain (Berthele, 2013, p. 72, Wälchli, 2009, p. 211). In his data,

Berthele (2013, p. 58) only finds a weak correlation between the two:

“Expressing *how* displacement takes place is not the same as expressing the *whereabouts* of a figure entity, and although one can express both aspects in one clause in many languages, this does not necessarily imply that the two domains have to be treated as two aspects of one type of event construal.”

The vague boundaries and problems of the dichotomous, trichotomous or continuous classifications have led several authors to question the typology itself and — similar to Croft et al.’s (2010) construction typology — advocate that the satellite- or verb-framed constructions should not be applied to entire languages, but rather should be regarded as options among which a speaker of a certain language type can choose (e.g. Beavers et al., 2010, p. 334). Hence, languages may fall in several crosscutting types, and lexicalization patterns are in fact just consequences of a language’s general semantic and morpho-syntactic properties. Thus, the motion event typology can be regarded as a peripheral epiphenomenon of other language characteristics (Goschler & Stefanowitsch, 2013, p. 6).

Even though various problems with the motion typology have been identified and discussed with the motion typology, I follow most researchers and work with a binary distinction in this thesis while bearing in mind that typological homogeneity does not exist.

1.5.2 Variation: Intratypological, diatopic and individual

Besides the inter-typological differences and consequent difficulties in setting typological boundaries discussed in the previous section, studies have shown that differences are not only encountered between language types sharing the same affiliation with a lexicalization pattern, but within the same language group, language variety and between individual speakers, as well. Ibarretxe-Antuñano (2009, p. 404) points out the existence of intratypological variation:

“Languages that share the same lexicalization pattern, and therefore, a similar habitual expression of motion, show a different degree of detailed elaboration of semantic components. In other words, languages might belong to the same group, but this does not imply that they characterize the motion event in the same way, both qualitatively and quantitatively.”

Variations in lexicalization patterns have been observed between genealogically different languages that share framing patterns. Concerning V-languages, differences

in PATH elaboration have, for example, been reported between Basque and Spanish (Ibarretxe-Antuñano, 2004b, 2004a, 2009), as well as Norwegian and Bulgarian (Dimitrova-Vulchanova, Martínez, Eshuis, & Listhaug, 2012), and differences in MANNER elaboration have been reported between Japanese and Spanish (Sugiyama, 2005)²⁰. However, such variations occur equally in languages that share a genetic affiliation. Along these lines, a range of empirical studies have documented intratypological variations within different language families (e.g. Huang & Tanangkingsing, 2005 for Austronesian languages; Hijazo-Gascón, 2011 and Hijazo-Gascón & Ibarretxe-Antuñano, 2013 for Romance languages, i.e. Italian, French and Spanish; Ragnarsdóttiri & Strömqvist, 2004 for the Germanic family, i.e. Swedish and Icelandic or Hendriks, 2005 and Carroll et al., 2012 for English and German). For instance, Hijazo-Gascón and Ibarretxe-Antuñano (2013) examine differences in PATH encoding between languages of the same group. They compare elicited Frog-story narratives in French, Italian and Spanish and conclude that PATH descriptions vary a great deal within the same genetic family. Given that Italian shows high PATH elaboration (see also Bernini, 2010, 2012; Hijazo-Gascón, 2011; Mosca, 2012), it is classified as a *high-path salient language*, whereas French is considered a *low-path salient language*.

Variations in lexicalization patterns within the same genetic family may even be so striking that it is no longer justifiable to ascribe a V-language or S-language status to a language type where this status might be assumed. Hence, Germanic languages are not compulsorily S-languages, and Romance languages are not compulsorily V-languages. Berthele (2006, 2013) extensively describes this observation and notes that although the Swiss minority language Romansh displays more cognates with Romance languages than with Germanic languages, it behaves differently in terms of syntax and shows a rather satellite-framed pattern with respect to motion lexicalization (2006, p. 113).

Similarly, Schwarze (1985) finds that certain Northern Italian varieties behave like S-languages (as cited in Hijazo-Gascón & Ibarretxe-Antuñano, 2013, p. 45) (see also Filipović, 2013, p. 22). However, satellite-framed patterns have also been found in other Italian dialects (Spreafico, 2008). The satellite-framed structures in Northern Italian varieties might not be due to German influence, but to diachronic change. Similar observations of satellite-framed patterns as Latinate inheritance have been found in French (cf. subsection 1.7.1). For Romansh however, the contact argument seems still legitimate given that Swiss-German's adstratum impact not only exists regionally; speakers are bilingual in German and Romansh (Berthele, 2003, 2004b, 2006, 2013).

²⁰ The difference between PATH and MANNER elaboration led to the continuous classification of languages discussed in the previous section.

A crucial methodological problem in typological research is the definition and oversimplification of ‘language’ (Berthele, 2004c, 2004a, 2005, 2006, 2013, 2014). Berthele (2004a, p. 118) notes that languages are usually treated as “homogenized categories” and the focus mostly lies on standard varieties. However, languages such as ‘French’ or ‘German’ are “bundles of sociologically, stylistically, and regionally stratified usage patterns” (Berthele, 2013, p. 57). The boundaries between these categories are “notoriously unclear” and there are simply “no purely linguistic grounds that license decisions on the ‘language status’ of a particular set of linguistic practices” (ibid). Furthermore, the status of a *dialect* or a *language* can change as in the case of Romansh in Switzerland, which has formerly been regarded as a dialect of Italian and is nowadays declared as national language of Switzerland — a political decision rather than a demarcation based on lexicalization patterns.

Along these lines, Berthele (2004b, 2005, 2006, 2007, 2009, 2013) and Berthele, Whelpton, Næss, and Duijff (2015) investigate cross-linguistic differences within different Romansh idioms and Swiss-German dialects. Compared to standard varieties, such as French for the Romance family and Standard German for the Germanic family, the lexicalization patterns of the substandard varieties show a different picture. For instance, Swiss-German speakers of the Muotathal dialect tend to favor complex PATH descriptions, which is different from speakers of other Swiss German dialects and even more different than speakers of Standard German. Moreover, they tend to omit manner verbs more frequently than speakers of Standard High-German. Some Muotathal dialect speakers use even fewer manner verbs than French speakers (Berthele, 2006, pp. 124-126). Diatopic variations within lexicalization patterns are also documented in other language varieties (e.g. Schwarze, 1985 and Spreafico, 2008 for Italian varieties; Ibarretxe-Antuñano & Hijazo-Gascón, 2012 for Spanish varieties).

Furthermore, Berthele (2004a, 2004b, 2006, 2013) observes that not only diatopic but also diastratic variables involving sociolinguistic factors are responsible for this variation. Whereas standard varieties share a written tradition, the dialects and idioms that were investigated are predominantly used orally (Berthele, 2006, pp. 237-246). Bernini (2010, p. 48) confirms the relevance of accounting for the diamesic dimension of variation, that is the continuum between oral and written language in investigating choice of lexical strategies and typological distinctions. In comparing four studies on Turkish-German contact varieties, Goschler (2013) confirms that sociolinguistic factors, such as formality must be taken into account when investigating variation of motion event encoding. In line with the formality argument, language size — in number of speakers — is a relevant predictor of variation (Berthele, 2013).

Finally, variations in lexicalization patterns are also due to individual speakers and idiosyncratic differences. Sociolinguistic factors, such as educational backgrounds or occupational status, as well as linguistic profiles are relevant predictors of variation (Berthele, 2006, 2013). Although variations resulting from speaker and task idiosyncrasies are evident, they are often neglected (Berthele, 2014, p. 42).

1.5.3 Revised notions and constructional variation

The motion typology has been challenged not only because of observed variations, but also because of vague definitions of certain concepts or definitions that do not apply to all empirical data. In order to understand the critiques that are relevant for the present investigation, it is important to delve more deeply into the notion of satellite, the semantic domains of *MANNER* and *PATH*, and their surface distribution.

The notion of ‘satellite’ has been criticized for being defined too vaguely — either too broadly or too narrowly (Beavers et al., 2010; Croft et al., 2010; Filipović, 2007, 2013). One of the major points of critique is that the difference between satellites and prepositions is not clear in many languages (Filipović, 2013). In German, for instance, the notion is problematic insofar as a satellite can be dropped and *PATH* can be encoded with the *GROUND* element in a local prepositional phrase (Berthele, 2006, p. 35). Wälchli (2006, p. 4) argues that the definition of satellite as it stands includes affixes and particles of various kinds that may have little in common (as discussed in Goschler & Stefanowitsch, 2013, pp. 5-6). Hence, he proposes a more fine-grained typological approach by taking the grammatical loci of *PATH* encoding as a starting point and distinguishing *verbal* (i.e. by the verb stem) from *adverbal* (i.e. by verb affixes or verb particles) and *adnominal* (i.e. by prepositions, postpositions and case markings) encoding (Wälchli, 2001, p. 301). Berthele notes that both, the adverbial and the adnominal category, are in a “sister position to the head of the verbal phrase” and both are “arguments rather than adjuncts” (Berthele, 2004b, p. 19). In this distinction, the adverbial category captures largely what Talmy names satellites and the adnominal category accounts for the other, verb-external cases of *PATH* encoding. For the languages in the present thesis, a similar approach in coding is adopted to capture the differences between verb-external *PATH* descriptions in French and German (cf. section C.6).²¹

Similarly, although rather straightforward in most investigated languages, the

²¹ Even though there might be categorical overlaps between satellites and prepositions, Croft et al. (2010, p. 5) point out that in the Talmyan typological approach, what matters is the locus in which the *PATH* is expressed, whether in the verb or elsewhere. Along these lines, Slobin (2008b) proposes to reclassify the distinction between V-languages and S-languages as PIV-languages (path in verb) or PIN-languages (path in non-verb) (cited in Filipović, 2013, p. 21).

notion of the verb has been criticized. Matsumoto (2003, p. 408) claims that the notion can be misinterpreted. Likewise, Croft et al. (2010, p. 5) explain that the identification of a verb is not straightforward across languages, since different criteria for identification are employed. They note that these criteria are not “crosslinguistically comparable, in that they employ language-specific constructions”. Furthermore, Wälchli (2009, p. 186) notes that “Talmy implicitly assumes that languages are usually verb solitarizing”; that is, motion events are expressed in only one lexical main verb, which would not account for constructions with auxiliaries such as *he will run* or constructions combining deictic and manner verbs as in *he comes running* (Wälchli, 2009, p. 187). Matsumoto (2003, p. 408) argues that what has been referred to as ‘verb’ in the motion typology concerns the head of the clause. He proposes relabeling the distinction between V-language and S-language as *head-framed languages* and *nonhead-framed languages* (ibid). In coding the data for the present project, several constructional variations (e.g. modal verb and motion verb combinations) are identified, which are analyzed similarly to single finite motion verb constructions (see section C.3).

Departing from observations that the component of PATH can be expressed in multiple syntactic elements, Sinha and Kuteva (1995, p. 193) argue that semantics is distributed in spatial language:

“spatial relational semantic information — the “linguistically conceptualized spatial relational referential situation” — is irreducible to the individual contributions of members of any single lexical form class.”

This polymorphist position is called *distributional spatial semantics* and has been downplayed considerably, as it further complicates typological distinctions (Wälchli & Sölling, 2013, p. 36). The distribution of the semantic elements of motion events over several categories is encountered in complex PATH descriptions not only in German (cf. example 4), where it is even encountered quite frequently (Berthele, 2006, p. 181) and where it is either pleonastic or complementary (Berthele, 2004a, p. 97), but also in French constructions that combine elements of different classes. Berthele (2006, p. 235) argues that the preposition *dans* in *entrer dans* contributes to the encoding of PATH. Hence, PATH is mapped on the verb and on a preposition. This is also the case in other pleonastic or redundant constructions, such as in *monter en haut* or *descendre en bas*.

Another criticism of the motion typology arises from the nature of the semantic categories of a motion event (cf. Filipović & Ibarretxe-Antuñano, 2015, p. 531). Hence, the categories MANNER and PATH are considered too general to account for the similarities and differences encountered in patterns of lexicalization. Consequently,

several scholars call for subdivisions of PATH (Wälchli, 2001; Berthele, 2006; Filipović, 2007, 2010; Narasimhan, 2003; Slobin, 2008b; Talmy, 2000a; Arias Oliveira, 2012; Dimitrova-Vulchanova et al., 2012). As an example, Wälchli (2001) distinguishes between six different PATH types, which he calls cardinal kinds of displacement. This subdivision is relevant in distinguishing tendencies cross-linguistically and establishing a more fine-grained typology. On the other hand, several authors propose subdivisions of the MANNER component, as well (Filipović, 2010; Özçalışkan & Slobin, 2003; Slobin, 2005; Harr, 2013; Slobin et al., 2014). In a more recent cross-linguistic study on MANNER descriptions, Slobin et al. (2014) identify several MANNER types specifically for the languages of the study and distinguish between more and less expressive MANNERS of motion.

1.6 The Boundary-Crossing Constraint

As discussed previously, V-languages and varieties can use manner verbs in combination with path particles, which constitutes the preferred pattern in S-languages and the PATH component can be expressed in the main verb in S-languages. However, empirical data has shown that there are certain constraints²² to this variation, namely in the way semantic components are employed to describe the crossing of a spatial boundary. According to Filipović (2013, p. 25), the crossing of a spatial boundary is perceptually and linguistically salient. When a boundary is crossed, there is a change of state, and there seems to be a “general human interest in movements that cross boundaries” (Slobin, 1997, p. 443). Speakers of S-languages predominantly use manner verbs, whereas speakers of V-languages describe the traversal of a spatial boundary using a path verb, since the use of a manner verb can lead to violations of grammatical constraints (Özçalışkan, 2013, p. 2). Aske (1989)²³ initially points out this phenomenon, and Slobin and Hoiting (1994) eventually coin the term *Boundary-Crossing Constraint*. According to several scholars, this constraint can even serve to determine the typological affiliation or the tendency to which a certain language variety might belong (e.g. Özçalışkan, 2013, p. 4).

Comparing English and Spanish lexicalization patterns, Aske (1989) observes that Talmy’s (1985, p. 63) formulation that Spanish generally does not make use of manner verbs in combination with PATH complements is not always accurate. Based

²² Other constraints for motion event clauses, such as the *Unique Vector Constraint* (Bohnenmeyer, 2003), have been put forth in motion event literature. However, a discussion of these constraints is not relevant in the present thesis given that the cross-linguistic differences between German and French are not expected to concern these constructions. Complex PATHS involving multiple vectors in the items were avoided, which can be explained by the simplicity of the items (cf. subsection 4.2.3).

²³ Note that Jackendoff (1990, pp.223-225) puts forth similar ideas from a different, generative perspective.

on his findings, he suggests that there are two types of path phrases: the mere locative and the telic path phrase. The locative path phrase merely predicates the location of the whole proposition and is “modification and atelic” (Aske, 1989, p. 6). The telic path phrase predicates, besides the PATH of the motion, the end of the PATH location/state of the FIGURE. Spanish and other V-languages only use locative path phrases, whereas in S-languages, both path phrases are possible. Since V-languages do not have the kind of telic PATH arguments used in S-languages, telicity must be expressed in the verb. In Aske’s terms “Spanish doesn’t have resultative non-verbal predicates at all, it only has depictive ones” (ibid).

Slobin and Hoiting (1994) rework these arguments. In their typological study on sign languages, which show similar patterns to spoken V-languages, they remark that the verbs ‘enter’, ‘exit’ and ‘cross’ are expressed in serial verb constructions; they need to be expressed continuously by means of two path verbs (two handshapes). Based on these findings, they propose two types of PATH orientation. There are PATH-focused verbs that can be signed with a single gesture marking the starting and ending point, such as ‘depart’, ‘approach’ and ‘descend’. The other, the more complex type, is GROUND-focused, which focuses on enclosures or boundaries. This distinction corresponds to Aske’s (1989) “mere locative path phrase” and “telic path phrase”. Slobin and Hoiting (1994) demonstrate through a series of examples that in a V-language, PATH must be expressed by a directional verb in a GROUND-focused construction. Confronting Talmy with this distinction in personal communication, Talmy remarks that in all cases of GROUND-focused constructions, “the figure crosses a boundary” (Slobin & Hoiting, 1994, p. 498). Taking up this remark, Slobin and Hoiting (ibid) indeed observe that “[t]he core schema of ‘enter’, ‘exit’ and ‘cross’ is movement across a boundary”. Accordingly, they change their terminology to “path focus” and “boundary focus” and call this limitation of V-language the Boundary-Crossing Constraint (BCC). Thus, in contrast to Aske (1989), Slobin and Hoiting (1994) do not explain the limited use of manner-verbs in motion constructions in V-languages by means of telicity, but rather by the constraints imposed by a spatial boundary.

The BCC is taken up by (Talmy, 2000b, 2009), who integrates it in his typologies. Talmy (2000b) introduces the notion of “split system conflation pattern” to refer to V-languages that show different conflation types for these two types of motion events, i.e. with and without boundary-crossing.

According to Slobin (1997, p. 441) “it appears to be a universal characteristic of V-languages that crossing a spatial boundary is conceived of as a change of state, and that state changes require an independent predicate in such languages”.

The BCC is thus seen as characteristic of V-languages and does not seem to play

a role in S-languages since patterns do not appear unexceptional with or without a manner verb in a boundary-crossing situation (Slobin, 1997, 2004).

With an increasing number of studies examining the BCC, many exceptions to this constraint have been noted. There are cases when speakers of V-languages can adopt the satellite-framed pattern and employ a manner verb as a main verb in a boundary-crossing situation without violating grammatical rules. Observing an unexpectedly high number of manner verbs in verb-framed constructions in items depicting boundary-crossing situations, Naigles, Eisenberg, Kako, Highter, and McGraw (1998) distinguish between vertical (such as ‘entering a pool’) and horizontal boundaries (‘entering a building’). In the items depicting vertical boundaries, they observe an overwhelming use of manner verbs in both V- and S-languages. If a horizontal boundary is depicted, path verbs are more frequently used in V-languages. The majority of the boundary-crossing items in their study, however, showed horizontal boundaries; only two of the items depict vertical motions which also show “uncontrolled motions” (1998, p. 543). Slobin (2004, p. 7) characterizes motion events where V-languages license the use of manner verbs as a main verb as showing “high energy motor pattern” or “instantaneous acts”. Slobin (2004) thus explains the exceptions to the BCC in terms of MANNER of motion, whereas Naigles et al.’s (1998) first hypothesis concerns the PATH of motion. Furthermore, Slobin (2004, p. 7) provides two explanations for these exceptions: either the construction foregrounds MANNER of movement (i.e. the MANNER is salient) or it would be “heavy” in terms of processing if a path verb were employed.

Building on studies of the BCC and its exceptions, some scholars have revised the rules governing it and have added more fine-grained categories and sub-categories (e.g., situation types proposed by Filipović, 2007, p. 37²⁴) usually by subcategorizing the component of PATH.

Cross-linguistic differences and variations in boundary-crossing situations are discussed further in the following section by examining the structural differences between the languages of the present study more deeply.

²⁴ Filipović (2007, p. 37) proposes a distinction between different situation types of a motion event according to the lexicalization of spatial (boundary) and temporal (change) components. The spatial situations of *boundary-crossing*, *boundary-reaching* and *non-boundary-crossing* are intertwined with a temporal framework of *change-occurred phase*, *moment-of-change phase* or *no-change phase*. She argues that all languages have means to lexicalize these situation types (p. 38) and cross-linguistic differences become more apparent when focusing on these situation type categories that combine the domain of space and time (pp. 66-67). See also Langacker (1987, p. 167) or Arias Oliveira (2012, pp. 76-81).

1.7 Languages in the present study

As the present thesis investigates motion event descriptions of bilingual French and (Swiss-)German speakers, it is important to closely investigate these languages. The reason why this language pair was chosen for the current research project is, first of all, practical and straightforward: the study is based at the French-German bilingual University of Fribourg. Finding enough participants defining themselves as French-German bilinguals has proven manageable. Furthermore, this language constellation has been discussed previously and syntactic and semantic differences have been discerned (Berthele, 2004a, 2005, 2006, 2007; Hendriks, 2005; Ochsenbauer & Hickmann, 2010; De Knop & Gallez, 2011; Arias Oliveira, 2012; Harr, 2013; Scheirs, 2015). As discussed in subsection 1.4.1, there are important precursors to Talmy, most notably Malblanc (1966) and Tesnière (1969), who noticed the difference between French and German with respect to the mapping of semantic content onto different parts of speech in the clause. Empirical evidence has shown that French speakers express MANNER of motion much less frequently (Antonijević & Berthaud, 2009; Hendriks & Hickmann, 2011). However, the statuses of French as a V-language and German as an S-language have been challenged.

1.7.1 French

Being classified as a Romance language, French's status as a V-language in Talmy's typology has been ascribed and documented by several authors. Hence, PATH would typically be encoded in the verb and MANNER would be encoded — if at all — in a separate grammatical constituent (cf. subsection 1.4.3). In a boundary-crossing situation, Slobin and Hoiting (1994, p. 495) point out that the BCC can be observed in French (see examples 11 and 12), which supports its V-language classification. Differentiating between the semantic components of MANNER and PATH and classifying them according to their syntactic application has a long tradition in French, predominantly based on work of Tesnière (1969) and his distinction between *déplacement* and *mouvement* (cf. subsection 1.4.1 and Arias Oliveira, 2012, p. 35). However, diachronic investigations point to the fact that French — as well as other Romance languages — have not always shown verb-framed characteristics but have evolved from a satellite-framed type to a verb-framed type (Pourcel & Kopecka, 2005, 2006; Kopecka, 2009, 2013; Acedo Matellán & Mateu, 2010; Harr, 2013; Beavers et al., 2010; Stolova, 2015).

In an analysis of Old French translations from 13th century fabliaux, written in colloquial and rather informal manner, Kopecka (2009, 2013) notes interesting differences in motion event descriptions between Old and contemporary French,

particularly concerning the elaboration of PATH information. Hence, not all categories of Old French motion verbs are adopted and translated into Modern French. A closer examination of the category of neutral verbs shows that most of these verbs are translated as path verbs. Given that the use and diversity of verb satellites has drastically diminished in Modern French, Old and Modern French elaborate PATH information differently. Compared to Old French, path satellites and path verbs are employed in a less abundant way in Modern French. Accordingly, PATH information is expressed in a less salient, granular and explicit way in contemporary French (Kopecka, 2013).

However, even though French underwent this structural reorganization, there are still traces of the Old French satellite-framed pattern. Pourcel and Kopecka (2006, p. 84) note that contemporary French can be regarded as a “hybrid system that amalgamates characteristics of both types of language”. Whereas some forms have been retained, others show hybrid-patterns or have undergone complete shift to verb-framed pattern (Kopecka, 2009, n.d.).

Remnants of these Old French satellite-framed forms are observed in Latinate path prefixes and particles spatial-temporal aspectual markings. Only few verbs have retained the ability to form independent lexical entries of the verb stem without fusions, like the Old French system allowed. Examples of these remnants are *accourir* ‘to run too quickly’ and *s’envoler* ‘to fly away’ where *courir* ‘to run’ and *voler* ‘to fly’ constitute independent manner verbs (Hickmann, Hendriks, & Champaud, 2009, p. 210) and therefore show a prototypical satellite-framed pattern when employed in motion event descriptions.

An incomplete shift to a verb-framed form can be ascribed to several confluences of MANNER and PATH in a verb (Pourcel & Kopecka, 2005, p. 149, Kopecka, 2009, p. 419). The system of verbal Latinate prefixes allows the combination of both PATH and MANNER in one lexical element. Concerning the combination of these components, Hickmann et al. (2009, p. 210) note that most of the verbs showing this hybrid-pattern belong to higher register. Example 13 illustrates the use of a hybrid-pattern incorporating both semantic dimensions from the data of the present project:

- (13) *une personne s’extirpe d’un étang glacé* (14-K24-bifr-1)
 ‘a person exits-with-difficulty of-a pond frozen’

Similarly, the *reverse verb-framing pattern* (Pourcel & Kopecka, 2005, p. 148) displays a perfectly grammatical French construction, that reverses the Talmyan verb-framed patterns of allocation. Hence, the PATH component is no longer expressed in the main verb slot, but rather in a PP or a gérondif adjunct. The verb

slot is consequently “free” to allocate the MANNER information (cf. example 14)²⁵. However, Ochsenbauer and Engemann (2011, p. 121) note that this construction has a “non-native flavor” because PATH is not usually expressed in a peripheral construction from a prescriptive point of view. Likewise, Pourcel and Kopecka (2005, p. 148) observe that constructions with a gérondif adjunct encoding the PATH component yield to ambiguous judgment (i.e. varied acceptability ratings from native French speakers, less so for constructions using a path PP).

- (14) *il danse en sortant d'une porte* (107-K1-fr-I)
'he dances by exiting from-a door'

A further construction that does not necessarily follow a prototypical verb-framed pattern is the *double framing* or *redundant* PATH construction discussed in subsection 1.5.1, in which the PATH is expressed twice, once as a detached satellite and once as part of the verb (Croft et al., 2010, p. 206). Berthele (2006, p. 235-236) points out that these constructions are usually not encountered in Standard French and are considered as characteristics of bad style French from a normative point of view. However, these “pléonasmes vicieux” can be encountered in spoken, colloquial French (Berthele, 2006, p. 236) or in French varieties of Switzerland (Berthele, 2004a, p. 11) (cf. example 15).²⁶

- (15) *quelqu'un monte en haut d'une colline en rampant* (139-K9-fr-IV)
'someone ascends up a hill by crawling'

Besides these pleonastic constructions, Swiss French may display different lexical and prosodic features compared to Parisian French (Berthele, 2004a, p. 10), but these are irrelevant for this thesis. Even though the influence of German is less intense than in the Romansh context, a certain contact-induced German influence or a maintenance of certain Old French patterns may be present — especially in bilingual regions (Berthele, 2006, p. 78). Similarly, Filipović (2007, p. 25) points out that English may influence certain varieties of Canadian French. However, for similar reasons why it was decided not to distinguish between Swiss-German dialects and Standard German (cf. subsection 4.3.3), all French varieties were collapsed in one category: ‘French’.

A complete shift to typical verb-framed patterns can be observed in the lexical fusion of verb prefixes and stems, which occasionally occurred in early Latinate forms such as *descendere* ‘to descend’ (Kopecka, 2009, p. 419). Some verb stems, however, could be used autonomously in a non-prefixed form in Old French, such as *e-loigner*

²⁵ This widespread theory of a “free” slot for MANNER information when PATH is expressed verb-externally has been termed “empty slot attractor theory” by Berthele (2017, p. 41).

²⁶ Similarly, Aske (1989, p. 11) notes that such redundant PATH constructions can be found in Spanish — though rather vernacular Spanish (see also Wälchli, 2009, p. 191).

'to move away' or *a-river* 'to arrive', and they conveyed the meaning of non-telic PATHS. In contemporary French however, these forms fused to monomorphemic path verbs (*éloigner, arriver*) (Kopecka, 2009, p. 417). Therefore, French is more often confined in motion event encoding so that the PATH is mapped on the main verb²⁷ and MANNER has to be expressed periphrastically, in a *gérondif* or some other adverbial expression, following thus a verb-framed like pattern.

Whether contemporary French can be classified as V-language or rather as a hybrid system is a matter of debate (Kopecka, 2006). While some authors advocate for a hybrid classification (Pourcel & Kopecka, 2005), others treat it as a prototypical V-language because in comparison to other Romance languages, it behaves more in a verb-framed way. MANNER information, for instance, is omitted more regularly than, for example, in Italian (Hijazo-Gascón & Ibarretxe-Antuñano, 2013, p. 49). Furthermore, French displays very low PATH elaboration, typical for a V-language (Hijazo-Gascón & Ibarretxe-Antuñano, 2013, p. 48, see also Berthele, 2013, p. 64). It remains also questionable, challenging, even impossible, to discern whether certain patterns are indeed remnants of an Old French satellite-framed system or if they were induced later through language contact (Berthele, 2006, p. 78). French appears to be typologically complex and does not appear at the verb-framed end of a typological continuum, as satellite-framed forms are to be found (cf. subsection 1.5.2). Nevertheless, its verb-framed tendency cannot be denied, and it is more often classified as a V-language (Slobin, 2004; Carroll et al., 2012).

1.7.2 (Swiss)-German

While satellite-framed lexicalization patterns can be discerned in French, it has been noticed that verb-framed patterns exist in German (Jokinen, 2005, p. 53). This observation lies not so much in the fact that motion event descriptions following a verb-framed pattern with the mapping of PATH onto the verb such as in example 8 are allowed, but more in the fact that in certain cases, German speakers tend to use constructions that are different from other S-languages and are rather found in V-languages. One of these typical verb-framed patterns that appears in German, but not in other S-languages such as English, concerns the implicit expression of PATH. While English speakers tend to explicitly mention PATH details by dividing PATH into multiple expressions, German speakers rather mention the source and target and express PATH implicitly (Slobin, 1997, p. 425)²⁸. Hence, the role of backgrounding

²⁷ The number of verbs encoding exclusively PATH is largely restricted. According to Pourcel and Kopecka (2005, p. 150), there are only nine verbs in this list, whereas Kopecka (2006, p. 85) adds another six.

²⁸ See Hendriks, 2005 and Carroll et al., 2012 for more details on intratypological differences between English and German.

becomes more important, as it is in V-languages. Similarly, MANNER of motion can be expressed in verbal constituents other than in the finite main verb such as in participle constructions which resembles a verb-framed lexicalization (e.g. *er kam heruntergerannt*) (Jokinen, 2005, p. 54). However, the status of (Swiss-)German as an S-language (Slobin, 1997, 2004; Ochsenbauer & Hickmann, 2010; Harr, 2013) has been challenged less extensively.

Compared to the French system, the (Swiss-)German system allows speakers to combine verbs — whether they encode PATH, MANNER, PATH and MANNER or deixis — with telic or atelic path phrases (Arias Oliveira, 2012, p. 27). Cross-linguistic comparisons show that German displays a high level of MANNER elaboration (Harr, 2013, p. 117). This is confirmed in several comparative studies of oral narratives, showing that German belongs to the language group in which the specification of MANNER of motion attracts much attention (Bamberg, 1994, p. 632). Likewise, Ochsenbauer and Hickmann (2010, pp. 219-220) point out that German has an eminently rich repertoire of manner verbs — richer than French and richer than even rather S-languages like English. They provide examples of German manner verbs that do not have monolexematic equivalents in French or English such as *schlurfen* ‘to shuffle along’ or *tappen* ‘to go falteringly’. Thus, German presents a fine-grained and very specific semantics in terms of MANNER of motion. In addition, De Knop and Gallez (2011, p. 11) notice that MANNER is not only expressed in the verb, but can be distributed over complex constructions. Moreover, they argue that German speakers more often conflate MANNER and PATH in the same verb than speakers of Romance languages.

Besides fine-grained MANNER description, German also displays a high elaboration on individual PATH parts (Bamberg, 1994, p. 632; Slobin, 2005, p. 311). English glosses are often quite complicated and certain expressions would be unusual to match the German expressions (Slobin, 2005, p. 311). Features of these complex PATH descriptions are mentioned in subsection 1.5.3 (e.g. *redundant* or *complementary* PATH constructions, see Berthele, 2006, p. 181). Differences in terms of these PATH elaborations can be found between German or Swiss-German varieties.

There is a variety of different terms and approaches to describe the language situation in German-speaking Switzerland. Most authors agree that it can be characterized as a diglossia (Ferguson, 1959) in that both the dialects and the Standard German are considered first languages, or the dialects as first languages and the Standard as second language (Berthele, 2004c). Furthermore, some authors consider the situation as sort of bilingualism, with both types used for different situations (Fishman, 1967; Berthele, 2004c). In formal written contexts, the Standard German is used predominantly and the dialects are mostly used in informal oral

or written contexts. Whichever the classification, the language situation is different from French-speaking Switzerland. It has been pointed out (Berthele, 2004a, 2004b, 2004d, 2006, 2013) that there are differences in motion event descriptions between the German Standard and Swiss-German dialects. These differences manifest not only on the lexical but also on the semantic level and concern the number of manner and path verbs, the elaboration of MANNER and PATH and the number of GROUND descriptions. Hence, Standard German speakers tend to use more manner and path verbs²⁹ and show a higher Type-Token-Ratio (TTR) of these entities. Some speakers of the Muotathal dialect show an even lower TTR for manner verbs than speakers of French. In some Swiss-German varieties, GROUND entities are less often described than in Standard German whereas PATH is more often encoded in complex ways — either pleonastically or complementary. However, the data show a high interindividual dispersion with some speakers diverging considerably from others. This is why it was decided to classify Swiss-German dialects and Standard High German within the same category: '(Swiss-)German'³⁰ (cf. subsection 4.3.3).

²⁹ Note that using more manner verbs does not imply using fewer path verbs, and vice versa. Speakers of the Muotathal dialect, for example, often express neither PATH nor MANNER in the verb, but instead use deictic verb constructions (Berthele, 2006, p. 115), which shows that speakers of Standard German show a higher usage of manner *and* path verbs.

³⁰ When a reference is made to German or to French, it will include all Swiss varieties.

Chapter 2

Bilingual lexicalization

To introduce the scope of bilingual lexicalization of this work, the first two sections in this chapter seek to unravel the terminological complexity of SLA and bilingualism research. The subsequent section delineates several concepts under the heading of Cross-linguistic influence (CLI) that are relevant for this thesis. CLI phenomena are numerous, often closely related and overlapping, and thus pertain to a fuzzy conceptual space. The degrees and kinds of CLI-phenomena this thesis explores are determined by language-internal factors such as typology, outlined previously, as well as external factors such as language dominance (section 2.3) or language mode (section 2.4). Section 2.3 deals with the problems of defining and delineating language dominance and how it can be assessed. Section 2.4 introduces theories about, empirical works on and methodological concerns related to language mode. Last, the chapter addresses potential interactions between bilingual dominance and language mode.

2.1 Defining bilingual

At the heart of this thesis is the notion of *bilingual*. A satisfactory definition of this term, however, seems impossible to pin down (see Bassetti & Cook, 2011, pp. 143-146 for a discussion on different definitions). In the current work, the term is employed rather broadly and refers to individuals regularly using two languages regardless of proficiency level, length of residence, age of acquisition or simultaneous, or successive acquisition (cf. Grosjean, 1982). Thus, it is important to emphasize that “using two languages regularly” does not imply that the bilingual person is balanced, i.e. uses the languages at the same level (Grosjean, 1982, p. 234) or with “little interlingual interference” (Lambert, 1990, p. 203). Moreover, the term bilingual does not refer to two monolinguals in one person (Grosjean, 1989). In the experiment outlined in this thesis, all participants consider themselves *bilingual* (section 4.5).

Given that most use two languages daily, they can be classified as being at least “bilingual”. However, most have knowledge of other languages, too, and may even use them on a daily basis. Thus, the terminological distinction between bilingual and *multilingual* tends to blur, but it will be highlighted when the distinction is important (subsection 6.6.3).

In line with Odlin (1989, p. 3), the terms *acquisition* and *learning* are used interchangeably, and no difference is made whether this process happens in a controlled context, such as school, or in contexts of migration. Distinguishing these terms is important in *Second Language Acquisition (SLA)* or *Third Language Acquisition (TLA)* research. However, this work primarily adopts the terminology of bilingualism and multilingualism research. Usually, different terms refer to the same phenomena in bilingualism and SLA research. For instance, a specific phenomenon of language influence may be termed *convergence* in the field of bilingualism (see subsection 2.2.2), while the same phenomenon is called *Interlanguage* in SLA. Furthermore, when speaking about the languages in question, I use the terms *dominant language* or *less dominant* or *weaker language* instead of classifying them as L1, L2... Ln. Finally, it must be pointed out that several notions bear different normative stances in an SLA or a bilingualism framework. In this thesis and bilingual research in general, an agnostic position will be adopted in the face of normativity (cf. subsection 2.2.7).

2.2 Cross-linguistic influence

The mutual influence of a bilingual’s language systems is uncontroversial and verifiable. Even though the notion *Cross-linguistic Influence* is often viewed as synonymous to language transfer (Odlin, 1989, p. 3; Jarvis & Pavlenko, 2008, p. 3), it is used in this work as an umbrella term covering all kinds of language influence and interactions. Hence, it encompasses a range of interconnected concepts, such as *code-switches*, *code-mixing*, (*nonce*) *borrowings*, *bilingual slip of the tongue*, *calque*, *restructuring*, *transfer*, *avoidance*, *preference*, *interference* or *convergence* — usually initially coined in the field of language contact — that can bear a negative, neutral or positive connotation from a normative point of view. These terms pertain to a fuzzy conceptual space. As they largely overlap, it is not possible to entirely delineate them. Reifying these concepts in bilingual lexicalization is therefore often challenging or even impossible. While some of these terms are defined as processes (e.g. convergence in the sense of Jarvis & Pavlenko, 2008), others are linguistic or conceptual manifestations (e.g. code-switches, nonce-borrowing, shifts) or strategies (e.g. avoidance or preference) induced by this process. Defining and discussing all

of these concepts in detail goes beyond the scope of this work. Instead, I refer to Jarvis and Pavlenko (2008) for a comprehensive discussion and a detailed taxonomy of these kinds of cross-linguistic influences. Given that the data analyzed in this thesis constitutes spontaneous utterances of bilingual speakers in a synchronic design, the CLI phenomena that are expected and of most interest for the purposes of this thesis are discussed in subsection 2.2.1 – subsection 2.2.4.

2.2.1 Transfer

It is implicitly taken for granted that the notion of *transfer* is to be understood metaphorically in that aspects of a language are not *transferred* — and hence no longer available — from one language to another, but rather *replicated*. However, there is no consensus on its definition. Although Odlin (1989) stresses some problems in his definition (27-28), it does outweigh some of the earlier controversies:

“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.” (p. 27)

Cross-linguistic similarities can produce *positive transfer*, or a “facilitating influence” (Odlin, 1989, p. 26), of any similarities between languages and compliance with language norms. On the other hand, the term *negative transfer* refers to errors in productions from a normative point of view (see subsection 2.2.7), often in the absence of cross-linguistic similarities. Another term for negative transfer is *interference*, which Weinreich (1979, p. 1) defines as:

“Those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language, i.e. as a result of language contact [...].”

2.2.2 Convergence

Early discussions on the notion of transfer are largely situated in historical and contact linguistics (Odlin, 1989, p. 6). Similarly, *convergence* has primarily been coined and used in language contact literature, but less so in research on individual bilingualism. In the context of language contact or societal bilingualism, linguistic convergence is considered a contact-induced phenomenon and describing a diachronic outcome rather than an observable process (e.g. Bullock & Toribio, 2004, p. 91). This prevalent definition and the association of convergence with an end-state phenomenon is one reason for its unobtrusive use in the context of individual bilingual linguistic systems,

given that bilinguals' language systems are variable and ephemeral rather than fixed. However, convergence in the context of individual bilingualism does not have to refer to fixed realization, but should be characterized as emergent and variable (ibid). For this reason, many scholars adopting the term convergence in the framework of individual bilingualism argue that convergence can be studied synchronically and not exclusively diachronically (e.g. Bullock & Toribio, 2004; Bullock & Gerfen, 2004; Toribio, 2004; Ameel, Malt, Storms, & Van Assche, 2009; Matras, 2009; Cook & Bassetti, 2011; Pavlenko, 2011; Brown & Gullberg, 2013)³¹. Along these lines, Bullock and Toribio (2004, p. 91) define convergence as "the enhancement of inherent structural similarities found between two linguistic systems." This definition is similar to Weinreich's (2011, p. 395) understanding of convergence as "partial similarities increasing at the expense of differences". In this sense, convergence does not cover phenomena such as newly emerged linguistic patterns, that differ from the converging linguistic systems (Verschik, 2011, p. 82). Other scholars define convergence more narrowly in that it merely refers to a "unitary domain" (Pavlenko, 1999, p. 219). Jarvis and Pavlenko (2008, p. 164) refer to convergence as a "particular kind of restructuring" and define it as follows:

"In fact, this process may be better described as divergence, since the new category does not fully resemble either the L1- or the L2-mediated category, but is rather a hybrid or amalgam of the two."

Another reason for a limited use and obfuscation of the concept of convergence in a bilingualism framework might reside in the fact that the term pertains to a fuzzy conceptual space. Matras (2009) lists some terms which are used synonymously to convergence such as *pattern transfer*, *calque*³² (p. 236) or *pivot matching* (p. 310).

2.2.3 Switches and slips

As both transfer and convergence phenomena can occur in spontaneous speech, they have much in common with code-switching (Treffers-Daller, 2009). *Code-switching* is a broad term conventionally employed in sociolinguistic work and refers to the alternation between two or more languages or varieties. It can also refer to instantaneous insertion of certain aspects, such as words or phrases, of one language into the other (e.g. Matras, 2009, p. 101). Code-switching covers many types such as intersentential or intrasentential switches etc. In contrast to

³¹ This synchronic understanding implies not only a theoretical but also a methodological shift from corpus-based approaches to an inclusion of experimental techniques used in psycholinguistic research (Bullock & Toribio, 2004, p. 93).

³² Others disagree with this synonymous use and argue that calque refers to individual expressions only (Backus, 2004, p. 180).

conventionalized loanwords, *nonce-borrowing* occur ad-hoc and mostly refer to single word code-switches that are structurally integrated (Matras, 2009, p. 106, widely used in e.g. Poplack, 1988). *Slips of the tongue* refers to “unintended, nonhabitual deviation from the speech plan” (Dell, 1986, p. 284). With respect to bilingual lexicalization, slips of the tongue can refer to momentary influences of another language induced by the simultaneous activation of the languages (e.g. Poulisse, 2000).

2.2.4 Strategies of avoidance

Finally, strategies pertaining to CLI, relevant to the present study, are avoidance of or preference for certain patterns. In her work on error analysis, Schachter (1974) notes that not only what language learners’ produce but also what they do not produce should be considered. Drawing on this work, Dagut and Laufer (1985) observe that Hebrew-speaking learners of English L2 frequently avoid phrasal verb structures and prefer single words. They define avoidance in the following terms (Dagut & Laufer, 1985, p. 73):

“[...] avoidance is the reverse side of negative transfer, since learners tend to avoid using in L2 those structures that have no parallel in their L1 and therefore provide them with no pattern for transfer.”

In a follow-up study on Swedish-speaking learners of English L2, they do not find regular avoidance of phrasal verb constructions. As phrasal verbs are common in Swedish but not in Hebrew, Laufer and Eliasson (1993) conclude that the phenomenon of avoidance may depend on linguistic similarity — respectively difference — rather than on the forms’ inherent difficulties.

Such strategies of avoidance are also found in bilingual production. In this study, several strategies are encountered in boundary-crossing contexts, as discussed in subsection 5.6.2.

2.2.5 Directionality

CLI-phenomena can occur in unidirectional and bidirectional ways (Jarvis & Pavlenko, 2008, pp. 21-22). Pavlenko and Jarvis (2002, p. 190) point out that transfer is usually treated as an L1-influence (or the influence of a dominant language on a less dominant one). However, in their study on elicited narratives of Russian L2-English speakers, they note L2-influence in several linguistic categories. Noticing that transfer can work in both directions, they coin the term *bidirectional transfer*. L2-influence, or reversed transfer (Jarvis & Pavlenko, 2008, p. 21), is further associated with CLI-phenomena such as *language attrition*, *language shift*

or *restructuring* (see Jarvis & Pavlenko, 2008: chapter 5 for a discussion of these concepts). The bi-directional character of transfer has also led to confusion with the term convergence. Whether convergence refers merely to bidirectional influences or covers unidirectional influences is a matter of debate. While most authors' definition of convergence point to reciprocal influence (Bullock & Toribio, 2004; Jarvis & Pavlenko, 2008) and consider this characteristic distinct from transfer or interference, others argue that this process does not have to be mutual and can only affect one language (Myers-Scotton, 2002, p. 178).

2.2.6 Affected domains and factors interacting with CLI

Transfer can manifest not only in linguistic aspects, but also in conceptual domains — among others, the domain of motion (Jarvis & Pavlenko, 2008). As with transfer, convergence tends to manifest in different aspects and domains to different degrees while other aspects may co-exist as they stand or shift completely (Pavlenko, 1999, p. 223; Myers-Scotton, 2006, p. 271; Silva-Corvalán, 2008, p. 221). The focus on CLI-phenomena in specific aspects of language has led to more fine-grained terminological distinctions, such as lexical vs. semantic transfer or semantic and conceptual convergence (Jarvis & Pavlenko, 2008).

Among the factors that interact with CLI-phenomena are external and personal factors such as attentional and cognitive factors, linguistic repertoire and internal linguistic factors (Jarvis & Pavlenko, 2008). Convergence, for instance, is seen a phenomenon that is not only driven by external influences but as a process induced by the collapsing of differences between features of linguistic systems that are already similar. In their phonetic and phonological analysis of English influence on French varieties, Bullock and Gerfen (2004), for instance, find that convergence may also result from unstable phonetic features and may either accelerate or affect the outcome of changes which are already in progress. Thus, the factors resulting in convergence not only encompass external features (e.g. language mode as discussed in Toribio, 2004), but also internal linguistic features vulnerable to external influence.

2.2.7 Intentionality and normativity

CLI phenomena can occur intentionally, for instance, when employed as a strategy to cover either the non-existence of a specific term or structure in a given language (e.g. avoidance) or a momentary lack of knowledge (e.g. nonce-borrowing). On the other hand, there are CLI phenomena that occur unintentionally and unconsciously (e.g. slips of the tongue). Other phenomena such as code-switches can occur either intentionally or unintentionally. While code-switching has long been a

preoccupation for applied linguists from a normative point of view, it is now regarded as a phenomenon that does not have to occur arbitrarily and that follows certain regularities (Matras, 2009, p. 101). Similarly, transfer has traditionally had a negative connotation as a normative deviance (Odlin, 1989, p. 26). However, definitions and connotations have shifted from positive, such as “creative process” (Kellerman (1979, p. 38)), to agnostic stances. While certain phenomena do not follow grammatical rules from a normative point of view, others conform. Semantic convergence, for instance, can manifest in a higher number of MANNER descriptions by an S-language speaker in a V-language. Similarly, strategies of avoidance or preference for certain structures do not deviate from grammatical norms. However, these CLI-phenomena still show signs of mutual influence between languages, as certain aspects, such as the frequency of occurrence, deviate from monolingual patterns.

Associated with questions of normativity is the distinction between overt and covert CLI. *Overt* CLI-patterns are direct deviations from language norms (Mougeon, Nadasdi, & Rehner, 2005), whereas *covert* patterns are indirect, not directly traceable CLI in, for instance, the overuse of a pattern (e.g. a greater proportion of manner verbs in French compared to monolingual native speakers).

2.3 Bilingual dominance

This chapter explores bilingual dominance and its impact on bilingual lexicalization patterns. Language dominance has predominantly been used in a bilingualism framework (Grosjean, 1998a) and it is less encountered — or is defined differently — in studies rooted in a SLA or TLA frameworks. In other words, definitions of bilingual dominance and the importance given to it vary considerably. Gertken, Amengual, and Birdsong (2014, p. 210) define dominance as “a multi-faceted, gradient and dynamic construct that includes but is not equivalent to language proficiency”. This definition highlights the continuity of the construct (subsection 2.3.2) and simultaneously points to the problem of confounding proficiency with dominance.

2.3.1 Dominance vs. proficiency

Proficiency and dominance conceptually overlap and are often confounded due to their tendency to correlate (Birdsong, 2006, p. 21). As outlined in chapter 3, many studies — although rooted in a bilingualism framework — in the motion event domain use these terms interchangeably (e.g. Ochsensbauer & Engemann, 2011 define balanced dominance as balanced proficiency). In other words, the term dominance is used when components of proficiency are actually assessed, like writing, speaking, reading and listening competences (Gertken et al., 2014, p. 211). In these lines,

Sheng, Lu, and Gollan (2014, p. 364), for instance, describe dominance as “the relative proficiency of the two languages within the same individual”.

However, several authors point out that it is important to distinguish dominance from proficiency (Birdsong, 2006; Dunn & Fox Tree, 2009; Gertken et al., 2014). Gertken et al. (2014, p. 209) argue that “one can be dominant in a language without being highly proficient in that language”. Vice versa, one can be more proficient in one language but it need not be the dominant language. Likewise, Treffers-Daller (2011) show that a balanced dominance does not equal high proficiency in both languages. Moreover, dominance can shift within the lifespan — independently of proficiency (Gertken et al., 2014, p. 211). Dominance shifts, regardless of proficiency level, are often attributed to psychosocial factors, which calls for an integration of these variables within the concept of dominance (Birdsong, 2014, p. 5).

Birdsong (2006, p. 47) argues that dominance can be defined in terms of processing, while proficiency can be defined in terms of attainment. Similarly, Harris, Gleason, and Ayçiçeği (2006, p. 264) describe dominance in psycholinguistic terms in that the dominant language represents the language that is “most highly activated”. Although this understanding of dominance in psycholinguistic terms is widely used, it does not account for all aspects of dominance (cf. subsequent chapter).

A further difference between proficiency and dominance is that the former does not require a bilingual context; proficiency levels of monolinguals can also be assessed. However, the latter is defined within a bilingual framework (Gertken et al., 2014, p. 211). Hence, proficiency is often measured with reference to external standards, while dominance is understood as a matter of internal reference (Birdsong, 2014, pp. 2-3).

The problem of conflating dominance and proficiency may ultimately lead to discrepancies between self-reports and objective measures (Gertken et al., 2014), which are discussed in subsection 2.3.4.

2.3.2 Components of dominance

As discussed in subsection 2.3.1, proficiency is regarded as an essential component of dominance, but does not alone define the concept.

A further, oft-discussed component defining dominance in terms other than mere language proficiency is language use. Birdsong (2014), for instance, distinguishes between dimensions (i.e. inherent abilities relating to proficiency) and domains (i.e. choices and purposes depending on contexts and situations of language use). Different dimensions can be assessed independently, but do not necessarily correlate. Similarly, language dominance does not correlate across all domains, as dominance can be domain-dependent; one can be dominant in French in one

context, but dominant in German in another (cf. Birdsong, 2014, p. 375). Lim, Liow, Lincoln, Chan, and Onslow (2008, pp. 395-396) discern three components of dominance: proficiency, frequency of use and domain of use. These variables depend on the speaker's educational system (Lim et al., 2008) and sociocultural environment (Grosjean, 1982, p. 234). Similarly, Daller (2011, p. 102) points out that dominance is a factor not only defined by language proficiency, but is also apparent at the "macro-level of society". They refer to the study of Hohenstein, Eisenberg, and Naigles (2006) who found that transfer patterns are not only affected by language proficiency, but also by factors such as language use in different environments. Similarly, Goral, Campanelli, and Spiro (2015) report that bilingual proficiency and language use can lead to differences in cognitive control mechanisms in that a dominant use can lead to better performances in inhibition tasks. They interpret these findings as a result of practice in switching languages (i.e. a balanced use of both languages may strengthen inhibition)³³.

Further variables that are considered crucial in defining dominance and overlap with language use are age of acquisition (AoA)³⁴, or length of residence (LoR) in an environment speaking the language in question. In this thesis, these variables are subsumed under the heading of 'language history' following the terminology of the Bilingual Language Profile (BLP) (subsection 4.2.1). While the variables language use, AoA and LoR can correlate with language proficiency (e.g. Li, Sepanski, & Zhao, 2006), they can sometimes be partially independent (Flege, MacKay, & Piske, 2002, p. 592). Bedore et al. (2012), for instance, report that language use is a better indicator of performance in proficiency tasks than AoA is. An example from the motion event domain showing that these variables do not necessarily correlate is discussed in Spring (2010) who reports that the variable of LoR showed a greater effect than proficiency level on the acquisition of motion event descriptions.

A series of studies have shown that not only proficiency, use and history or experience compose dominance, but also that language attitudes can have a major impact on language dominance (Grosjean, 1982; Pavlenko, 2004). Following these propositions, Gertken et al. (2014, pp. 211-212) argue that psychosocial factors are crucial components of dominance that must be assessed. In a study on bilingual Spanish-English students, Hakuta and d'Andrea (1992) show that language attitudes influence self-reported proficiency ratings and can have a major influence on language maintenance or loss. Similarly, Flege et al. (2002, p. 591) point out that the social prestige and economic importance of languages may have an impact

³³ See section 7.4 for the relevance of this proposition.

³⁴ Depending on the research framework, different concepts, such as age of acquisition, age of onset or age of arrival, can be found in the literature, which sometimes refer to the same phenomena but may be distinguishable in specific cases.

on dominance such that it may even lead to a dominance switch. However, the component of attitude itself is complex, multifaceted and dependent on factors such as motivation and sociocultural identification, which creates difficulties in adequately measuring it (cf. subsection 2.3.4).

2.3.3 Gradual vs. categorical understanding of dominance

Traditionally, language proficiency has been measured in terms of categories. Similarly, in bilingualism research, Dunn and Fox Tree (2009, p. 274) note that dominance was defined in binary terms such as “balanced” vs. “non-balanced” or, for example, “German-dominant” vs. “French-dominant”. However, this binary conceptualization presents several inherent problems. On the one hand, Birdsong (2014, p. 376) notes that putting bilinguals in balanced or non-balanced groups twists the fact that balanced bilinguals are rather exceptions than the norm (cf. Grosjean, 1982, p. 235). Furthermore, a dichotomous classification of dominance does not account for the observation that bilinguals can be dominant in a language in a given context, but may be dominant in the other language in a different context (Gertken et al., 2014, p. 212; Birdsong, 2014, p. 375). Birdsong (2014, p. 376) notes:

“Dominance is thus understood to be a gradient or continuous construct, as opposed to a nominal or categorical construct. A bilingual is not simply dominant in a language, but is dominant in that language to a measurable degree.”

Dunn and Fox Tree (2009, p. 275) not only foreground the advantages of this continuous understanding of dominance, but also point out that a dichotomous scale may even create technical problems and mask aspects of bilingual behavior or performance. They compare sentence translation tasks of bilingual participants filling out their gradient scale (Bilingual Dominance Scale (BDS) by Dunn & Fox Tree, 2009). In a binary framework, the demarcation would be at zero, dividing participants into dominant and non-dominant groups, and the results would be the same for both groups. However, when they put participants in balanced groups with scores falling between -10 and +10, the dominant groups’ reaction times in translation tasks differed. Hence, a simple binary cut-off leads to a loss of information. Similarly, Flege et al. (2002, p. 578) note that a continuum provides a more “sensitive method” than discrete distinctions. Thus, the effect of understanding dominance as a continuous construct is noted when comparing bilinguals with one another. For instance, two French-dominant French-German bilinguals are not equally dominant in French (cf. Birdsong, 2014, p. 276). Such deepening of data inspection is crucial in research on the subtle differences between bilinguals, for example, in cognitive

performances (G. Luk & Bialystok, 2013). Similarly, Goral et al. (2015, p. 83) favor a continuous understanding of dominance, because a dichotomization inevitably leads to a loss of information and thus a reduction of power.

Besides deepening data inspection and avoiding problems of defining binary cut-off points, a further practical advantage of a gradual classification is that bilinguals' dominance configurations and dominance changes can be assessed longitudinally (Dunn & Fox Tree, 2009, p. 287). The assessment of the gradual construct of dominance is discussed in the next section.

2.3.4 Assessing dominance

Over the past few years, various tools have been developed to standardize dominance assessment (see Gertken et al., 2014, p. 217 for a comparison and discussion of four different tools). However, the problems that must be addressed for each research design are as follows: What aspects of language are of interest? How is dominance defined for the current purposes? What components should be assessed, and how are they valued? How are the components of dominance separated in a clear-cut way?

Both self-evaluations and objective tests can be conducted in various forms. Bedore et al. (2012) point out that depending on the definition of dominance, e.g. how language exposure and language proficiency are measured and scored, dominance accounts can vary a great deal (see also Marian, Blumenfeld, & Kaushanskaya, 2007). Furthermore, not only how components are measured, but also the aspects of the components that are measured, vary. Moreover, tests vary on how the different components are valued. As the focus in dominance assessment is usually proficiency (Flege et al., 2002, p. 569), this component is often given more scores than others. As several scholars criticize, the lack of consistency in measuring language dominance impedes comparison (Dunn & Fox Tree, 2009; Gertken et al., 2014).

As most advocates of self-assessment insist, assessing language dominance by means of self-ratings is easy to implement, quick and highly accurate (Gertken et al., 2014, p. 213). The most broadly used approaches to assess bilingual proficiency are thus self-ratings.

However, Gollan, Weissberger, Runnqvist, Montoya, and Cera (2012) argue that self-reports bring along several pitfalls. Whereas bilingual speakers can tell which language is their dominant, the degree to which they report dominance is far from accurate (see also Dunn & Fox Tree, 2009). Similarly, Hakuta and d'Andrea (1992) argue that self-reports are often accounts of attitudes, rather than actual language ability.

On the other hand, objective assessment tools also bear problems which need to be

considered (Gollan et al., 2012, pp. 594-595). On the one hand, these measures can be biased in that they are more difficult in one language than the other. Equality in measurement is especially difficult in structurally and typologically different languages (Lim et al., 2008, p. 392). Furthermore, objective measures are usually not designed for bilinguals and thus bear a strong normative stance (Gollan et al., 2012). Aside from the fact that objective measures may not be appropriate for a bilingual target group, there are no measures trying to objectively assess dominance components other than proficiency. Whether and how these non-linguistic factors can be objectively measured is not discussed in the literature. It is thus important to know that while there are studies that directly investigate the relationship between self-assessments and objective measures and that report significant correlations between the two measures (e.g. Marian et al., 2007, p. 960), they focus exclusively on proficiency-related dimensions.

Given that objective measures do not account for these non-linguistic components, it is difficult to combine the two methods. Lim et al. (2008, p. 392) note that the problem of combining self-reports and objective measures is that there is no agreed-upon method to combine and interpret them. Gollan et al. (2012, p. 611) further remark that objective measures such as translation tasks may differ from self-reports because bilinguals usually do not exclusively imagine doing a translation task when self-assessing their proficiency. An important argument to bear in mind is that even though bilingual speakers may under- or overestimate their proficiency, language dominance would be less affected by such differences, given that the focus of interest is one language versus the other within the same individual rather than the individual's proficiency in each language relative to others (Gollan et al., 2012, p. 596). Hence, while objective measures may be a good fit for certain aspects of proficiency, Lim et al. conclude that "objective assessments may not be suitable for determining language dominance" (2008, p. 402).

2.4 Language mode

The concept of language mode has been subject to contention. Language mode is said to be a naturally occurring phenomenon in bilingual speech. Some scholars have integrated Grosjean's (1982, 1998a, 2001, 2008) propositions in their research and have attempted to experimentally manipulate language mode with both similar and diverging findings. These studies however, focus mostly on language processing and to my knowledge, only few studies have addressed the effect of language mode on linguistic performance — let alone on structural-semantic mappings.

2.4.1 Defining language mode

In several publications, Grosjean (1998a, p. 136; 2001, p. 3; 2008, p. 39) defines language mode:

“language mode is the state of activation of the bilingual’s languages and language processing mechanisms at a given point in time.”

The basic proposal of language mode theory as different situations of language activation goes back to Grosjean (1982, chapter 6), which is based on observations that the amount of interference (Weinreich, 1979, pp. 80-82) or code-switches (Hasselmo, 1970) is constrained depending on the situation and the language repertoire of the interlocutor. In later publications, Grosjean (1985, 1998a) elaborates on the concept and redefines it in terms of a continuum, rather than presupposing different situation types. Hence, language mode is considered a continuum of language activation with a deactivation (to a certain degree) of one language in the monolingual mode and an activation of both languages in the bilingual mode.

Grosjean (2001, p. 7) further notes that a bilingual can neither totally deactivate (or inhibit in the terms of Green, 1986, 1998) the other language nor activate both languages to the same degree. Hence, the endpoints of the continuum, i.e. total monolingual mode with only one activated language and total bilingual mode with a 50% activation of both languages, are never reached. Depending on various factors, such as the interlocutor, the situation and the content of discourse, one language is more active than the other and is considered the base language. The state of activation of the other language, thus, varies from relatively deactivated (monolingual mode) to relatively activated (bilingual mode). Moreover, Grosjean (2008, p. 251) notes that bilinguals differ to the extent they move along on the language mode continuum. While some bilinguals are regularly in bilingual mode and code-switch on a daily basis, others hardly find themselves in bilingual mode.

Furthermore, the activation of both languages results not only in more CLI phenomena but also in different kinds of CLI. Grosjean (1998a, p. 136) claims that instances of interference (in the sense of Weinreich, 1979) can best be discerned in monolingual mode. In bilingual mode, interference is obfuscated by momentary performance-related CLI phenomena like code-switches, nonce-borrowings or slips of the tongue (cf. subsection 2.2.1 – subsection 2.2.4).

In bilingual mode, it would therefore be more difficult to assess the competency of a bilingual’s languages and the amount of (negative) transfers, because momentary blips and/or communicatively adequate code-switches can interfere (cf. subsection 2.4.1). To isolate interferences from code-switches or borrowings in

bilingual speech, Grosjean (1998b, p. 175) argues that it is imperative to control for language mode when testing, recording or observing bilingual performance.

2.4.2 Language mode research

Following Grosjean's definition of language mode, some scholars have attempted to test his propositions empirically. Grosjean (2001, pp. 8-13) lists studies showing evidence for the language mode hypothesis that pertain to different aspects of language research, such as language production, language perception, language acquisition and language pathology. As for language perception studies, the influence of language mode has been reported in terms of reaction times in lexical decision tasks by Soares and Grosjean (1984). Dunn and Tree (2014) note an effect of language mode mediated by language dominance (cf. section 2.5). In their study on word recognition by trilingual speakers, Dijkstra and Van Hell (2003) argue that their findings speak against the language mode hypotheses. They try to induce a monolingual mode according to Grosjean's propositions (2001), but cognates and homographs were facilitated — participants used their knowledge of the other languages and thus activated the other languages — even in the monolingual condition.

For the present purposes, findings on language mode effects in language production are of greater interest. However, such studies are scant and none of the studies reviewed adopt a procedure similar to that sought in the present experiment. The CLI phenomena the few empirical studies on language mode's effect in language production focus on are borrowings, code-switches, language mixing or changes of base language. Treffers-Daller (1998) found that not only the number of code-switches was dependent on context and interlocutor, but also the kinds of code-switches changed accordingly. Grosjean (described in 1997 and 2008) attempted to manipulate language mode experimentally by means of the stimulus itself and the interlocutor. French-English bilingual participants were asked to retell stories in French about typical situations in France and typical American activities (where English code-switches were encouraged). They had to retell those stories to three interlocutors, i.e. a French native with little English knowledge (monolingual French mode) and a French-English bilingual where code-switching was less appropriate according to his biography (intermediate mode) and a French-bilingual where code-switching was appropriate (bilingual mode). The results showed that the number of code-switches, borrowings and English syllables used depended on the manipulation of the topic and interlocutor. In a study with French-Swiss German participants, Weil (1990, discussed in Grosjean, 2008, pp. 72-75) replicated these findings and observed a higher number of code-switches and changes of the base

language when appropriate.

In the motion event domain, few studies have discussed language mode as a potential conflicting variable regarding the outcomes or have tried to control for language mode beforehand in the research design. Although these studies do not attempt to manipulate language mode deliberately for the sake of comparison, their approach in controlling for language mode are briefly outlined. To induce a monolingual language mode, the language of instruction of the experiment was the target language only (e.g. Brown & Gullberg, 2011; Nicoladis, Rose, & Foursha-Stevenson, 2010; Lai, Rodriguez, & Narasimhan, 2014; Ochsensbauer & Engemann, 2011). In some studies, language mode is explicitly controlled for in that participants had some small talk with the instructor in the target language (e.g. Brown & Gullberg, 2008a) or were asked to do some additional activity in the target language such as counting before the experiment (e.g. Treffers-Daller & Tidball, 2015). The potential influence of language mode was addressed in that participants whose performances were examined in two different sessions were asked to show up for the second session after a break (e.g. Nicoladis et al., 2010; Brown & Gullberg, 2011). Kersten et al. (2010) report a language mode effect in English-Spanish bilingual participants, who differed in their attention to MANNER in a categorization task in an English monolingual condition and a Spanish monolingual condition. A study by Athanasopoulos et al. (2015) reveals a similar context-bound pattern: German-English bilingual speakers categorized motion events differently depending on the language context. In contrast, Filipović's (2011) study on recognition memory of motion events in Spanish-English bilinguals did not suggest any effect of the language of instruction (or prior verbalization) on memory performance.

2.4.3 Manipulation of language mode

In manipulating language mode in an experimental setting, it needs to be considered how one of the bilingual speaker's languages can be deactivated to induce a monolingual mode and how both languages are simultaneously activated to induce a bilingual mode. As mentioned in subsection 2.4.1, Grosjean (2001, p. 7) argues that there is neither a pure monolingual mode nor a pure bilingual mode; however, in aiming to manipulate language mode, several factors must be considered to reach a state of activation or inhibition as close as possible to the ends of the language mode continuum. To this end, it is important to consider what language activation means.

Grosjean (2008, p. 42) lists a series of factors that can influence the activation of language. An experimental setting, as in the present project, is considerably different from a natural interaction. Top-down factors, such as the profile of the experimenter, the situation and formality, and bottom-up factors, such as the topic and stimulus,

conflict with the successful induction of the target language mode and demand careful reflection.

2.4.3.1 Language activation

Assumptions and theoretical propositions on the role and degree of language activation processes in bilingual production, perception or acquisition differ greatly. Dijkstra and Van Hell (2003, pp. 2-3) outline the ambiguity of the concept of “language activation” and contend that it can be interpreted in at least four different ways. Language activation can be understood abstractly as activation of language-as-a-whole. On the other hand, only the words that are heard or read can be really activated, while the others are on a “resting level of activation”. Activation can also be theorized in the sense of a lower recognition threshold for “active” words in comparison to non-active words which would imply separate processing mechanisms of the two language systems. Last, activation can be understood in relative terms in that certain aspects of the target language are activated faster than those from the other language because of either extra contextual stimulation or inhibition effects.

Based on these different understandings of language activation or inhibition, a series of psycholinguistic models on lexical access and control in bilinguals have been developed. In the Inhibitory Control (IC) model (Green, 1998), task schemas (e.g. word production schemas) can alter the level of activation of lemmas. A word is produced by suppressing lemmas with incorrect language tags, i.e. lemmas from the non-base language are inhibited. Similarly, in the Bilingual Interactive Activation (BIA) model proposed by Dijkstra and Van Heuven (1998), the competition between different words in both language systems can be inhibited in a top-down manner on the basis of language nodes (or tags). In addition, proficiency modulates levels of activation and word frequency. Revising and extending the BIA, Dijkstra and Van Heuven (2002) propose the Bilingual Interactive Activation Plus (BIA+) model, which collapses language nodes. Thus, the focus is no longer on top-down inhibition effects, but rather on bottom-up excitation where both language systems are always simultaneously activated. Additionally, the BIA+ model includes phonological and semantic representations. In contrast to the IC, BIA or BIA+, the Bilingual Model of Language Access (BIMOLA) proposed by Léwy and Grosjean (n.d.) and Grosjean (1997) relies on global language information to excite specific lexical components. Depending on a given task or language mode, the BIMOLA allows the excitation of either both, one or neither language lexicon. While the BIA and BIA+ focus on visual word recognition, the BIMOLA models speech comprehension. In sum, while these different psycholinguistic models all assume an interaction of the bilingual’s language systems, they predict either a global language activation or only certain

aspects.

These psycholinguistic models of language activation and lexical access go hand in hand with questions and theories on mental lexical representations as well as dependent and independent bilingual language processing and production mechanisms. Delving deeper into these respective theories on selective or simultaneous activation and the architectural characteristics of the models on language access would go beyond the scope of this thesis. Regardless of the assumptions on what language activation looks like, whether language- as-a-whole or only certain aspects are activated or whether there are indeed inhibition mechanisms, it is more important to know that there possibly are different states of activation — whether globally or only of certain aspects — leading to different CLI phenomena. It can be hypothesized that competing components of the bilingual's language systems can influence the availability of certain linguistic aspects. The more frequently these aspects are used, the more active and available they are and the more likely they may be chosen in production. In line with Grosjean (2008, pp. 43-45), the degree of activation can be measured by the number of types of CLI-phenomena. Therefore, it is more important to reflect on how this activation (or inhibition) can be manipulated experimentally, and what factors require careful consideration.

2.4.3.2 Conflicting variables in controlling language mode

When language mode is the independent variable, several conflicting variables must be taken into account that may influence the extent of language activation. Grosjean lists several variables that must be considered when experimentally manipulating language mode that may have led to conflicting results in previous experiments (2008, pp. 81-83). He distinguishes between top-down and bottom-up factors. Top-down factors refer to the environment, the laboratory doing bilingual research, the study relating to bilingualism, reports from other bilingual subjects, the experimenter, the instructions, the task and the proficiency level. Bottom-up factors, on the other hand, refer to cognates, shared word onsets in phonetically similar languages, homographs and homophones, code-switches and borrowings (Grosjean, 2008, p. 78).

Even though neither the monolingual nor the bilingual end of the language mode continuum are usually reached (see above), an experimental setting in which bilingual subjects are ready to process stimuli from one or the other language allows a somewhat simultaneous activation (Grosjean, 2008, p. 78). Inducing a monolingual mode in a bilingual speaker is methodologically more challenging. As a bilingual never totally “switches off” his or her languages, these top-down and bottom-up factors can immediately activate the other language to the extent that the person

travels to the bilingual side of the continuum (Grosjean, 2008, p. 46). Basically, any of these indices that may be associated with the language to be deactivated should be avoided. There is no guarantee that a subject is in a monolingual mode when the instructions, preliminary tasks and occasional reminders are in the target language (Grosjean, 2008, p. 58). These efforts may set the target language as the base language, but the position on the continuum is not necessarily close to the monolingual end. Furthermore, having a bilingual experimenter feigning being monolingual in the target language is risky, given that subtle cues like facial expressions can reveal the experimenters actual comprehension of the other language and immediately put the subject in bilingual mode. Moreover, the profile of the examiner (or interlocutor) must be carefully chosen, and further persons present — if they need to be — should not master the language which is to be deactivated (or inhibited). The simple knowledge that the non-base language can be involved in the study could activate it (Grosjean, 2008, p. 45). Grosjean (2008, pp. 80-82) argues that despite efforts to put participants in a monolingual mode, previous research has failed to do so. Dijkstra and Van Hell (2003) carefully selected their participants (i.e. participants were not supposed to know that the study was about bilingualism), task and stimuli did not refer to the L2; and exclusively communicated in the L1. However, the participants might not have been in a monolingual mode, because of the stimuli themselves. The presence of cognates and homophones might have activated the other language and pushed them toward a bilingual mode.

Concerning interindividual differences in the experiments, it must be borne in mind that differences between participants might be due to the fact that some bilingual speakers are rarely in a bilingual mode in their daily lives, while others hardly ever leave the bilingual mode (Grosjean, 2008, p. 45). However, inter-individual differences are expected in terms of language dominance, given that dominance constitutes a top-down factor accounting for influences on the language mode effect. The assumption that dominance configurations of a bilingual speaker may interact with the language mode is discussed in the next section.

2.5 The interplay of language dominance and language mode

Central to the hypothesis that the variables of bilingual dominance and language mode can interact is the following statement by Grosjean (2008, p. 63):

“bilinguals who are highly dominant in one language may simply not be able to control language mode in the same way as less dominant or

balanced bilinguals.”

The assumption that bilingual dominance can be a factor for varying degrees of code-switching or language mixing in natural speech can be found in earlier work by Grosjean (1982, p. 238). Grosjean (2008, p. 63) lists a few studies reporting greater language mixing when bilinguals speak their weaker language. For instance, Nicoladis and Genesee (1998) note that bilingual children mix languages more often when speaking their weaker language — irrespective of whether the parent interacts only in one language or uses both. This study, however, suggests that there is only a dominance effect on CLI phenomena, not a language mode effect, because the interlocutor’s language mode did not affect the amount of code-mixing. The results of an experimental study by Caixeta (2003) on bilinguals of Brazilian-Portuguese and French who were exposed to a monolingual and a bilingual experimenter, support these findings, as participants code-switched more often than they did when speaking their weaker language (as cited in Grosjean 2008: 75-76). These findings suggest that dominance can influence the number of CLI phenomena, but does not have to interact with language mode.

In Spivey and Marian’s (1999) study, however, L1 Russian - L2 English bilingual participants made more eye movements towards the Russian distractor, even though they were set in a monolingual English mode. Although the reverse was not true for the Russian monolingual mode, this study is usually cited as evidence against language mode theory (or the existence of a monolingual mode). In a subsequent paper, however, Marian and Spivey (2003) acknowledge that they might have failed to induce the monolingual mode in the weaker language, because participants were aware of the study’s interest in bilingualism. Regardless of whether these findings are interpreted as evidence for or against the existence of a monolingual mode, they hint that language dominance can have a major influence on language mode effects. As Grosjean (2008, p. 63) points out, dominance can influence the effect of language mode by pushing the speaker away from a monolingual mode because the stronger language can easily seep through in the weaker language.

The proposition that language mode and language dominance can interact has been investigated empirically by Dunn and Tree (2014). Spanish-English bilinguals participated in word recognition in either a monolingual or a bilingual mode. Reaction times for English non-words were longer the more dominant in Spanish the participants were. Although their results did not yield an interaction effect between dominance and mode, they discuss the possibility of a language mode effect when bilingual proficiency is controlled for (Dunn & Tree, 2014, p. 611).

Chapter 3

Cross-linguistic influence in motion event descriptions

The lexicalization patterns of bilinguals in two typologically different languages can show interesting CLI phenomena beyond the lexical and syntactic level. A series of studies investigating the effects of the interplay of typologically different languages are discussed in this chapter. It should be noted that a thorough depiction of a state-of-the-art is beyond the scope of this thesis. The literature review is further limited, as several studies on bilingual motion event encoding that are not directly relevant to the research questions are excluded. More precisely, the focus is on the expression of self-propelled motion in typologically distinct languages (cf. section 1.2). Hence, bilingual encodings of caused motion, for instance, are not taken into account. Furthermore, it must be noted that the present project exclusively deals with language production. Thus, findings from studies rooted in a relativistic framework analyzing CLI phenomena in the mental construal of language learners or bilingual speakers are marginally discussed, although they tend to dominate the discourse on research on motion event encoding in SLA or bilingualism. Finally, the literature review aims to shed light on research gaps and methodological issues (section 3.3), which the study aims to cover. The last section of this chapter briefly summarizes two studies that address some of the research gaps and laid the groundwork for the present study.

3.1 Why study CLI in the motion event domain?

As outlined in chapter 1, Talmy's seminal work has led to an array of contrastive and cross-linguistic research with a large body of empirically investigated languages (see Matsumoto & Slobin, 2012 for an extensive bibliography on motion event encoding). The systematic differences in lexicalization patterns across languages have inspired

myriad research in translation, SLA and bilingualism.

Whereas Cadierno (2004, p. 13) notes that the study of motion in SLA research is rather neglected, the following literature review will show that this area has largely been developed in recent years with empirical research involving different language pairs, sample sizes, constellations and methodologies. The reasons for the growing interest in this field are manifold.

As noted above, the study of motion events in SLA/bilingualism research are widely motivated by investigating the TFS-hypothesis and the “learning of another way of thinking for speaking” (Cadierno & Lund, 2004, p. 145). Following and extending Slobin’s TFS-hypothesis, a growing body of research has investigated the impact of different framing patterns on cognitive aspects, such as perception, attention, memory, conceptualization and categorization (e.g. Z. P.-S. Luk, 2010; Kersten et al., 2010; Schmiedtová, 2011, 2013; von Stutterheim, Andermann, Carroll, Flecken, & Schmiedtová, 2012; Lai et al., 2014). Several studies, however, interpret their findings in light of the TFS-hypothesis, even though only the *speaking* and not the *thinking* part is analyzed (e.g. Hasko, 2010; Hendriks & Hickmann, 2011). Since the present project exclusively focuses on language production, no neo-relativistic interpretations are intended. For reviews of studies discussing typological influences on co-verbal or non-verbal cognition, see Han and Cadierno (2010); Pavlenko (2011) or Cook and Bassetti (2011).

Besides the interest in investigating the acquisition and use of different framing systems on mental construal, there is interest in investigating CLI in language production data, which is the focus of the present investigation. More precisely, bilingual verbal motion event expressions allow researchers to explore patterns of CLI at different language levels. Hence, transfer and convergence can be observed not only at the lexical, but also on the syntactic and semantic level.

Apart from questions on CLI, there resides an interest in studying motion event descriptions in the framework of SLA and bilingualism, because more general questions on the cognitive challenges of switching between the two syntactically-semantically different systems can be addressed. Odlin (1989, p. 45) remarks that research based on linguistic typologies is useful for SLA research in general and for the investigation of transfer in particular, given that it allows for the study of systematic influences. The ultimate aim of such studies would thus be a clearer understanding of the complex interplay of transfer and natural principles of L2 acquisition.

3.2 Literature review on the acquisition and use of typologically different languages

Although the field of motion event analysis in a bilingualism framework is growing, studies in SLA are still more numerous. Research in SLA primarily concerns the acquisition process of distinct framing patterns. In research on bilingualism, the focus is primarily on the use, rather than acquisition, of distinct framing types. In addition to the scarcity of studies rooted in a bilingualism framework, comparison is impeded as different definitions of ‘bilingualism’ are adopted (Engemann, 2012, p. 46). However, as outlined in section 2.1, both research domains conceptually overlap and often refer to the same phenomena through different terminology (e.g. the same type of speaker may be called ‘L2-speaker’ in an SLA framework, but ‘bilingual’ in bilingualism research). Due to the overlap of these domains — not only terminologically but also with respect to CLI — the literature review includes studies rooted in bilingualism and SLA frameworks, even though the present project focuses on bilingual speakers and adopts bilingualism research terminology.

In both frameworks, various language constellations have been investigated with different methodologies and results. Given that variation ascribed to different typological affiliations not only manifests between different languages, but within languages or varieties of the same type (cf. subsection 1.5.2), CLI phenomena have been revealed analyzing all sorts of language constellations — belonging to typologically different and similar types. As the languages of the present studies belong to different lexicalization types, the focus of the literature review is on studies exploring the influence of the satellite-framed pattern on verb-framed pattern and vice versa.

In general, most studies reveal influences — whether mutual or not — of the typological differences on lexicalization patterns. However, the reported influences and the methods applied to investigate them differ. Independently of the examined language pairs, a recurring question is whether the main verb encodes *PATH*, following a verb-framed pattern, or *MANNER*, following a satellite-framed pattern. Further questions are whether *MANNER* is expressed at all, especially in situations where a spatial boundary-crossing is predicated.

3.2.1 Language pairs

In investigating how speakers handle distinct language systems and examine typologically induced CLI, most research on the acquisition and use of different languages or varieties in the motion event has consequently focused on typologically distinct language types. However, since inter- and intratypological differences

(subsection 1.5.2) are reported in numerous contrastive studies, typologically similar types can also present CLI phenomena. Hence, a handful of studies analyzed motion descriptions from speakers acquiring and using languages classified to the same type. Further studies compared, for instance, learners of an S- and a V-language acquiring both a S-language (e.g. Bernini, Spreafico, & Valentini, 2006). The group sharing the same typological pattern can serve as control group, allowing to distinguish CLI phenomena from general (and arguably universal) learning difficulties. As the present project aims to investigate a language pair that tends to different typological patterns (see section 1.7), studies investigating the use and acquisition of typologically similar languages are only marginally discussed.

In the literature reviewed, the most frequently investigated language pair was Spanish and English, usually with the focus on the influence of Spanish as L1 on English as L2 (Montrul, 2001; Negueruela, Lantolf, Jordan, & Gelabert, 2004; Navarro & Nicoladis, 2005; Hohenstein et al., 2006; Jia, Kohnert, & Collado, 2006; Álvarez, 2008; Stam, 2006, 2015; Spring, 2010; Filipović, 2011; Reshöft, 2011; Alonso, 2011, 2013, 2016; Larrañaga, Treffers-Daller, Tidball, & Ortega, 2012; Alcaraz Mármol, 2013; Lai et al., 2014; Aveledo & Athanasopoulos, 2015; Sharpen, 2016). Being the most frequently investigated language, English has been analyzed in combination with other V-languages such as French (Nicoladis & Brisard, 2002; Hendriks, Hickmann, & Demagny, 2008; Antonijević & Berthaud, 2009; Nicoladis et al., 2010; Reshöft, 2011; Carroll et al., 2012; Engemann, 2012; Soroli, Sahraoui, & Sacchett, 2012; Hendriks & Hickmann, 2011, 2015; Treffers-Daller & Tidball, 2015), Italian (Bernini et al., 2006; Reshöft, 2011), Japanese (Yu, 1996; Inagaki, 2002; Matsunaga, 2006; Stringer, 2007; Spring, 2010; Brown & Gullberg, 2008a, 2008b, 2010, 2011, 2013; Brown, 2015), Korean (Choi & Lantolf, 2008) or Turkish (Montrul, 2001; Demirtaş, 2010). Other S-framed V-framed language pairs encountered across studies are Japanese and German (Bauer, 2010), Turkish and German (Schroeder, 2009; Goschler, 2009; Goschler & Stefanowitsch, 2013; Daller, Treffers-Daller, & Furman, 2011), Turkish and Dutch (Waegemaekers, 2012), Turkish and Danish (Jessen & Cadierno, 2013; Jessen, 2014b, 2014a; Suner Munoz & Jessen, 2016), Danish and Spanish (Cadierno, 2004; Cadierno & Ruiz, 2006; Cadierno, 2010), Swedish and Spanish (Bylund, 2009; Bylund & Jarvis, 2011; Donoso, 2014, 2016), and Russian and Spanish (Chui, Yeh, Lan, & Cheng, 2013). The language pair of the present study — French and German — has been analyzed within different frameworks and through different approaches (Carroll et al., 2012; Scheirs, 2015) and in the two independent studies preceding the present project discussed in section 3.4 (Berthele & Stocker, 2016; Berthele, 2017).

3.2.2 Methods

The question of how typologically different languages interact and influence each other has been approached qualitatively and quantitatively, through case and large-scale studies. Data collection methods range from experimentally elicited data by means of pictures or videos to recordings of conversations in naturalistic settings. The selection of participants and the conflicting factors that are taken into account vary from study to study. The factors that are controlled for are usually proficiency and/or dominance levels, types of learners or bilinguals, age (chronological, AoA or LoR) and socio-economic status (SES).

3.2.2.1 Stimuli and data elicitation

The most widely used method in not only contrastive motion event studies but also in an SLA or bilingualism framework is *The Frog Story* (Mayer, 1969) picture description task. Narratives of *The Frog Story* descriptions were either elicited orally (e.g. Cadierno, 2004; Bernini et al., 2006; Treffers-Daller, 2012; Hijazo-Gascón, 2015; Donoso, 2016) or in written form (e.g. Cadierno & Ruiz, 2006; Nelis & Miljan, 2016). Other textless picture stories, such as the *Father-and-Son stories* by Plauen (1996) (e.g. Daller et al., 2011; Treffers-Daller & Calude, 2015; Treffers-Daller & Tidball, 2015), or picture books purposely designed for the study, such as *The CAT-Story* (e.g. Hendriks, 2005), are used.

Besides picture stories, a frequently used elicitation method is the use of video-clips — either animated or real-life. Prominent video-clips of animated cartoons are *Canary Row* (e.g. Choi & Lantolf, 2008; Brown & Gullberg, 2008a, 2008b; Spring, 2010; Brown, 2015), *Pink Panther* (e.g. Navarro & Nicoladis, 2005; Alcaraz Mármol, 2013), *Mickey Mouse & Friends* (e.g. Chui et al., 2013), and *Tomato man* (e.g. Lai et al., 2014). Real-life video clips are usually recorded merely for the purpose of the study (e.g. Hohenstein et al., 2006; Carroll et al., 2012).

Several scholars have adopted translation tasks in their studies by asking participants to translate sentences encoding motion events which are usually interspersed with filler sentences not depicting motion events (Montrul, 2001; Bauer, 2010; Alonso, 2011, 2013; Sharpen, 2016). Another method is to display several sentences with different framing patterns and let participants choose the most appropriate description of the event (Alonso, 2016).

The experimental elicitation methods also differ in whether filler items are employed in the research design. Although the purposes and research questions of these studies are comparable, filler items are occasionally integrated in the research designs — mostly to disguise the research aim (e.g. Carroll et al., 2012; Bylund & Jarvis, 2011; Waegemaekers, 2012). Other studies only mention critical items (e.g.

Naigles & Terrazas, 1998; Hohenstein et al., 2006; Spring, 2010; Jessen & Cadierno, 2013).

Further methods, through which motion descriptions are not directly elicited, are analyses of learner text corpora. Reshöft (2011), for instance, compared written English-learner corpora of speakers of L1 French, Spanish and Italian to L1 English school and university essays. Finally, data is also collected in natural settings. Goschler, Woerfel, Stefanowitsch, Wiese, and Schroeder (2013), for instance, recorded informal conversations among their Turkish-German bilingual subjects for about 20 hours.

3.2.2.2 Participants' profile and influencing factors

The sample size and types of participants selected as well as the information about the participants' profiles provided vary considerably in the studies reviewed. Sample sizes range from single-case, longitudinal studies lasting four (Álvarez, 2008) to 14 years (Stam, 2015); to studies of only eight participants (Nicoladis & Brisard, 2002); to larger sample sizes of 96 (Engemann, 2012), 99 (Jessen, 2014a) or even 240 participants (Kersten et al., 2010). These very small or large samples, however, are outliers. Fifty-two randomly selected studies on motion event descriptions within an SLA or bilingualism framework show a median of 45 participants and a mean of 52.6, including comparison and control groups.

Learners' levels of proficiency are mostly grouped into intermediate and advanced categories (e.g. Antonijević & Berthaud, 2009) or more fine-grained groups with three (e.g. Iakovleva, 2012) or four levels (e.g. Hendriks, 2005). Proficiency (or dominance) levels are usually defined by study-external circumstances such as a constellation in language courses the participants are visiting (e.g. Filipović, 2011; Alcaraz Mármol, 2013; Sharpen, 2016). In a few studies, however, proficiency is assessed through self-reports (Z. P.-S. Luk, 2010), additional language tests such as C-tests (e.g. Larrañaga et al., 2012; Treffers-Daller & Tidball, 2015) or other language tests (Hendriks & Hickmann, 2011; Alonso, 2016). Several studies provide additional sociolinguistic information gathered by means of questionnaires (e.g. Hendriks & Hickmann, 2011; Alonso, 2016). The effect of language dominance has been treated as an alternative interpretation of divergent patterns of bilinguals (e.g. Hohenstein et al., 2006) or as a factor investigated in its own right (e.g. Daller et al., 2011).

Short-term and long-term learners are identified and compared based on LoR (e.g. Spring, 2010). In addition to different types of learners, different types of bilinguals have been investigated. In several studies, bilinguals are grouped into early and late bilinguals — usually with an arbitrary cut-off age (e.g. five years old in Hohenstein et al., 2006). Further distinctions are made between bilingual children

and bilingual adults and between simultaneous and sequential bilinguals. Engemann (2012), for instance, investigates early simultaneous bilingual learners of French and English with balanced levels of dominance, i.e. children exposed to English and French from birth following the ‘one-parent — one-language’ principle (Engemann, 2012, p. 92). Jia et al. (2006), on the other hand, compare sequential bilinguals and distinguish between early and late sequential bilinguals. The prevailing subjects studied are, for obvious reasons of availability, feasibility or convenience, students or employees at a university or other institution of higher education. These students are often enrolled in linguistic departments or are students of translation (e.g. Alonso, 2011, 2013). Participants have been compared across groups with different language constellations (e.g. Cadierno & Ruiz, 2006), language levels (e.g. Antonijević & Berthaud, 2009) or monolingual control groups (Hendriks & Hickmann, 2015). To date, most studies have adopted a between-subject design and only a handful of the studies reviewed show a within-subject design (e.g. Nicoladis & Brisard, 2002; Hohenstein et al., 2006; Nicoladis et al., 2010).

While some scholars report a clear influence of proficiency or dominance on the encoding of motion events in an SLA or bilingual framework (e.g. Larrañaga et al., 2012), others attribute a limited role to this factor, emphasizing the learnability of language dependent motion event framing patterns (e.g. Cadierno, 2008, p. 265, Navarro & Nicoladis, 2005, p. 106). Regardless of the degree of influence of proficiency or dominance, however, these variables have shown to play a role no matter what language pairs were examined.

Besides variables attributed to dominance or proficiency, there are several factors considered influential in bilingual encoding of motion events. While in most studies, demographic variables such as age, gender, regional background and SES are controlled for, few studies report a possible influence of language mode. As mentioned in subsection 2.4.2, few motion event studies include language mode and pay attention to inducing monolingual mode. In some studies, this variable is discussed as a potential factor leading to conflicting results.

3.2.3 Occurrence and directionality of CLI

As the typological distinctions go beyond the lexical and syntactic levels, and concern semantic and conceptual differences, the acquisition and use of typologically different languages constitutes challenges on different levels. Several studies have investigated which components of which lexicalization patterns in the motion event domain are particularly difficult to master and are prone to CLI or general learner difficulties (Goschler, 2009, 2013).

The general questions addressed in studies investigating the occurrence of CLI in

motion event descriptions of speakers acquiring and using two typologically different languages are whether speakers retain dominant language patterns or whether there is a restructuring and convergence of the two systems. Further points of consideration are questions on which component and to what degree CLI phenomena occur. Drawing on work of Müller (1998), Iakovleva (2012) and Hohenstein et al. (2006) argue that the degree of CLI phenomena in the motion event domain depends not only on typological differences but also on structural ambiguity. In other words, patterns are transferred not simply because one language system exerts an influence on the other language system, but because for certain structures, one language system is more systematic. Along these lines, bilingual speakers use transfer as a “relief strategy” (Müller, 1998) and use the pattern of the more-systematic system to cope with ambiguity.

Yet, other explanations of CLI in the motion event domain are motivated by the TFS-hypothesis. Cadierno (2010) argues that CLI phenomena are not simply transfer of structures, but rather depend on the different degrees of salience of particular concepts in the respective languages. Hence, *MANNER* of motion, for instance, is less salient in S-languages, and it is backgrounded when expressed in the main verb root and is thus less salient for V-language speaking learners. Drawing on this argumentation, Carroll et al. (2012, p. 205) note that problems are evoked by the different criteria for the notion of salience:

“At the level of linguistic form one can argue that grammaticalized categories are less salient than optionally added categories since they are automatically expressed. With respect to the concepts they encode, however, these categories are foregrounded when planning the content of an utterance, because they are obligatory (cf. Slobin, 2006).”

Questions of the components on which CLI phenomena are observed go hand in hand with questions on the directionality of CLI phenomena. Most studies reviewed report unidirectional influences of V-language on S-language patterns and report less on bidirectional CLI. This is because most of these studies are rooted in an SLA framework, where unidirectional CLI phenomena are far more evident. However, few studies report influences from the L2 on the L1 showing that the typologically different framing patterns of motion events can lead to processes of restructuring in the L1, or dominant, language.

3.2.3.1 Satellite-framed patterns in a V-language

The main typologically-induced challenge for a satellite-framed pattern with *MANNER* in the main verb combined with path satellites is conforming to a pattern with *PATH*

mapped on the main verb and MANNER on adverbial components.

Concerning the verb lexicon, S-language speakers learning a V-language do not have to learn a wide range of path verbs, since this category is more limited than the manner verb inventory is. Iakovleva (2012) argues that the path verb category is more systematic and involves less variability in V-languages like French. The data suggest that Russian learners of French acquire French path verbs quickly and effortlessly. In a similar vein, Z. P.-S. Luk (2010, p. 56) argues that the PATH component seems easier to master, and there may thus be an asymmetry in the verb lexicon in terms of the directionality of CLI. Advanced Spanish speakers with L1 English did not differ in Navarro and Nicoladis' (2005) study in terms of path verbs compared to monolingual Spanish speakers. Treffers-Daller and Tidball (2015) show that L1 English learners of L2 French master French path verbs early on. Song, Pulverman, Pepe, Golinkoff, and Hirsh-Pasek (2016) note that Spanish path verbs, especially in boundary-crossing contexts, are used to the same extent by advanced L1 English - L2 Spanish speakers as they are by native Spanish speakers. However, it must be pointed out that, compared to other S-languages, English displays several Latinate path verb forms (cf. subsection 1.4.2). The prevalence of English path verbs in comparison to other S-languages is confirmed in Bernini et al.'s (2006, p. 18) study on learners of different S-languages. The analyses of motion event constructions of L1 English speakers show a considerably higher use of path verbs in L2 Italian than in L1 German or L1 Dutch. Bernini et al. (2006) show that even differences in PATH saliency in different L1 S-languages lead to L1-transfer patterns in V-language path verb occurrence. Bidirectional transfer patterns modulated by an age factor are reported in Hohenstein et al.'s (2006) study where bilingual L1 Spanish - L2 English speakers used less path verbs than monolingual Spanish speakers, but the L2-effect was stronger for early bilinguals.

A further S-language influence in a verb-framed pattern is the use of path satellites. V-languages generally show less elaboration of this constituent (though, see section 1.5 for intratypological differences). Treffers-Daller (2012) notes a frequent use of redundant path constructions that are atypical in Standard French, but can be explained by contact induced Dutch influence. From an SLA perspective, Cadierno (2004, p. 41) report that their analysis of motion event descriptions of learners of L2 Spanish shows a "satellization of the Spanish locative constructions". The L1 Danish speakers used redundant and anomalous path particles that are not found in native Spanish speaker data (see also Cadierno & Ruiz, 2006). Similarly, Ochsenbauer and Engemann (2011) and Engemann (2012) report that early French-English bilingual children differ from monolingual French children in their higher use of verb-external path expressions, which hints to an influence of

an S-framed pattern in a V-language. L2 transfer patterns are found in Brown and Gullberg's (2008a) data, where L1 Japanese - L2 English speakers showed more path satellites in their L1 V-language Japanese. Bidirectional transfer patterns are also found in a study by Daller et al. (2011) for different groups of bilinguals. Taking bilingual dominance determined by language as a predictor variable, Daller et al. (2011) count more redundant path satellite constructions in German-Turkish bilinguals living in Germany than in German-Turkish bilinguals living in Turkey in the V-language Turkish.

As for the component of *MANNER*, several studies note a higher use of manner verbs in V-languages due to influences of an S-language either as L1/less dominant language (e.g. Navarro & Nicoladis, 2005; Larrañaga et al., 2012; Treffers-Daller & Tidball, 2015) or, in the reverse direction, as L2/dominant language (e.g. Hohenstein et al., 2006; Brown & Gullberg, 2008a; Avelado & Athanasopoulos, 2015). A particular challenge for L1 S-language speakers is the BCC in V-languages; there is usually no restriction on manner verbs in a satellite-framed pattern (cf. section 1.6). Speakers with low proficiency or dominance levels in a V-language often do not conform to or "violate" this constraint regularly (Treffers-Daller & Tidball, 2015). While the BCC has been reported to have been mastered on advanced levels, i.e. participants did not make use of manner verbs in boundary-crossing contexts (Cadierno & Lund, 2004), other scholars note that even at advanced levels, the BCC is frequently violated (Larrañaga et al., 2012; Treffers-Daller & Tidball, 2015). Hendriks and Hickmann's (2011, 2015) informants often describe motion events involving the crossing of a spatial boundary by means of multiple clauses or subclausal constructions, mapping *MANNER* on the verb in one clause and describing the boundary-crossing by means of a path verb in another clause or sub-clause. This strategy allows the expression of both components in two, less semantically dense, clause constructions. The use of a manner verb in a V-language would thus not violate any grammatical constraint from a normative point of view, but it hints to the influence of a satellite-framed pattern where encoding *MANNER* in the verb would be the typical choice.

Apart from verbs, other means to express the *MANNER* component are adverbials or adverbial constructions, which constitute an alternative way of encoding *MANNER* in V-languages if the verb slot is "occupied" (cf. subsection 1.4.3). Given that the mapping of *MANNER* of motion on verb-external constituents is possible in both framing patterns, this can be interpreted in two ways in terms of CLI. It could be a lexicalization pattern conforming to the typical verb-framed pattern, i.e. a path verb combined with a manner adverbial. On the other hand, in a S-language, the aspect of *MANNER* tends to be more elaborated, so a manner adverbial can be the result of an S-language influence. Hohenstein et al. (2006) report a lower propensity

of manner modifiers (i.e. manner adverbials) use for English-Spanish bilingual speakers in comparison to monolingual speakers in their Spanish utterances. They interpret these findings as English L2-influence on the V-language Spanish. Similarly, L1 English speakers in Navarro and Nicoladis's (2005) study use fewer verb-external manner descriptions in their L2 Spanish than L1 Spanish speakers. In contrast, Iakovleva (2012) interprets the more frequent omission of manner adverbials by L1 Russian - L2 French speakers in comparison to French L1 speakers as general learner simplification strategy and less as an influence of a satellite-framed pattern on the V-language. Taking a similar track, Larrañaga et al. (2012) argue that the use of verb-external manner descriptions, which occur only at advanced levels in their data on L1 English – L2 Spanish speakers, depends largely on language proficiency. On the other hand, Donoso's (2014) study, shows a higher number of manner adverbials in L1 S-language Swedish speakers in the L2 V-language Spanish than in L1 Spanish speakers. She argues that the informants use these adverbials to compensate for a semantic component that is compulsory in their L1.

Other semantic aspects where S-language patterns have been detected in a V-language are in the number of *GROUND* elements³⁵. Several studies have reported more *GROUND* elements in S-language narrative texts (cf. subsection 1.4.2), a higher propensity of *GROUND* elements in V-language descriptions may be traces of S-language influence. Navarro and Nicoladis (2005) report that their participants use more *GROUND* descriptions in L2 Spanish than in L1 Spanish, which could be due to an influence of L1 English. Furthermore, the focus on endpoint, which is more pronounced in some satellite-framed systems such as Swedish than in verb-framed systems like Spanish³⁶, has shown traces of bidirectional CLI in a study by Bylund and Jarvis (2011). The non-dominant language Swedish has been shown to exert an influence on the dominant language Spanish in that L1 Spanish – L2 Swedish bilinguals more frequently encode an endpoint than monolingual native speakers of Spanish do.

3.2.3.2 Verb-framed patterns in an S-language

A series of studies have reported traces of verb-framed patterns in S-language motion event descriptions. To conform to a satellite-framing pattern, speakers must map the description of *PATH* on verb-external components and combine it with the description of *MANNER* in the main finite verb. This involves mastering a wide range of manner verbs. A larger lexicon implies more diversity, a more fine-grained

³⁵ In the present study, it was decided not to code *GROUND* expressions for reasons outlined in section 4.4.

³⁶ Endpoint-focusing is associated with telicity, where S-language and V-language patterns differ (cf. section 1.6).

description of MANNER and in Slobin's (1996, 1997) terms, a different rhetorical style (cf. subsection 1.4.2). As MANNER can be an optional component in V-languages, difficulties in terms of manner verb use by S-language learners, irrespective of their proficiency, have been reported (e.g. Antonijević & Berthaud, 2009). Contrasting different L2 Danish learner groups, i.e. L1 speakers of the V-language Spanish and the S-languages German and Russian, Cadierno (2010) notices that L1 Spanish learners experience most difficulties in acquiring the Danish satellite-framed pattern of manner verbs combined with path particles. Less frequent use of manner verbs in comparison to native S-language speakers is noted in studies on L1 V-language speakers in their L2 S-language in both oral (Hohenstein et al., 2006; Brown & Gullberg, 2008a; Carroll et al., 2012) and written production (Reshöft, 2011) or written choice (Alonso, 2016). A series of studies report a higher use of manner verbs in L2 S-language from speakers with an L1 V-language depending on their level of proficiency (Bauer, 2010; Alcaraz Mármol, 2013). Alonso (2011, 2013) notes that even for advanced L2 S-language speakers, the use of manner verbs in English translations of Spanish motion events is limited, which speaks to an influence of L1 Spanish patterns. The limited choice of manner verbs from L2 S-language speakers compared to native S-language speakers increases in boundary-crossing constructions where the L1 verb-framed pattern is constrained in terms of manner verbs (Alonso, 2016). Likewise, Daller et al. (2011) contrast three groups' German motion event descriptions and note that the monolingual German speakers use most manner verbs in boundary-crossing contexts, followed by bilingual Turkish-German speakers living in Germany and bilingual Turkish-German participants living in Turkey, who used the fewest manner verbs in boundary-crossing situations. This suggests that language dominance has an impact on manner verb use in boundary-crossing situations.

The influence of the verb-framed pattern in terms of an increasing use of path verbs in the S-language has been found in several studies. Compared to monolingual English speakers, a higher use of path verbs in English has been reported in bilingual L1 Spanish speakers (Hohenstein et al., 2006) and L1 Japanese speakers (Brown & Gullberg, 2013). Similarly, Alcaraz Mármol (2013) notes a lower use of path verbs in monolingual English speakers compared to L2 English - L1 Spanish speakers, who themselves differ in terms of proficiency, i.e. higher use of path verbs in elementary English speakers than advanced English speakers. On the other hand, Goschler et al. (2013) do not find any difference in path verbs between bilingual Turkish-German speakers and monolingual German speakers.

However, the influence of a V-language can manifest in deictic or generic verbs in terms of lower proportions of manner verbs and higher proportions of path

verbs. Goschler et al. (2013) note a preference for semantically light verbs in German by bilingual Turkish-German speakers compared to monolingual German speakers, particularly for the verbs *kommen* and *gehen*³⁷. Similarly, Suner Munoz and Jessen's (2016) data shows that L1 Turkish - L2 Danish speakers used the deictic verb *gå* 'to go' in Danish more frequently than Danish speakers, who preferred to employ manner verbs. On the one hand, these examples may reflect a Turkish verbalization type in that speakers used these verbs analogously to Turkish path verbs when German (Goschler et al., 2013, p. 244) or Danish (Suner Munoz & Jessen, 2016, p. 7) lacked corresponding path verbs. On the other hand, the use of "semantically light", generic or deictic motion verbs does not have to be the result of typologically determined influences, but may point to learner strategies (Goschler, 2009, 2013). This second interpretation points to a fundamental difficulty in distinguishing between different CLI phenomena like transfer (subsection 2.2.1) and avoidance or preference (subsection 2.2.4). At the same time, teasing apart these typologically or structurally induced phenomena from general learner preferences for semantically less dense and complex forms is not straightforward (see section 6.7). It is usually a given fact that in SLA studies, motion event descriptions from language learners are in general less elaborated than those from L1-speakers (Hickmann & Robert, 2006). The misinterpretation of the use of generic or neutral verbs instead of more diverse manner verbs as a V-language influence rather than an effect of lower verb inventory calls for controlling participants' language dominance configurations (cf. section 3.3).

Related to questions on the influence of vocabulary size is the question whether manner adverbials are used in S-language descriptions. Adding a more fine-grained description of manner by means of a manner adverbial in an S-language relates not only to MANNER saliency of the stimulus but also to factors such as vocabulary size and language dominance. As mentioned above, the use of manner adverbials is restricted in neither the satellite-framed pattern nor the verb-framed pattern. In comparing monolingual English speakers with Spanish-English bilinguals, Hohenstein et al. (2006) found a higher proportion of manner adverbials in monolingual English speakers. However, while manner adverbials are not uncommon in S-languages, the combination of manner adverbials with path verbs corresponds rather to the verb-framed pattern (cf. subsection 1.4.3). Daller et al. (2011), for instance, note that Turkish-German bilingual speakers living in Turkey more often use manner adverbials combined with path or deictic verbs than Turkish-German bilinguals living in Germany do, which suggests a V-language influence.

³⁷ Note that the coding of these verbs is a matter of debate. The coding decisions for *kommen* and *gehen* in the present project are outlined in section C.4.

While Goschler et al. (2013) did not find any difference in preferences for manner verbs and path verbs between German monolingual and Turkish-German speakers, the satellite-framed construction comprising a manner verb and path particle is generally avoided by bilingual speakers in their German utterances. Similar observations have been reported in oral video descriptions from L1 Italian learners of L2 Dutch (Waegemaekers, 2012) and written narratives of bilingual Turkish-German speakers (Schroeder, 2009). Based on these outcomes, Goschler et al. (2013) adopt a construction-based account of CLI, arguing that typological transfer manifests on the constructional level rather than on separate grammatical components such as verbs. In their study on patterns of convergence in motion event descriptions from Japanese-English bilingual speakers, Brown and Gullberg (2013) report similar findings. In comparing monolingual Japanese and monolingual English speakers' clausal packaging, they found less cross-linguistic differences but did find differences between the monolingual and bilingual groups. While both monolingual groups tended to encode both *MANNER* and *PATH* in a single clause, the bilingual groups, irrespective of whether they described the events in Japanese or in English, usually employed multiple clause constructions to encode both components. While Japanese allows to encode *MANNER* in a variety of grammatical components (cf. subsection 1.4.3), it is restricted in that the encoding of *MANNER* in the verb usually does not co-occur with a *PATH* description in the same clause. Being the typical locus of *MANNER* encoding in English, however, the description of *MANNER* in the verb in one clause and *PATH* in another clause may point to a pattern of convergence of the two systems. On the other hand, and in line with the question of CLI and phenomena of bilingualism in general, the differentiation between semantic elements in syntax may be a general pattern of bilingual development (Brown & Gullberg, 2013, p. 490).

3.3 Implications, methodological concerns and research gaps

The studies reviewed and outlined in the previous section show different kinds of CLI irrespective of the research design, the language pairs examined or the method of data collection and analysis. While most studies report unidirectional CLI phenomena, several show bidirectional CLI phenomena in motion event descriptions, either from satellite-framed pattern to verb-framed patterns or vice versa. Whether these effects are major or modest, and which and to what degree grammatical and semantic elements are affected, shows a different picture from study to study. The present section outlines different methodological issues that may account for these varied and inconclusive findings.

A recurring topic in the literature reviewed are CLI phenomena, which are identified either by nonconformity to monolingual production patterns or by comparing learners or bilingual speakers with different language backgrounds and different levels of proficiency. The difficulty in teasing apart effects of bilingualism and general learner strategies from typologically induced effects calls for an accurate integration and control of language dominance in the research design in order to minimize variation caused by this variable. While several studies acknowledge that greater language knowledge equals more vocabulary in general (e.g. Alcaraz Mármol, 2013), the variable of dominance or proficiency is often a confounding variable in detecting typological influences, such as in the example of the manner verb inventory. As outlined in subsection 3.2.2, the assessment of language proficiency and the consequent grouping of participants is frequently based on language courses the participants are taking. In a few studies, proficiency levels or dominance configurations are determined through self-assessments or objective measures. As Grosjean already criticized two decades ago (1998b, p. 134), the problem of insufficient information about the participants' levels of language dominance impedes replication and cross-study comparisons.

Insufficient information concerning participant selection are also found in terms of sociolinguistic variables. As demonstrated in Hart and Risley (1995), variables such as SES can determine vocabulary size. In the motion event domain, Goschler (2013) notes in a series of studies on German varieties, that sociolinguistic parameters like formality rather than typological factors can account for variation. Similarly, Berthele (2006, 2013) remarks that besides variation across language varieties due to factors such as language size and standardization (subsection 1.5.2), there is variation across speakers that can be explained by formal education. Hence, it is important to assess speakers' sociolinguistic background variables, as social strata are confounding variables. Sociolinguistic variables can thus further complicate the distinction between typological influences, general linguistic influences, common learner strategies and bilingualism per se.

Another recurring methodological problem in the literature reviewed is related to the general research design. Most studies adopt a between-participant design comparing either learners on different proficiency levels or language learners or bilinguals to native, mostly monolingual, speakers. While both within-subject and between-subject designs have advantages and disadvantages (Keren, 2014), there are recurring and prominent methodological, statistical and theoretical problems in between-subject designs. Among these concerns are biases due to idiosyncratic variations and consequently a lower statistical power (cf. subsection 4.6.2).

Related to this statistical problem of the research design are the sample sizes of the

studies reviewed. Given that most studies deal with a sample of about 50 participants, who are then distributed across groups (cf. subsection 3.2.2), the sample sizes are relatively small and imply low statistical power (cf. Button et al., 2013; Plonsky & Oswald, 2014). Furthermore, the expected cross-linguistic influences on the semantic level, especially from the non-dominant on the dominant language, are very subtle, if present at all. A small sample size creates the problem of under- or overestimating these subtle effects (Button et al., 2013).

The review of experimental motion event data elicitation methods shows, that filler items are not used regularly (cf. subsection 3.2.1). While it is usually assumed that cross-linguistic differences in motion encoding are not common knowledge to the study participants, there is still the risk that this may be the case or that participants might become aware that their descriptions of motion events are of interest. The use of filler items can not only diminish this risk, but also prevent participants from repeatedly choosing the same constructional types (cf. subsection 4.2.3.2).

Further methodological problems in the studies reviewed lie in data coding schemes and analyses. Not only do coding schemes differ across studies, but there is also unanimous categorization of specific verbs, which can show a high token ratio (cf. section 4.4). Coding decisions for motion verbs are often subjective. However, mention of inter-rater reliability tests are only made in few studies (e.g. Brown & Gullberg, 2013). While the qualitative data analyses are comparable across studies, the predominant statistical models applied do not model the variability within the stimuli and participants (cf. subsection 4.6.2.1).

Coupled with the problem of loosely defining and determining — if at all — language proficiency or dominance, is that language mode is only controlled in few studies, even though this variable can have an effect on the number and types of CLI that are of interest (see section 2.4). As explained in subsection 3.2.3, language mode has been cited as an influencing factor in some studies. However, the studies are scarce, and a systematic manipulation of language mode to compare a monolingual with a bilingual condition in speakers who are bilingual in two typologically different languages has not yet been conducted. The few findings from studies on language mode manipulation merely report mode effects concerning code-switches or phonological transfers, not CLI phenomena like semantic convergence, which is an issue the present project seeks to investigate.

3.4 Preceding studies to the project

Two studies conducted at the University of Fribourg in 2013 and 2014 published by Berthele (2017) and Berthele and Stocker (2016) lay the groundwork for the present

project. These two studies address several of the methodological issues discussed in the preceding section following the overarching research questions of whether language dominance and language mode influence motion event descriptions. This section briefly sketches these two studies, outlining the relevant implications for the present purposes.

3.4.1 Preceding study I: Language dominance effects

In the first study, published by Berthele (2017), motion event descriptions in French and German were elicited by means of video clips showing self-propelled motion events³⁸. One hundred seventy-two speakers participated, of whom 20 described the clips twice: once in French and once in German. The resulting data comprised 96 response sets in French and 96 response sets in German. The participants' dominance configurations were assessed via the BDS. Coding was conducted adopting a response-by-response annotation system by counting the number of manner verbs, path verbs, manner modifiers, path particles, path prepositions, "violations" of the BCC and ground elements³⁹. Data were analyzed with logistic mixed effects model accounting for by-stimuli and by-participant related variability (see subsection 4.6.2.1). The results showed an effect of language dominance on several variables, but not all variables and not for both languages. For instance, in German answers, the number of manner verbs depended on the participants' dominance configuration; with increasing German dominance, there was an increased use of manner verbs. Such a dominance effect was not found in the French answers in terms of manner verbs. While there was an expected cross-linguistic difference in terms of path verb use, dominance configurations of the speakers did not serve as a predictor in either the German or French answers. For BCC-"violations", there was the expected cross-linguistic difference between German and French. However, while the S-language German does not show grammatical restrictions in boundary-crossing situations (see section 1.6), the data showed a lower use of manner verbs in German for boundary-crossing items than for items that do not predicate the crossing of a boundary. For both languages, dominance played a role in the combination of finite manner verbs and boundary-crossing predication. With increasing French dominance, this combination was avoided more often. In sum, the study shows that, on the one hand, language dominance plays a role, but not for all variables and not to the same degree in both languages. On the other hand, it shows that the motion event components of MANNER and PATH are not

³⁸ Twelve clips were used in Naigles et al. (1998) and 17 additional videos were filmed for the study.

³⁹ Manner modifiers are referred to as manner adverbials in the present project, path particles to path adverbials and path prepositions apply largely to path adverbials, though the latter category comprises more elements.

connected to the same domain (see also Wälchli, 2009, p. 181 and Berthele, 2013, p. 72), that language patterns are not affected by certain factors to the same degree, that a constraint such as the BCC does not apply categorically to V-languages and can affect S-languages and that the individuals' language dominance configurations must be taken into account.

3.4.2 Preceding study II: Language mode effects

The second study, published by Berthele and Stocker (2016), addresses the effects of language mode manipulation on motion event descriptions. As outlined in subsection 2.4.2, none of the studies reviewed found an effect of language mode on semantic aspects of language. The same stimuli as in Berthele (2017) were employed, and the dominance profiles of the participants were assessed through the BDS. Forty-four French-German bilingual speakers participated in the study and were asked to describe the video clips twice: once in a German monolingual mode and once in a German bilingual mode (with interspersed filler items in French, see subsection 4.2.3 for fairly the same method). The coding scheme was largely the same as that in the first study. Compared to the first study, however, the research design of the second allowed for a thorough within-subject analysis to compare the answers of each subject in both language modes. Data was likewise analyzed adopting logistic mixed effect models. The results showed that the manipulation of the language mode yielded an effect on manner and path verbs. While the language mode effect was not striking, it proved statistically significant. Hence, participants used more manner verbs in the German monolingual mode than in the German bilingual mode. In the monolingual mode, they used less path verbs than in the bilingual mode, where French was supposed to be more activated. However, while the descriptive analyses suggested an effect of dominance in the reverse direction (i.e., more path verbs were used by speakers dominant in German), there was no statistically significant effect of language dominance on the proportions of manner verbs and path verbs in either French or German. Moreover, there was no interaction effect between language dominance and language mode. Hence, the results of this second study do not confirm the hypotheses and findings of the first study in terms of the influence of language dominance on variables such as German manner verbs. In line with the first study, the results confirm that the different semantic components in motion event descriptions are only loosely related to the same referential domain.

Many questions that remain unanswered in this study are investigated in the present project. Hence, answers in both languages from each participant will be analyzed to see whether an effect of language mode is present in the French language and how dominance configurations affect individual answers in both

languages. Furthermore, the present study investigates a large sample, implying higher statistical power. Further adaptations of the research design and methodology of these preceding studies are outlined in section 4.2 and subsection 4.4.2.

Chapter 4

Methodology

The first section of this chapter outlines the hypotheses based on the literature and findings of previous studies discussed in the preceding chapters. The outline of the methodology for the study begins with a brief sketch of the materials used for data collection, the procedure and the study design. The research design is largely based on two preceding studies (discussed in section 3.4 and published by Berthele, 2017 and Berthele & Stocker, 2016). The stimuli and the procedure for the main data collection are then piloted (subsection 4.3.1). The main data collection lasted about six months and participants were asked to show up four times (subsection 4.3.2). Section 4.5 provides participant selection and sociolinguistic background information. The participants' oral descriptions of the stimuli were recorded, transcribed and coded (section 4.4). Data analysis was carried out in both qualitative and quantitative ways, which will be explained in section 4.6.

4.1 Hypotheses

Drawing on the theoretical propositions and findings from the previously outlined empirical studies, the effects of language dominance, language mode and language of response will be expected on the proportion of different variables. As there are exceptions (section 1.6) and strategies (subsection 5.6.2) to circumvent grammatical constraints in boundary-crossing situations allowing the use of a finite manner verb, it must be pointed out that the term “violation”, which will be used henceforth, does not necessarily refer to a grammatical violation. However, “BCC-violation” refers to the combination of manner verbs in the boundary-crossing predication clause in both languages, leaving out the strategies discussed in subsection 5.6.2. More information on the variables depicted are provided in subsection 4.4.2 and Appendix C. The following hypotheses are formulated for the present study:

1. Given the cross-linguistic differences between French and German in motion

event framing patterns (cf. chapter 1), the following variables are expected to differ across French and (Swiss-)German answers:

- (a) **Manner verbs:** The proportion of manner verbs will be higher in German clauses.
 - (b) **Path verbs:** The proportion of path verbs will be higher in French clauses.
 - (c) **Verb-external path description:** Speakers will make use of path adverbials in both languages, but more so in German than in French. Path adverbials will only show up in German, and German clauses will show more path elaboration as they allow combining path adverbials and path adverbials.
 - (d) **Manner adverbials:** Supposing (a) and (b) are true, French clauses will likely contain a greater number of manner adverbials.
 - (e) **BCC-violations:** Given French grammatical constraints outlined in section 1.6, clauses describing boundary-crossing will contain fewer finite manner verbs in French than in German.
2. An effect of language dominance is expected in linear terms for the following categories. Drawing on the results of the preceding studies, this effect may be different in French and in German.
- (a) **Manner verbs:** The proportion of manner verbs will increase with increasing German dominance (viz. decreasing French dominance).
 - (b) **Path verbs:** The proportion of path verbs will increase with increasing French dominance (viz. decreasing German dominance).
 - (c) **Verb-external path description:** A greater number of path adverbials and path adverbials (independently and combined) is hypothesized with increasing German dominance (viz. decreasing French dominance).
 - (d) **Manner adverbials:** Assuming (a) and (b) are true, the proportion of manner adverbials will be higher with increasing French dominance (viz. decreasing German dominance).
 - (e) **BCC-violations:** Supposing that French-dominant speakers more often conform with grammatical constraints, the number of clauses describing boundary-crossing will contain fewer finite manner verbs with increasing French dominance (viz. decreasing German dominance).
3. Supposing that a bilingual mode leads to a higher proportion of CLI, an effect of language mode is predicted in the following terms. Again, there may be differences in this mode effect between German and French.

- (a) **Manner verbs:** The proportion of manner verbs will be higher in a German monolingual mode than in a German bilingual mode and higher in a French bilingual mode than in a French monolingual mode.
 - (b) **Path verbs:** The proportion of path verbs will be higher in a French monolingual mode than in a French bilingual mode and higher in a German bilingual mode than in a German monolingual mode.
 - (c) **Verb-external path description:** A higher number of path adverbials and adverbials (independently and combined) is expected in German monolingual mode compared to a German bilingual mode and in French bilingual mode compared to a French monolingual mode.
 - (d) **Manner adverbials:** It is expected that the proportion of manner adverbials is higher in French monolingual mode than in a French bilingual mode and higher in the German bilingual mode than in a German monolingual mode.
 - (e) **BCC-violations:** The proportion of finite manner verbs in boundary-crossing clauses is expected to be higher in French bilingual mode as compared to the French monolingual mode and higher in German monolingual mode as compared to German bilingual mode.
4. Based on the literature reviewed in section 2.5, it is plausible that language mode effects depend on language dominance configurations. Concretely, with increasing dominance in the target language, there will be a decrease in the effect of language mode manipulation. This effect may again be different for French and German, implying a three-way interaction between language mode, language dominance and language of response. Interaction effects can be formulated differently (see chapter 8) and are expected for the proportion of the following variables:
- (a) **Manner verbs:** The proportion of manner verbs will be higher in the French bilingual mode than in the French monolingual mode, and this difference will be more considerable for German-dominant speakers. The proportion of manner verbs will be higher in the German monolingual mode than in the German bilingual mode and this difference will be more considerable for bilinguals at the French-dominant end of the language dominance continuum.
 - (b) **Path verbs:** The proportion of path verbs will be higher in the French monolingual mode than in the French bilingual mode and this difference will be more considerable for German-dominant speakers. The proportion

of path verbs will be higher in the German bilingual mode than in the German monolingual mode and this difference will be more considerable for French-dominant speakers.

- (c) **Verb-external path description:** The proportion of path adverbials will be higher in the French bilingual mode than in the French monolingual mode, and this difference will be more considerable for German-dominant speakers. In German, the proportion will be higher in the monolingual than in the bilingual mode, and this difference will be more considerable for French-dominant bilinguals.
- (d) **Manner adverbials:** The proportion of manner adverbials will be higher in the French monolingual mode than in the French bilingual mode, and this difference will be more considerable for German-dominant speakers. In German, on the other hand, the proportion of manner adverbials will be higher in the bilingual than in the monolingual mode, and this difference will be more considerable for French-dominant speakers
- (e) **BCC-violations:** The proportion of BCC-violations will be higher in the French bilingual mode than in the French monolingual mode, a difference which is more considerable for German-dominant participants. There will be more BCC-violations in the German monolingual mode than in the German bilingual mode, and this will occur significantly more often with increasing French dominance.

4.2 Materials

The materials for data collection consisted of a version of the Bilingual Language Profile (BLP), which participants could fill out online; a language test in German and French; 60 stimuli video clips arranged in different orders; and short texts to induce the language modes before the main task.

4.2.1 The Bilingual Language Profile

As outlined in chapter 2.3.4, it is not easy to measure bilingual dominance. There are several reasons why the Bilingual Language Profile (BLP) developed by Birdsong, Gertken, and Amengual (2012) is employed. First, the questionnaire was relevant for the profile of the sample candidates and proved to be easy to implement, quick and feasible online. Furthermore, the BLP is used in a growing number of empirical studies⁴⁰. In order to ensure the quality of the questionnaire, several rounds of

⁴⁰ Number of citations according to Google Scholar, by July 2017: 56.

pilot testing with participants not involved in the study were conducted, and minor revisions were based on their feedback.

The BLP was translated into German, and the available French version (Birdsong et al., 2012) was adopted with some minor corrections. The BLP begins with an introductory section for biographic information and four modules containing questions about language history, language use, language proficiency and language attitudes.

The introductory section for **biographic information** comprises five entities: *name, age, sex, place of residence* and *highest level of formal education*. This section was only slightly modified. Instead of the participant's name, the participant's e-mail address was requested, and the choice of answers in the dropdown list for education level were adapted to the Swiss education system.

The first module on **language history** contains six entities. The first entity asks the age of language learning onset, and the second asks the age at which a participant felt comfortable using the language. The latter four entities concern the number of years pursuing school subjects in the languages, residing in a region/country where the languages are spoken, living with a family where the languages were spoken and working in an environment where the languages were spoken. The term 'family' was substituted with the more general term *ménage / Haushalt* 'household' to account for all kinds of cohabitation — especially in students' lives. Likewise, 'working environment' was complemented with 'education environment'. All questions could be answered by choosing the respective number in a dropdown-menu.

The subsequent module aims at gathering information on participants' **language use** through five questions. The first three questions are about the average percentage of use of both French and German — as well as other languages — in an average week with friends, family and at work or school. Again, the term 'family' was substituted with 'household'. The fourth and fifth questions ask how often the participant thinks and counts in German and French. In the adapted version for the present project, a sixth question was added to ask the percentage of code-switching that occurs in an interaction with a bilingual person. This question was added for reasons outlined below in section 7.4 and recommended by Goral et al. (2015, p. 86).

In the third module on **language proficiency**, the four classic questions on abilities in speaking, understanding, writing and reading were asked. Participants had to self-evaluate their abilities on a 7-point Likert scale. This module was complemented with two questions adopted from the BDS (Dunn & Fox Tree, 2009). The questions asked whether the participant felt they had lost fluency and whether he or she considered themselves to have a foreign accent (again evaluated on a 7-point Likert

scale)⁴¹. Finally, participants' knowledge of other languages was asked by indicating their proficiency levels by choosing one of the six levels of the Common European Framework of Reference (CEFR).

The last module on **language attitudes** comprised four questions on a 7-point Likert scale. The questions were about the degree to which candidates feel like themselves when speaking each language, their identification with the cultures of each language, the importance of using the languages like a native speaker and the importance of being mistaken for a native speaker. The original questions were adopted without modification.

While the BLP has a straightforward scoring procedure with an equal point distribution across all four components and a dominance score ranging from -218 to +218, it is also suggested that certain aspects can be weighted more heavily depending on the purpose of the study. Dominance scores were calculated several times by weighing components differently. However, the outcome was not affected by these different dominance scores, and the original questions and scores were kept for the calculation of dominance effects (section 6.6).

4.2.2 Language Tests

As self-reported measures usually yield valuable results concerning language history, language attitudes and language use (subsection 2.3.4) but can lead to unreliable scores concerning the dimension of proficiency, an additional objective measure of proficiency was conducted. Hence, in addition to the BLP, participants were administered a language test in French and German. The challenge of choosing and constructing language tests was, first and foremost, that language tests for participants at advanced language levels — as was the case for the participants in the present study — are rare, measure only one or some aspects of language competence or are too expansive. A further drawback was that language testing had to be feasible and quick given the number of participants. This implied that only certain aspects of proficiency, such as vocabulary and grammar, could be assessed, not oral production and comprehension.

The tests comprised two parts: a vocabulary test and a language test including all sorts of knowledge. The first part consisted of the LexTALE vocabulary test (Lemhöfer & Broersma, 2012). Basically, LexTALE is a lexical decision task developed for quick and standardized language assessment in cognitive science (ibid). The German version was adopted by excluding the training items. From the French version (Brysbaert, 2013), training items and the final 17 items were excluded

⁴¹ In the final analysis for the present purposes, however, these questions were not taken in account and the original BLP-scoring was adopted (see below).

to integrate an equal number of words in both language versions.

The second part of the language proficiency tests consisted of 20 multiple choice questions assessing grammar and syntactic structures, vocabulary knowledge, phraseological expressions, text coherence and text comprehension. The tests were adapted from a demo version of the entrance exam for higher education in translating and interpreting at the Zurich University of Applied Sciences (ZHAW)⁴². These tests were created to measure extraordinarily high levels of language proficiency under strong normative constraints, strictly disallowing certain constructional variations with subtle non-standard deviations. However, they were chosen in addition to the LexTALE part to measure different language features besides word recognition. Furthermore, despite the drawbacks of a normative orientation, the tests garnered comparable, objective proficiency scores for advanced language levels for French and German.

Both parts of the language proficiency tests were scored according to the test designers' recommendations: in the LexTALE part, the percent of correctly identified words and non-words was calculated and in the second part, each question was given an equal score. Finally, the scores of each part were totaled and compared once as a whole and once independently to the BLP dominance scores and only to the proficiency component (cf. section 6.6).

4.2.3 Stimuli

As outlined in subsection 3.2.2, methods to elicit motion event descriptions are manifold. In the present project, data was gathered through recordings of oral descriptions of animated video-clip stimuli⁴³. Video clips were chosen instead of pictures, because they closely reflect fluid movement (cf. Hohenstein, 2005, p. 408) and thus less frequently result in static descriptions of a scene. Furthermore, MANNER of motion could be conveyed less ambiguously. The video clips were produced in animated format⁴⁴, even though animated videos are limited in their representation of the FIGURE's anthropomorphic features. However, as shown in a pre-pilot study, the motion descriptions did not yield different descriptions or different types of dependent variables regardless of whether animated or real-life videos were shown (cf. subsection 4.3.1).

As mentioned above, the scenes of the present stimuli were based on the two

⁴² The demo versions are available at <https://moodle.zhaw.ch/course/view.php?id=4183/>, Zurich University of Applied Sciences (ZHAW), institute of translation and interpreting.

⁴³ The video clips can be downloaded from Berthele, R. and Stocker, L. (2014–2017) "StoBerMan: An instrument to elicit motion event descriptions" <http://tinyurl.com/stoberman>

⁴⁴ To create the animated video clips, a professional producer was hired and was reimbursed by the SNF grant.

preceding studies discussed in section 3.4. However, several scenes that resulted in either too complex or too many non-motional descriptions in the preceding studies were eliminated, simplified or replaced.

The animated format further eliminated unnecessary and irrelevant background information, such as weather conditions or protagonists' clothing, that participants might have focused on rather than the *MANNER* and *PATH* of the motion event. Hence, the same *FIGURE* was chosen for all scenes for critical and filler items, and background objects were added in an unobtrusive grey tone only to render the ground objects recognizable and unambiguous.

All in all, there were 60 video stimuli; 30 were critical items, the other 30 were filler items.

4.2.3.1 Critical items

The critical items displayed self-propelled motion events with the *FIGURE* moving in a specific *MANNER* and covering a specific *PATH*. The scenes of these critical stimuli are described in section A.1.

The *MANNER* of motion of the 30 critical items was always of a different type. Although the animated figure closely portrayed human movements, the *MANNER* of motion was often unconventional and thus salient (e.g. K24, a figure crawls out of a pond in a reversed, crab-style manner).

The 30 critical items included five different unidirectional *PATH* types: *up*, *down*, *across*, *out* and *in*. Each type was used six times. Hence there were 18 boundary-crossing stimuli with six items where a *FIGURE* moved *across* a *GROUND* object, six where she moved *in* and six times she moved *out of* a bounded (e.g. a house or a cave) or plane space (e.g. a street or a bridge).

4.2.3.2 Filler items

Although filler items are not employed in the majority of stimuli in the literature reviewed (cf. section 3.3), fillers were implemented as an inherent part of the research design in addition to distract participants from the research aims and prevent them from using the same constructions and verb types. Thus, they established a bilingual mode by trying to activate the non-target language to the same degree as the language used to describe the critical stimuli.

The scenes for the filler items were adopted from the caused-motion domain and never showed intransitive motion events. The aim was therefore to prevent participants from activating the same constructions and verb types used in the critical stimuli. The motion types of the filler stimuli focused on placement events, of which German displays at least three types: *setzen* 'to put sitting', *legen* 'to put lying', *stellen*

‘to put standing’ that can be translated into the verbs *mettre* or *poser* in French. The 30 filler video clips were designed to display the canonical position and dimensionality of 10 *setzen*-types, 10 *legen*-types and 10 *stellen*-types, primarily based on filler items used in Berthele (2017) and Berthele and Stocker (2016).

4.2.3.3 Randomized block design

To exclude potential order effects, the stimuli were presented in four different orders in a randomized block design. The 60 video clips were divided into ten blocks of three filler items and three critical items each. Theoretically, this design allowed no more than six filler or critical items to be presented sequentially (e.g. three filler items at the end of one block and three filler items at the beginning of the next block). In the blocks, critical items were placed with different PATH types and filler items for each of the three (German) caused motion types (cf. subsection 4.2.3.2). Inside each block, the items were distributed randomly. Table 4.1 shows an example of the randomized block design used in the study (order 3).

Table 4.1: Stimuli order 3: example of randomized block design

Bl. 1	Bl. 2	Bl. 3	Bl. 4	Bl. 5	Bl. 6	Bl. 7	Bl. 8	Bl. 9	Bl. 10
1. F7	7. F29	13. F13	19. F18	25. F9	31. K18	37. K12	43. K8	49. K3	55. K9
2. K14	8. K6	14. K15	20. K2	26. F14	32. K7	38. F19	44. F1	50. K29	56. F26
3. F17	9. F4	15. K4	21. F16	27. K26	33. F24	39. F6	45. F27	51. F25	57. F22
4. F15	10. F10	16. K21	22. K22	28. K11	34. K24	40. K1	46. K19	52. F30	58. K30
5. K5	11. K17	17. F8	23. F28	29. K10	35. F23	41. F12	47. K28	53. K20	59. K16
6. K23	12. K27	18. F3	24. K13	30. F5	36. F2	42. K25	48. F21	54. F11	60. F20

There were two orders in which blocks were assigned semi-randomly, i.e. it was paid attention that the blocks in the two orders did not show repeating patterns. The third and fourth orders showed the reversed block arrangement, i.e. starting with the blocks that were placed at the end of the first and second orders and ending with their starting blocks, resulting in a total of four different orders.

Given that each participant was asked to describe the critical and filler items four times, each participant was assigned to a different order arrangement in each language mode.

4.2.4 Texts to control for language mode

There were four topically different texts that were randomly chosen from the Swiss confederation: “the vocational education in Switzerland”, “risk assessment”, “air traffic” and “observation post”. All four texts were available in German and in

French⁴⁵. For the German and French monolingual modes, the original versions were taken. For the German bilingual mode, sentences were taken alternately from the German and French versions. For the French bilingual mode, the same principle was applied, taking every other sentence in the other language. Taking together the four different contents in four different modes, there were 16 versions in total. These texts were chosen because they were all of similar length (between 90 and 130 words), fairly literal and had sound translations available. Most importantly, their content had nothing in common with the motion event domain and therefore should not have triggered any motion verbs. Hence, these texts also served to put candidates on the wrong track if they were trying to guess the research purposes, which was confirmed in several comments from the participants in the pilot study. The primary goal of these texts however, was to induce the respective language modes in addition to short, small talks with the experimenters in the sessions.

4.3 Procedure and data collection design

To examine intra-individual variation across languages and between bilingual and monolingual modes, the present study adopts a within-subject design. As outlined in section 3.3, most studies within the motion event domain adopt a contrastive approach by comparing either different language groups or different learner groups (e.g. with different dominance levels or different L2s). Although group differences are important, studying individual variation across different conditions can offer insights on different phenomena and variations. Furthermore, a large-scale study in a within-subject design covers the statistical power problems of previous studies. However, studies adopting a repeated measure design are somewhat more demanding in terms of participant availability. Given that the design bears the risk of participants becoming accustomed to the task and may resort in constantly using the same constructions, intervals of at least two weeks between sessions and an interval of two months in the middle of the study were planned.

Before launching the main data collection, several pilot rounds were conducted to test the stimuli and the general procedure.

⁴⁵ The texts were found on the homepage of the departments of the Swiss confederation at <https://www.admin.ch> under the headings *Die Berufsbildung in der Schweiz* (1), *Risikobeurteilung* (2), *Luftverkehr* (3), *die Beobachtungsstelle* (4) for German and *La formation professionnelle en Suisse* (1), *Evaluation des risques* (2), *Transport aérien* (3), *L'Observatoire* (4) for French. The texts were retrieved in June 2015.

4.3.1 Piloting

There were several reasons to conduct a pilot study. First, the quality of the stimuli had to be validated, and it was important to analyze whether they yielded the kinds of answers that were expected and whether there was variation in constructions. Furthermore, all orders were tested to guarantee an unimpeded play of each item in the main collection. The pilot tests also served to acquaint the experimenters with the procedure before the start of the main data collection.

Given that the stimuli of the previous studies, on which the ideas of the present project were built (Berthele, 2017; Berthele & Stocker, 2016), were not animated but real-life amateur videos, the question was first, whether animated stimuli would lead to comparable motion event descriptions. After the production of four critical items, 20 independent participants were asked to describe and evaluate the stimuli. Participants did not seem to be bothered by the fact that the video clips were animated, given that their descriptions contained similar constructions and motion verbs to the preceding studies. Mostly, the speakers focused on the motion event and not on the FIGURE's appearance or on the background. Therefore, all stimuli were produced in the same animated format with the same FIGURE and simple background objects.

As soon as the 60 clips were produced and revised and the 16 orders were programmed, a pilot study was launched. The pilot participants filled out the BLP online and were tested individually. Thirty-two French-(Swiss-)German speakers participated in the pilot study, eight in each mode. Most were fellow students of the instructors and did not know the research purposes, except that the study aimed at investigating linguistic variation. The instructor of the French monolingual mode was a Francophone student, the bilingual modes were led by a German-French speaker who considers himself an equally balanced bilingual speaker and the German monolingual mode was led by the author of this thesis. The responses were coded following the coding lines of the preceding studies: a response-by-response annotation with the following basic categories: number of clauses, manner verbs, path verbs, other verbs (deictic or neutral), path adverbials and adverbials, manner modifiers, ground elements and BCC-violations. Given the small number of participants per group, only descriptive analyses were conducted. As expected, participants used more manner verbs in their German descriptions than in their French descriptions and used more path verbs in French than in German. There were no dramatic differences between French and German or between language modes concerning other variables such as ground elements, path adverbials or manner modifiers. The group differences between the language modes were not considerable. The number of the different types of motion verbs depended not only on the language

but also on the item. Most stimuli were described in a single clause.

After the recorded descriptions of the video stimuli, participants were asked to guess the research aim of the study. Some of the pilot participants understood that their motion event descriptions were of interest. However, they did not have knowledge of language mode theories and were even less aware of the cross-linguistic differences in motion event descriptions between French and (Swiss)-German. Some participants assumed that the interest might reside in different lexical elements of verbs or grammatical aspects, such as prepositions, in French and German. Yet, they focused more on the verbs in the filler items, such as the difference between *setzen*, *legen*, *stellen* and their French equivalents. Several participants in the bilingual modes also assumed that the focus was on how fast they could switch between the languages and how many “mistakes” they made in the sense of using the non-target language. Some participants tried to connect the text they had to read at the beginning to the video descriptions. Given these answers, it was assumed that the theories on which the research questions of the present thesis are based are generally not known to participants not acquainted with the field. Thus, their constructions would not be biased in these directions.

A few minor adaptations in view of the main data collection were made. To guarantee a smooth streaming of the video clips on the computer, two external recorders were used instead of a computer-integrated recorder. Moreover, the color of the background screen was adjusted. Light blue and orange were chosen instead of grey and orange to enhance the contrast.

4.3.2 Groups, sessions and scheduling

Candidates selected for the main data collection were asked to register for a four-week schedule over different intervals. Between the first and second session, there was a break of two weeks; between the second and third session, two months passed; and between the third and fourth, two weeks passed. All in all, the data collection lasted from August 2015 to January 2016. There were four different groups per condition differing in terms of stimuli orders and the succession of texts. Of the 154 participants who completed the study, 38 began with the German monolingual mode and 38 with the French monolingual mode, while 78 participants started with one of the bilingual modes. Table B.2 summarizes the arrangements of the stimuli, text and language mode orders across the four sessions.

4.3.3 Instructions and language mode manipulation

In previous motion event studies employing video clip stimuli (cf. subsection 3.2.2.1), participants usually were instructed to answer the question “What happens?”, which also proved to lead to expected descriptions in the pilot studies. Oral elicitation was preferred given that it was faster and less tedious for participants and would lead to more spontaneous descriptions than in written form. To avoid longer narrations or attempts to connect the different stimuli items, participants were asked not to narrate a story, but to describe the video clips individually and focus on relevant changes.

Even though there are lexical and structural differences between Standard German and Swiss-German dialects (cf. subsection 1.7.2), the patterns relevant for the present thesis are identical in both. Motion verbs usually show cognate forms with few exceptions. Cognate forms with different meanings were not considered problematic for the present questions, such as the verb “laufen”, discussed in section C.4. Thus, participants were given the choice to describe the stimuli in Standard German or in a Swiss-German dialect. This allowed to elicit more spontaneous and natural productions. Hence, there is no distinction made between dialects and Standard when the term ‘German’ is used to report on the project⁴⁶.

Given that one of the central factors in inducing a language mode is the interlocutor, or instructor in the case of an experimental manipulation as in the present study (cf. subsection 2.4.2), there were three different instructors. The French instructor was a Francophone student with little German knowledge who exclusively communicated in French with the participants. The German instructor and the instructor for the bilingual modes were the same as in the pilot study (subsection 4.3.1). Communication before the experiment, such as for scheduling and planning the sessions, were held in the respective languages of the instructors. To induce a bilingual or a monolingual language mode in the experiment, the instructors chatted with the participants exclusively in the target language(s) before launching the experiment (i.e. (Swiss-)German for the (Swiss-)German monolingual mode, French for the French monolingual mode and alternating between French and German for the bilingual modes) and subsequently had them read the short text (subsection 4.2.4). Following this short text, participants were asked to describe what happened in the video clips. The questions “Was passiert?” or “Qu’est-ce qui se passe?” were displayed on the screen for each item. After the description of the stimuli, the German language test in the German monolingual mode and the French

⁴⁶ The analyses of the German descriptions also showed that in several cases, Standard German and Swiss German were mixed, so it was not possible to ascribe the production to one of the varieties such as in the example *er läuft im schnee hinauf, uf n berg obschi* (127-K11-bide-III).

language test in the French monolingual mode were run. Sessions with the bilingual mode condition were thus about ten minutes shorter.

4.4 Transcriptions and coding decisions

The audio files were transcribed and then coded for several variables, as outlined in section C.1. The coding served in the first place to extract the dependent variables in the transcribed motion event descriptions and secondarily to annotate interesting features and patterns deviating from the expected patterning. Coding decisions were mainly based on previous studies, but were also adapted at several points. The coded data were checked by further raters to guarantee inter-rater reliability.

4.4.1 Transcriptions

Transcriptions were kept simple since only the content and not the suprasegmental features were of interest for the research questions of the present study. The texts to induce the language modes (cf. subsection 4.2.4) and comments not related to stimuli descriptions were not transcribed. However, comments on difficulties in describing the motion event or in switching between languages were transcribed and a note was added to the coding file. Furthermore, filler items and answers that were not in the target language were transcribed but were not part of the analyses.

Transcriptions were carried out by a single transcriber in order to keep a maximum consistency, especially for the Swiss German varieties where no orthographic conventions exist.

4.4.2 Coding lines

Based on the coding manual of previous motion event studies, *the Berkley Coding of Motion Events in Texts* (revised version in 2008a) designed by Slobin et al. and the coding conventions in preceding studies (cf. section 3.4), several decisions were made for the coding of the transcribed data. Adapting to these original coding schemes was primarily governed by the nature of the data. In other words, short, oral descriptions of video clips required some modifications to coding schemes developed for written narratives or entire texts to minimize inconsistencies and difficulties encountered in previous studies.

A basic difference between the coding of the preceding studies' data and the coding of the pilot study was a clause-by-clause annotation. Although most speakers provided simple clauses for the description of the items (cf. chapter 5), some responses could comprise more than one clause. These multiple clause constructions

usually contained information on the motion event distributed across several clauses and resulted in constructional variants going beyond the Talmyan typology⁴⁷. In the pilot study, the description of the motion event with multiple finite motion verbs — belonging to different semantic types or not — resulted in complex coding lines with additional categories that were eventually difficult to integrate in the analysis. Furthermore, in boundary-crossing situations, the kinds of constructions packaging MANNER in one clause in a finite verb and describing PATH and the crossing of the spatial boundary in another clause led to interesting strategies of MANNER encoding without “violating” the BCC (cf. subsection 5.6.2). A response-by-response annotation would have led to loss of information about these constructions and strategies. Hence, target responses can comprise several clauses and thus correspond to several coding lines.

The coding scheme was further adapted in that GROUND elements were not counted. The reason is that there were no significant differences between the GROUND predictor variables in preceding and pilot studies. Furthermore, as opposed to longer story narrations, there was no reason to expect differences given the short duration of the clips — involving only one type of PATH and one type of MANNER — and the poverty of GROUND elements in the stimuli. An adaptation of the coding scheme also allowed to link several spreadsheets to one main coding file. Finite motion verbs, for instance, were identified and marked in the main file including all basic coding lines and were coded analogously in a separate file for verbs. This allowed the automatic coding and correcting of elements and constructions identified in the motion clause. Second, this interconnection allowed the coding of motion verbs across semantic categories by further coders in an economical way (cf. subsection 4.4.3). The semantic categories included MANNER, PATH, deixis, neutrality and non-translational motion verbs, as described in section C.4.

It must be pointed out that some morpholexical elements in motion event encoding do not bear spatial information when considered in isolation (cf. Wälchli, 2009, p. 15). Spatial meaning can thus be ascribed only when the whole construction is considered. Given this contextual dependency, the individual elements are coded keeping in mind an orientation on the stimuli item.

While the coding scheme easily allowed to identify single grammatical elements, it also enabled a construction-based approach in a second step counting the combinations of particular grammatical elements (see subsection 5.3.3).

⁴⁷ Although Talmy (2000b, p. 221) recognizes that a macro-event does not have to be expressed in a single clause, most discussions on the motion typology usually assume a single-clause construction.

4.4.3 Inter-rater-reliability check and corrections

Although often the same type of motion is analyzed across studies, different coding practices have emerged across studies and languages. These different coding conventions result in different classifications of the same verbs or verbal constructions (cf. Cadierno & Ruiz, 2006, p. 193).

Thus, it is not always straightforward to determine the semantic status of a given verb — with or without context. For this reason, the verbs in the present data were categorized by three raters independently.

In terms of Fleiss' kappa⁴⁸, the inter-rater reliability was relatively high for MANNER (0.74), PATH (0.73) and deictic (0.79) information and was lower for neutral (0.45) and non-motional (0.33) information.

In terms of percentage, the raters agreed on 96.36% of the verb categorizations. For 77.94% of the verbs, there was total agreement across all categories, i.e. they were coded equally in all five categories⁴⁹. Among those were the motion verbs showing the most tokens in German, i.e. *laufen* 'to walk' (1930), *gehen* (deictic reading 'to go' 1032 tokens and manner reading 'to walk' 762 tokens), *springen* 'to jump' (696) and in French, i.e. *monter* 'to ascend' (1367), *traverser* 'to cross' (1347), *descendre* 'to descend' (1249). The verbs yielding disagreement or uncertainty in terms of categorization do not present high numbers of tokens. The two verbs giving rise to the least amount of agreement (i.e. 60%) adding up the ratings of all categories which are *évoluer* 'to evolve' (14) and *halten* 'to stop' (4). The final decisions for the coding of the verbs are based on the coding of the majority or discussed with the other raters if there was disparity.

In addition to the verbs, verb-external MANNER (cf. section C.5) and PATH (cf. section C.6) descriptions and 10% of all coding lines were checked by another rater. As most coding was automatized in the coding lines relying on the different tables (see above), this second round of coding was to check for correct element identification rather than a categorization task. The coding lines resulting in discord to the first round were corrected or — in the case of doubt — discussed with the coder.

⁴⁸ Fleiss' kappa was calculated with the package *irr* (version: 0.84; Gamer, Lemon, Fellows, & Singh, 2012) for R (R Core Team, 2016).

⁴⁹ Note that some of these verbs coded by all raters (e.g. *einsinken* 'to sink in' or *continuer* 'to continue') do not show any finite verb tokens in the final data set, as they showed up only in non-motional or non-translational clauses, which were excluded from analyses.

4.5 Participants

The participants were recruited using the university's mailing list distributor. They were informed that they must consider themselves bilingual in French and German in order to participate, that participation involved attending four 30-minute sessions and that they would be financially rewarded after completing the fourth session. The only information they received about the project was that the experiment was about linguistic variation. The email contained a link to the BLP. Based on their answers on the BLP, candidates suitable for the experiment were selected. Thus, participants who did not consider French and German their strongest languages in their linguistic repertoire or reported very poor command of one of the languages were excluded. Selected candidates then received an email reminding them of the participation conditions. They could choose a week to begin their first session, implying a reservation for the next weeks' sessions. In registering for the sessions, they consented to being recorded and participating in all four sessions. Because the primary goal was to analyze within-subject variation, participants who did not complete all four sessions were excluded from the analysis. Although completing the BLP and participating in all four sessions were required, the dropout rate was modest, presumably because the financial compensation was given only after the last session.

The BLP-scores ranged from -148.7 (French dominance) to 139.8 (German dominance) with a mean score of 6.98. Seventy-one participants were identified to be on the French-dominant side of the continuum, falling between -148.7 and 0, and 83 participants were on the German-dominant side of the continuum. The sample is thus slightly skewed toward German-dominant speakers. However, as Figure B.1 demonstrates, participants were more or less equally distributed across the dominance scale. As can be noted furthermore, the sample does not include participants who are on the very dominant end of the continuum in either French or German, as the scores of the BLP can theoretically add up to -218 and +218, respectively (see above). Presumably, speakers with very high or low scores usually do not have the required linguistic skills to describe motion events in both languages.

The participants' main socio-demographic characteristics are summarized in Table 4.2⁵⁰.

⁵⁰ Although language dominance is modelled as a continuous variable, it was collapsed into two groups at the cut-off score of 0 in the BLP (scores greater than 0 are German-dominant and scores less than 0 are French-dominant speakers) for the sake of clarity and to inspect the distribution of these demographic variables.

Table 4.2: Demographic characteristics of the participants

	Total ($n=154$)	German-dominant ($n=83$)	French-dominant ($n=71$)
Sex	106 ♀, 48 ♂	64 ♀, 19 ♂	42 ♀, 29 ♂
Mean age	23.9 years	23.9 years	23.8 years
Age range	18-48 years	19-47 years	18-48 years
Level of education (median)	undergraduate	undergraduate	undergraduate

Finally, section B.2 shows the indication of the participants' further language knowledge mentioned in the BLP, which may present conflicting variables. As can be drawn from this table, participants reported knowledge in a variety of languages, but at lower levels. Twenty-three different languages are listed on level A1 and 12 different languages are on levels A2 and B1. Concerning higher language levels, there is less variation and fewer people who report knowledge of these languages. Eight different languages are reported on level B2, six different languages are on C1 and five different languages are on C2. An outlier of these languages is English. Most participants (i.e. 140 speakers) report English knowledge, most of them on higher levels. Only one participant reported an A1 level in English, and 58 participants report B2 knowledge. The possible influence of English as confounding variable is discussed in subsection 6.6.3.

4.6 Methods of data analyses

The kind of data collected in this project allow for qualitative and quantitative investigation. The data show a high variability primarily due to the nature of the language production task and the difference between and within the participants and stimuli. A range of constructional variants, showing up systematically or irregularly, are analyzed in qualitative ways. In subsection 4.6.2, the inferential analyses carried out are explained; subsection 4.6.2.1 briefly outlines why generalized mixed-effect models are well tailored for the present data; and subsection 4.6.2.2, explains on how the models were fitted and analyzed.

4.6.1 Qualitative and descriptive data analyses

Primary qualitative analysis began during data collection, where surprising or odd constructions and interesting details were noted. The second phase of qualitative analyses occurred during transcription and coding. On the basis of these notes and the coding categories, several points that were salient and repeated themselves

are discussed in the chapters reporting on the results. Among the variants going beyond the Talmyan typology are constructions which are coded under the heading “micro construction” (cf. the coding manual in Appendix C). Particularly in boundary-crossing situations, the constructions classified as deviating from the expected patterns are discussed. Qualitative data analyses are primarily described in chapter 5 and chapter 6.

4.6.2 Statistical modeling

The present chapter outlines the technical part of statistical analyses beginning with a brief introduction to generalized linear mixed models and an explanation of why mixed-effect models were a best fit for the present data. The method of mixed effect modeling allowed the simultaneous packaging of all main research questions into one model. The questions of whether the probability of using a manner verb differs between French and German, whether it depends on language dominance and on language mode and whether there was an interaction of these predictor variables, could be answered within a single model. The fitted models relevant to this thesis are reported in Appendix D. Please note that only clauses describing respective stimuli with a finite motion verb are analyzed; clauses where no motion in clause is encoded are excluded from the analyses (cf. Appendix C).

4.6.2.1 Generalized mixed-effect models

To inferentially analyze the data, generalized logistic mixed-effects regression models (GLMM) were run⁵¹. Mixed effect models have several advantages over traditional methods⁵² and can now be considered standard measures for these kinds of language production data (Baayen, 2008; Johnson, 2014).

“Mixed” implies that both fixed and random factors are incorporated⁵³. Fixed factors refer to the predictor variables which are repeatable. In the present data, fixed factors are the language of response, mode condition and language dominance. Random factors refer to the factors that are randomly sampled from a larger population, such as participants and items (Coleman, 1964; Clark, 1973). In the present experiment, the 154 participants and the 30 critical stimuli are included in the model as random factors to account for by-participant and by-subject variations and thus circumvent the problems of generalization in traditional statistical methods.

⁵¹ The GLMM were fitted with the `glmer()` function in the `lme4` package (version: 1.1-12; Bates, Maechler, & Bolker, 2015) for R (R Core Team, 2016).

⁵² See Vanhove (2014, pp. 59-63) for less technical explanations of the advantages of GLMM over traditional statistical methods.

⁵³ See Baayen (2008, pp. 241-242) for more information on the distinction between fixed and random effects.

Furthermore, the data points are not independent from each other; they are clustered. Concretely, there is not just one clause per speaker to analyze, but rather several clauses per participant distributed over four different conditions. Thus, several data points for each participant for the same stimuli imply a dependency among the data points, which GLMMs do take into account (Vanhove, 2015, 2016).

In addition, the GLMM approach is well-suited for continuous predictor variables (such as dominance in our case) and binary outcome variables (e.g. manner encoding in the finite verb vs. no manner encoding in the finite verb)⁵⁴. Finally, the models allow the integration of interaction effects simultaneously with predictor variable effects.

4.6.2.2 Fitting and analyzing generalized mixed effect models

The formulae and the output of the models reported in this thesis are outlined in Appendix D. To clarify the steps taken in the model fit, the basic formulae for these models are explained here.

To take an example, the outcome variable of the model ‘mv9’ (section D.1) is the presence or absence of a manner verb. As pointed out in the previous section, random effects are defined as participants and the stimuli. Fixed effects consist of the overall intercept (i.e. baseline) and the independent variables which were language, language dominance and language mode. Furthermore, the interactions between dominance and mode, language and mode, language and dominance as well as the three-way interaction between them are modeled⁵⁵. A three-way interaction was modeled because the effect of dominance may depend on mode, and this dependent effect may vary across languages (see section 4.1). The continuous predictor variable ‘language dominance’ was centered at its sample mean⁵⁶, following Baayen, Davidson, and Bates (2008, pp. 254-255). The binary predictor variables are coded as numeric variables with the ‘language’ values of -0.5 for German and 0.5 for French and the ‘mode’ values of -0.5 for bilingual mode and 0.5 for monolingual mode⁵⁷.

The random effects were adjusted by random intercepts and random slopes. Random intercepts were added because of between-participant related differences that were not due to the defined fixed effects. Random intercepts provided a baseline, which can be higher or lower depending on the specific stimulus or participant.

⁵⁴ Although ANOVA-based approaches would allow to account for an aggregation of data across both participants and items, they are not well-suited for continuous predictor variables (like dominance) and are limited to continuous outcome variables (Jaeger, 2008). The reason the models are advantageous for binary data is explained by Vanhove, 2015.

⁵⁵ The * in the glmer formulae models the interaction and effect of predictor variables simultaneously.

⁵⁶ The centered variable spans from -2 (French-dominant) to 1.74 (German-dominant).

⁵⁷ The recoding of the variables was necessary to avoid certain warning messages produced by the first model fits with the “raw” data.

Random slopes were added because the effect of a predictor variable may not be the same for all participants and stimuli. For instance, the random slope ‘mode’ in the random effect ‘participant’ accounts for variation of the mode effect between participants. Hence, the “1” in the random slope models a different intercept for each participant, while the fixed effect ‘mode’ models a different slope for each participant.

In order to choose the best model fit, several models were computed and compared. To start, the most basic model without random effect adjustment was fitted⁵⁸. Since the model fits with the `glmer`-default settings produced convergence warning messages, a different optimizer was chosen and the number of iterations was increased (see Appendix D). Random effects were adjusted by adding random slopes only when considered meaningful. The random slope ‘mode’ with ‘stimuli’ for instance resulted in a standard deviation of 0, which did not contribute significantly to the model and was therefore removed. Given that all participants had a different score of dominance, a slope of ‘dominance’ in the random effect adjustment for ‘participants’ would not be meaningful and was therefore not included. A random slope adjustment resulting in a correlation of 1.00 indicated an overparameterization of the model. To circumvent this problem, correlation parameters were forced to 0 by means of double-pipe syntax (Vanhove, 2016). Models were compared with the Akaike information criterion (AIC)⁵⁹.⁶⁰

In order to obtain the p -value for a given predictor, log-likelihood ratio tests using the `anova()` function were applied where a model including the predictor variable and a model without the predictor variable were compared. Finally, effect sizes were computed following Baayen et al. (2008) by multiplying the parameter estimate for a given predictor variable by the range of that predictor variable.

More complex models were calculated with further fixed factors, such as the participant’s sex, that did not contribute significantly to the fit of either model and are thus not reported in this thesis. For additional analyses, models including only some participants, some items (section 8.3), co-variates such as English skills (subsection 6.6.3) or the number of session (subsection 7.3.2), or different coding (subsection 6.2.2) are discussed in the respective chapters.

⁵⁸ The documentation in the R-scripts conveys more detailed and technical information on these steps.

⁵⁹ Basically, the AIC measure indicates whether the increased complexity in the model results in a better absolute model fit or whether the increased complexity models more fluctuation in the data (cf. Vanhove, 2014, pp. 62-63).

⁶⁰ I owe a debt of gratitude to Jan Vanhove for helping me with all these steps in statistical modeling.

Chapter 5

French and German motion event descriptions

The current and the three subsequent chapters present the results of the data analyses along the main research questions outlined in the introduction. This chapter summarizes the main findings and addresses the general cross-linguistic differences and variations between French and German answers. It also discusses implications and effects of language choice on the dependent variables.

Given that the questions sought to examine are interrelated, one single model to inferentially analyze the data was fit for each outcome variable, including all independent variables as fixed factors (cf. subsection 4.6.2.2). The inter-relatedness of the questions also implies a strong connection and overlap within the subsequent chapters.

5.1 Data summary

As outlined in section 4.5, 154 bilingual speakers attended four sessions each. Hence, the dataset comprises 18,480 responses composed of 4 x 154 descriptions of 30 critical items.

The 18,480 critical items were described in 20,592 clauses, whereas 16,418 items were described in a simple clause construction. There were 3,912 multiple-clause and 131 super-subordinate constructions. The number of simple and multiple-clause constructions was similar for both French and German. In 83 responses, there was no encoding of motion in any element of the response, 27 responses were entirely in the non-target language, 18 responses did not contain a verb and three answers did not contain a finite verb. These responses were discarded from analysis.

The number of the main variables per language are listed in Table 5.1.

Table 5.1: Number of main variables per language

Categories (critical items)	French	(Swiss-)German
Number of simple motion event clauses	8236	8182
Number of multiple- and super-subordinate clause constructions	1970	2073
Finite motion verbs	9471	9701
Manner verbs	3421	7906
Path verbs	6308	1222
Deictic verbs	159	1369
Neutral verbs	184	110
Manner adverbials	5112	3770
Path adverbials	4743	5628
Path adverbials	-	3924
BCC-violations (only in BC-items)	1626	3848

In total, 19,172 finite motion verbs were coded⁶¹. As can be drawn from Table 5.1, the number of these verbs was nearly the same for French and German. However, these verbs differ in the types of semantic components they express in either French or German. In German clauses, there are more manner and deictic verbs than in French clauses. In French clauses, on the other hand, 5,086 more verbs encoding PATH information were identified. Neutral verbs did not show up often in either language. Regarding the number of manner and path adverbials, there are differences between French and German: fewer manner adverbials in German than in French and fewer path adverbials in French than in German. These differences, however, seem less drastic than the differences between the semantic information the finite motion verbs convey. Finally, for the stimuli predicating a boundary-crossing situation, BCC-violations were found in both languages. As predicted, these BCC-violations were more common in German than in French.

5.2 Inter-rater reliability

Although the inter-rater agreement on the finite verbs was 96.36% and thus relatively high, especially for verbs showing a high number of tokens (see subsection 4.4.3), the codings for the finite verbs from the three raters were applied to the entire data set. The resulting three data sets were compared for their proportions of path verbs and manner verbs, as visualized in Figure 5.1.

⁶¹ Recall that some of the finite motion verbs were coded for two categories simultaneously (e.g. the verb *klettern* ‘to climb’ is coded as a manner and path verb). Hence, the finite verbs in total do not correspond to the number resulting from the sum of manner verbs, path verbs, deictic verbs and neutral verbs (cf. section C.4)

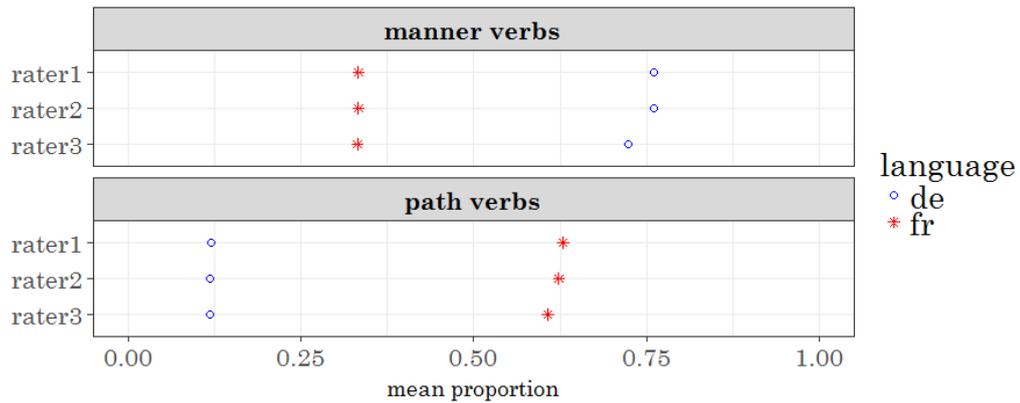


Figure 5.1: Proportions of manner verbs and path verbs across three different codings

This dot plot graph illustrates that although the task of coding for some verbs may be subjective, the codings of each rater are fairly similar. Rater 3 differed slightly, attributing less MANNER and PATH information on the verbs in general. However, this difference is minimal, and the outcome variables of interest in the present study did not substantially change.

5.3 General cross-linguistic differences

To explore general cross-linguistic differences in the data and thus address the first research question, the mean proportion of manner and path verbs, manner and path adverbials and BCC-violations in French and German are visualized. In Figure 5.2, the mean proportion of these dependent variables for French and German answers are shown.

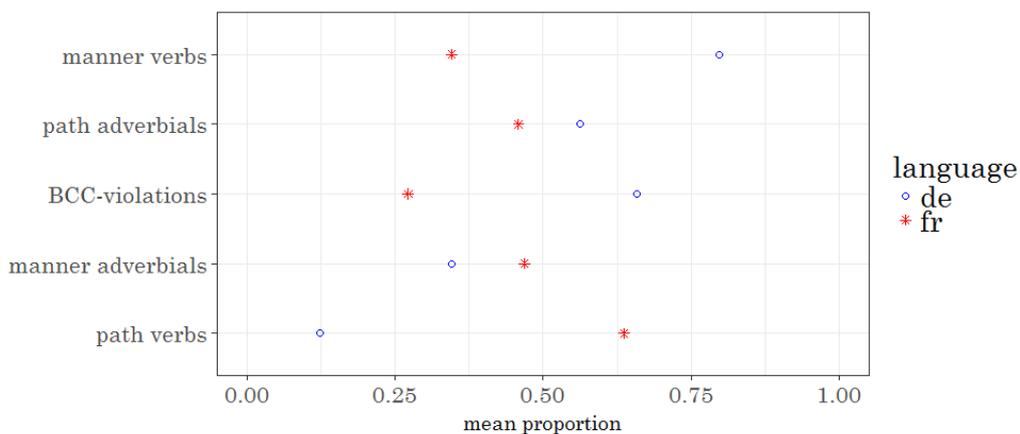


Figure 5.2: Proportions of dependent variables across language

The figure demonstrates that — in line with the predictions — the mean proportion of manner verbs in German answers was higher than in French answers.

Nevertheless, there is still a considerable number of finite manner verbs in the V-language French. The relatively frequent MANNER encoding in the main verb in a V-language is probably due to the nature of the stimuli, i.e. the salience of MANNER in these video clips. There are more path adverbials in German than in French, although the cross-linguistic difference is considerably smaller than that for manner verbs. The cross-linguistic difference between BCC-violations seems to be comparable to the difference of manner verb proportions. However, the overall proportion of manner verbs is higher than the proportion of BCC-violations, i.e. the use of a finite manner verb in the same clause as the boundary-crossing predication. In subsection 5.6.2 some of the reasons for this are discussed and it is explored how finite manner verbs are employed in boundary-crossing situations without violating the BCC. Manner adverbials are more frequently used in French, but the cross-linguistic difference seems comparable to the difference between French and German path adverbial proportions. Path verbs are clearly used more often in French than in German. The overall mean proportion however is less than that for manner verbs.

To inferentially test the first prediction outlined in section 4.1 and examine the probabilities of the dependent variables in the motion clauses, the outcomes for language as a fixed factor in the GLMMs for these variables are listed in Table 5.2. The table includes the estimates, *p*-values and effect sizes (ES) for the five outcome variables in log-odds⁶².

Table 5.2: Language as a fixed factor

Outcome variable	Estimate ± SE	<i>p</i> -value (LRT)	Effect size ± SE	Model
manner verbs	-3.08 ± 0.34	2.41e-10 ***	-3.08 ± 0.34	mv9, section D.1
path verbs	4.04 ± 0.29	2.21e-15 ***	4.04 ± 0.29	pv9, section D.2
manner adverbials	0.84 ± 0.35	8.68e-12 ***	0.84 ± 0.35	me9, section D.3
path adverbials	-0.54 ± 0.23	0.03 *	-0.54 ± 0.23	pai9, section D.4
BCC-violations	-2.04 ± 0.27	9.25e-07 ***	-2.04 ± 0.27	bcc9, section D.6

As can be drawn from all these models, language seems to be a significant predictor for the presence or absence of manner verbs, path verbs, manner adverbials, path adverbials and BCC-violations. This cross-linguistic difference, however, is stronger for some variables than for others. In terms of effect sizes, the main effect of language was strongest for path verbs (ES: 4.04 ± 0.29). In other words, French and German answers differed most fundamentally in the mapping of the PATH information on the main verb. Following path verbs, the effect of language is

⁶² Recall that the factor of language is expressed in numerical terms, i.e. -0.5 for German and 0.5 for French (cf. subsection 4.6.2.2). Therefore, the effect sizes do not differ from the estimate, given that the range with which the estimate is multiplied equals 1: $-3.08 \times |0.5 - (-0.5)| \approx -3.08$ for the model 'mv9' featuring manner verbs as outcome variables.

considerably high for the probability of choosing a manner verb (ES: -3.08 ± 0.34). Furthermore and in line with the hypotheses, language significantly contributes to the probability of BCC-violations, although the effect of language is somewhat less pronounced as for manner and path verbs (ES: -2.04 ± 0.27). Finally, the effect of language was weakest in manner adverbials (ES: 0.84 ± 0.35) and path adverbials (ES: -0.54 ± 0.23).

In the following subsections, the description of PATH and MANNER in French and (Swiss-)German are discussed in a qualitative way via examples drawn from the data set.

5.3.1 The description of Path

The syntactic composition of the PATH information in the clauses was grouped in three grammatical categories: finite verbs, adverbials and adverbial constructions (cf. Appendix C).

In line with the expectations and as shown in the previous section, path verbs, in general, are encountered significantly more often in French descriptions. In terms of lexical diversity, German was expected to show less variety in types of path verbs (subsection 1.7.2). All in all, 13 different types⁶³ of path verbs in the analyzed clauses were identified in German, and 24 types were identified in French. Compared to manner verb types, there are considerably fewer different PATH types (cf. subsection 5.3.2). The lower lexical diversity, however, can be ascribed not only to the fact that there are generally fewer path verbs in languages, but also — and linked to this — to the relatively less-diverse PATH types in the items and in general given the geometrical limitations as compared to MANNER information in the items. As described in subsection 4.2.3.1, there are five different PATH types in the stimuli. The dependencies of these PATH types are discussed in section 5.5.

The number of path adverbials, on the other hand, did not differ dramatically across languages. Compared to path verbs and path verbal constructions, path adverbial constructions show more types. In both languages, path adverbials cover a range of grammatical categories, such as prepositions or prepositional phrases, adverbs, path-gérondif (subsection 5.6.2.2) or infinitif-de-but constructions (subsection 5.6.2.3). Path adverbials are only encountered in German descriptions and are explored in subsection 6.3.2. Although S-languages generally show more often complex or even redundant PATH elaborations (subsection 1.7.2), a

⁶³ Note that a thorough type-lemmatization was not conducted given that lexical diversity was not the primary goal of the study. The general principle, however, is that inflected and prefixed verb forms were grouped together. For example, *approcher* 'to approach' and *s'approcher* 'to approach-REFL' are grouped into one type.

combination of several path adverbials in the same clause can also be found in French constructions, such as in example 16 below.

- (16) *le personnage fait un saut à côté sur le côté droit pour sortir d'un bac à sable* (68-K10-fr-I)
 'the person makes a jump on side on the side right to jump out-of-a box of sand'

Some of the verbal constructions are coded for PATH and MANNER information simultaneously and can thus be considered semantically denser than other path verbs. These hybrid forms are found in both French and German utterances. Examples of these semantically denser verbs in German are *klettern* 'to climb'. Compared to German verbs coded to exclusively bear PATH information, the semantically denser verbs in the present data are usually in combination with path adverbials and/or path adverbials such as in example 17:

- (17) *er chlätteret d rutschbahn duruf* (22-K7-bide-II)
 'he climbs the slide up'

From a normative point of view, constructions missing a verb-external path element are sometimes grammatically incorrect in German, such as example 18, which can be interpreted as a mapping of the French *monter les escaliers* ('ascending the stairs').

- (18) *er steigt, er steigt die treppe eines toboggan* (123-K7-de-IV)
 'he ascends, he ascends the stairs of-a slide'

For other cases, it is arguable whether the motion event involves PATH information or only MANNER information. Example 19, for instance, questions whether the verb *klettern* involves up-ward PATH information when employed without a path adverbial or adverbial component. At the same time, this example demonstrates that verbal semantics are context-dependent, which justifies the context-orientation in the coding (cf. Appendix C).

- (19) *er klettert wie ein affe* (65-K9-bide-I)
 'he climbs like a monkey'

In French, most of these hybrid verbs identified in the data pertain to the up-ward PATH type, such as 'to climb' as expressed in *escalader*, *grimper* or *gravir*⁶⁴. As discussed in subsection 1.7.1, these hybrid patterns in French may be remnants of satellite-framed Old French patterns and pertain to a higher register. However, the verbs identified in the present data do not necessarily show up in combination with a verb-external PATH element as the verbs in German do. Although some native judges

⁶⁴ Similar observations are reported in previous studies on French up-ward motion verbs (Hickmann & Robert, 2006, p. 298).

consider a construction like example 20 as either odd or colloquial French⁶⁵, the present French data includes many such examples. A motion event clause including *grimper* without a PP stresses the MANNER information and focuses less on the goal. However, the combination with the GROUND element *une colline* still implies the up-ward PATH information.

- (20) *il grimpe une colline* (58-K9-bjfr-I)
'he climbs a hill'

Lastly, when dealing with bilingual data, it can be a matter of debate whether certain forms display individual idiosyncrasies, show patterns of synchronous transfer or are indeed remnants of Old French. To illustrate an example at this point, consider the verb *sursauter* in example 20, which would translate as a self-contained motion verb 'to startle up' when read without context. This verb was chosen by three different participants in stimuli K18 and it translates to *überspringen* 'to leap over' in German. Native French speakers — neither from Switzerland nor from France — consider this construction "proper" French and would judge it as an influence from German.

- (21) *un bonhomme qui sursaute une chaîne en fer* (110-K18-bjfr-I)
'a guy who over-jumps a chain of iron'

5.3.2 The description of Manner

MANNER information in the data was coded into three categories: finite verbs, adverbials and whole manner clauses. In contrast to PATH, which mainly covers directions, MANNER of motion covers a range of dimensions, such as a variety of motor patterns, rates of motion, force dynamics, attitudes and encoding instruments. These dimensions, or combinations of such dimensions, appear frequently in both languages. The specificity of MANNER of motion in the present data quite often resulted in comparisons to the animal kingdom by way of similies (e.g. *wie ein Känguru* 'like a kangaroo' in German, or *comme un lézard* 'like a lizard' in French) or conceptual metaphors (e.g. *robber* 'to crawl seal-like' in German, or *galoper* 'to gallop' in French).

The saliency of MANNER of motion in the items also resulted in descriptions in which MANNER is marked by encoding it in the first part of the clause, as in examples 22 and 23.

- (22) *sur les quatre pattes une personne traverse une route* (121-K5-bjfr-III)
'on the four legs a person crosses a route'

⁶⁵ Thanks to Joëlle Siedel, Florence Bernard, Emmanuelle Lieber and Audrey Bonvin for your (French) evaluations of these examples.

- (23) *hüpfend geht dr toggu us me bluemäfäld usi* (91-K30-bide-IV)
 'hopping goes the guy out a flowerbed out-of'

As shown previously, the hypothesis that the French and (Swiss-)German differ significantly in terms of the probability of expressing MANNER information in the finite verb holds true. However, a substantial number and variety of finite manner verbs are found in both languages. In terms of lexical diversity, French shows a variety of manner of motion verbs and verbal constructions, even though the total number of manner verb tokens was significantly lower, i.e. 161 different types in comparison to 172 different types in German. The number of different manner verb types in French is to a certain degree explainable by the fact that constructions such as *faire des sauts* 'to make jumps' and *sauter* 'to jump' are counted as distinct types that may otherwise be grouped together as a single lemma. This explains also the higher type-token ratio (TTR) in French in general. The average TTR per participant for French manner verbs was 0.40 compared to 0.30 in German. Both languages show a variety of manner verbs with a high number of tokens that express routine, frequent, less-specific and semantically less-complex MANNER of motion descriptions, such as *laufen* (1930), *marcher* (808) or *gehen* in the sense of 'to walk' (762). On the other hand, both languages show a variety of MANNER of motion verb constructions that are very specific and/or semantically more complex, as they involve additional semantic components referring to a special kind of 'walking'. Examples of these more nuanced manner verb forms — or 'second tier' manner verbs in the sense of Slobin (2006) — would be *tituber* 'to stagger' (6), *faire des roulés-boulés* 'to perform somersaults' (4), *Purzelbäume schlagen* 'to perform somersaults' (9) or *krebsen* 'to crawl crab-like' (3). In contrast to the motion event literature, the cross-linguistic differences in terms of manner verb tiers are less remarkable as they show up frequently in both languages, which can again be attributed to the general salience of MANNER in the stimuli items.

As described in section C.4, the semantics of the verbs can change according to context. The verb *gehen* is thus coded differently across items as bearing either deictic or MANNER information⁶⁶. Some general motion verbs such as *laufen* or *marcher*, also appear polysemous being employed generically and not referring to a walking gait as in examples 24 and 25.

- (24) *er läuft auf dem bauch über eine brücke* (146-K28-de-1)
 'he walks on the belly over a bridge'

- (25) *il marche sur les mains pour traverser un pont* (90-K27-fr-1)
 'he walks on the hands to cross a bridge'

In line with the expectations, manner adverbials appeared in both French and

⁶⁶ In subsection 6.2.2 different codings of the verb *gehen* — once as a manner verb 'to walk' and once as a deictic verb 'to go' — are compared.

German descriptions. Although empirical data has shown that MANNER and PATH are only weakly correlated and ideas such as the “empty slot attractor theory” do not hold categorically true across different varieties and speakers (Berthele, 2017, p. 41), a slightly higher number of manner adverbials in French than in German was expected (cf. section 4.1). This prediction was encouraged by the fact that MANNER of motion was salient in the items. If French was expected to show a significantly lower proportion of manner verbs than German, speakers might opt to express the salient MANNER information more often in verb-external elements as an alternative. Like path adverbials, manner adverbials and adverbial constructions cover a range of grammatical categories and constructions such as noun phrases (*un acrobat* ‘an acrobat’), adverbs (*schnell* ‘quickly’), adjectives (*fröhlich* ‘happy’) or a gérondif (*en rampant* ‘by crawling’).

In both languages, manner-only clause descriptions usually appeared in multiple-clause constructions, such as in examples 26 and 27. The number of manner-only clauses was nearly the same for both languages; while 202 manner clauses were coded in French descriptions, 218 manner clauses were coded in German descriptions. Usually, the MANNER information expressed in a subordinate clause referred to the FIGURE’s inner state or disposition.

- (26) *scheint ein älterer roboter zu sein* (1) *der in den bus reinklettert* (2) (73-K4-de-I)
 ‘seems an elderly robot to be (1) who in the bus into-climbs (2)’
- (27) *il est à quatre pattes* (1) *et traverse un tapis* (2) (155-K13-bjfr-II)
 ‘he is on four legs (1) and crosses a carpet’

5.3.3 Simple and complex constructions

In addition to analyzing the occurrence of the dependent variables, this thesis analyzes the combination of these elements. Taking the verb as obligatory element for a clause and focusing exclusively on path and manner verbs, 16 different possible constructions of the combinations of the adverbials and adverbials for the present data were predicted, while only eight constructions can theoretically apply in French clauses⁶⁷. This allowed furthermore to adopt a construction based approach, as recommended in Goschler and Stefanowitsch (2013) for instance. Table 5.3 shows these possible constructions with examples drawn from the present data.

⁶⁷ Note that to simplify matters, and because they show up less frequently, verbs showing hybrid or deictic forms are excluded from this analysis.

Table 5.3: Constructions

Manner verb combinations	Path verb combinations
<p>MV (manner verb alone): <i>er tanzt</i> 'he dances' (48-K1-bide-I) <i>une personne danse</i> 'a person dances' (153-K1-bifr-II)</p>	<p>PV (path verb alone): <i>er überquert eine strasse</i> 'he crosses a street' (87-K6-de-II) <i>il descend un talus</i> 'he descends a hill' (9-K10-bifr-I)</p>
<p>MVPAI (manner verb + path adverbial): <i>es schnaagget über ne strass</i> 'he crawls across a street' (1-K5-de-I) <i>il rampe par dessus un tapis</i> (79-K13-bifr-I)</p>	<p>PVPAI (path verb + path adverbial): <i>*er quert die strasse durch</i> 'he *crosses the street over' (146-K6-bide-II) <i>il rentre dans l'étang</i> 'he enters the pond' (99-K23-bifr-IV)</p>
<p>MVPA (manner verb + path adverbial): <i>er tanzt d stäge nai</i> 'he dances the stairs down' (95-K16-de-III) -</p>	<p>PVPA (path verb + path adverbial): - -</p>
<p>MVME (manner verb + manner adverbial): <i>er hüpfst wie ne frosch</i> 'he hops like a frog' (24-K30-de-I) <i>il fait du snowboard en tournant</i> 'he does snowboarding by turning' (108-K12-fr-II)</p>	<p>PVME (path verb + manner adverbial): <i>öper überquert e teppich rückwärts</i> 'someone crosses a carpet backwards' (151-K14-bide-II) <i>un homme descend une colline en se promenant</i> 'a man descends a hill by strolling-REFL' (37-K10-bifr-II)</p>
<p>MVPAIME (manner verb + path adverbial + manner adverbial): <i>er springt siitwärts i d höhli</i> 'he jumps sideways in the cave' (161-K22-de-II) <i>il marche en arrière par dessus un tapis</i> 'he walks backwards over a carpet' (12-K14-fr-I)</p>	<p>PVPAIME (path verb + path adverbial + manner adverbial): <i>er überquert e strass vo rechts nach links schnaggend</i> 'he crosses a street from right to left crawling' (89-K5-bide-IV) <i>il rentre très lentement dans un bus</i> 'he enters very slowly in a bus' (12-K4-bifr-I)</p>
<p>MVPAME (manner verb + path adverbial + manner adverbial): <i>er balanciert ganz behutsam ein hausdach hinunter</i> 'he balances very carefully a rooftop down' (107-K26-de-III) -</p>	<p>PVPAME (path verb + path adverbial + manner adverbial): - -</p>
<p>MVPAPAI (manner verb + path adverbial + path adverbial): <i>es männdli hinkt in e bus ine</i> 'a manikin limps in a bus into' (110-K4-bide-III) -</p>	<p>PVPAPAI (path verb + path adverbial + path adverbial): - -</p>

MVPAPAIME (manner verb + path adverbial + path adverbial + manner adverbial): <i>er lauft langsam in bus ine</i> 'he walks slowly in a bus into' (80-K4-de-IV) -	PVPAPAIME (path verb + path adverbial + path adverbial + manner adverbial): - -
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As can be seen in the table, several combinations with path verbs are not found in the German data: PVPA (e.g. *er tritt ein* 'he steps into'), PVPAME (e.g. *er tritt langsam ein* 'he steps into slowly'), PVPAPAIME (e.g. *er tritt ins haus* 'he steps in-the house'), PVPAPAIME (e.g. *er tritt langsam ins haus ein* 'he steps slowly in the house into') constructions did not appear. The only PVPAI construction encountered in the data is a rather idiosyncratic construction, which suggests only eleven such combinations in the German data. Furthermore, French answers show that speakers do not necessarily opt for semantically less-dense descriptions and ignore MANNER information. In fact, French answers show a slight preference for encoding MANNER information in combination with a path verb than a path verb without a manner element; PVME is preferred over PV, and PVPAPAIME is preferred over PVPAI.

Figure 5.3 shows the mean proportion of these constructions and their distribution across languages.

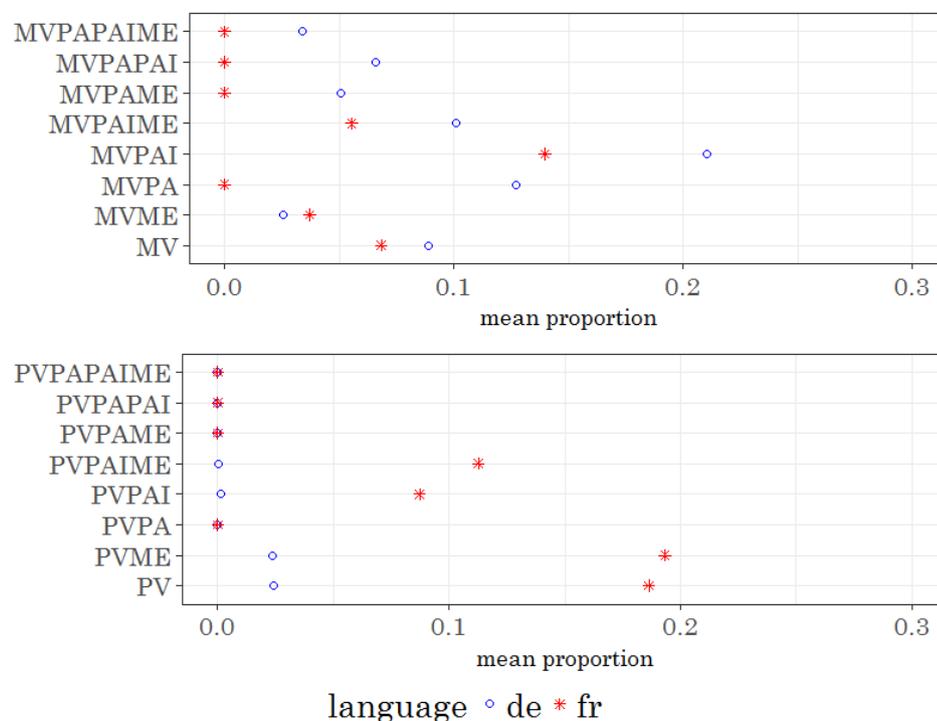


Figure 5.3: Proportions of constructions

As can be drawn from the above figure, manner verbs allow for more

combinations with verb-external elements, especially in German. Manner verbs most frequently show up with a path adverbial in both languages. The combination of path adverbials and path adverbial elements in German allows for PATH complexity or redundant PATH descriptions. As mentioned in subsection 1.7.1, however, a PATH elaboration in verb-external elements such as “pléonasmes vicieux” are also found in the French data (cf. example 28).

- (28) *les bras tendus comme un équilibriste* (1), *il descend du haut en bas*
 ‘the arms stretched like a tightrope-walker (1), he descends from up to down
du toit (2) (103-K26-bifr-III)
 the roof (2)’

In section 6.4, the relations of some of these constructions as well as language dominance configuration are discussed.

5.3.4 Correlation of semantic components

Being the crucial semantic components of a motion event, it is usually implicitly taken for granted that MANNER and PATH belong to the same semantic domain. However, as pointed out by Berthele (2013, p. 72) and Wälchli (2009, p. 211), MANNER and PATH of motion express crucially different aspects, a fact which does not imply that they should be treated as two aspects of the same event construal (cf. subsection 1.5.1). Empirical data points to the fact that these semantic components do not correlate (Berthele, 2013, p. 58). Table 5.4 features the correlation coefficients between the main dependent variables in German, expressed in Pearson’s r .

Table 5.4: Correlation coefficients of dependent variables (German)

	manner verbs	path verbs	manner adverbials	path adverbials
manner verbs		-0.20	-0.31	-0.20
path verbs			-0.16	-0.09
manner adverbials				0.16

Basically, a correlation coefficient between two variables close to -1 would suggest that there is a tendency that the occurrence of one variable implies the non-occurrence of the other variable and vice versa. A correlation coefficient close to +1 would indicate the contrary: a tendency that the occurrence of one variable implies the occurrence of the other variable. Keeping the grammatical component constant by focusing exclusively on the verb, an inverse correlation of -1 between MANNER and PATH mappings on the verb would imply that MANNER encoded in the verb usually does not encode PATH, and vice versa. This coefficient is unlikely, because certain verbs encode semantic components other than MANNER or PATH, such as deictic

information. Second, there are verbs that encode both components. A coefficient close to -1, then, would point to such a tendency in general. However, the coefficient of -0.20 implies a very weak negative correlation. There is a slightly stronger correlation between manner adverbial constructions and manner verbs, suggesting a weak tendency to map the MANNER information on an adverbial component if not expressed in the verb and vice versa. Overall, the table shows weak correlation coefficients between the semantic components.

Table 5.5 shows the correlation coefficients for manner verbs, path verbs, manner adverbials and path adverbials in French.

Table 5.5: Correlation coefficients of dependent variables (French)

	manner verbs	path verbs	manner adverbials	path adverbials
manner verbs		-0.44	0.11	0.08
path verbs			0.03	-0.52
manner adverbials				0.03

As can be drawn from the table, the correlation between manner and path verbs is stronger in French than it is in German. There is a stronger tendency in French than in German to encode the PATH component in the verb if MANNER is not expressed in this verb, and vice versa. The strongest correlation, however, is between path verbs and path adverbials; if the PATH information is not mapped on the verb, it tends to be encoded in adverbial constituents in French.

These low correlation coefficients in both German and French are in line with the above propositions that MANNER and PATH weakly correlate and that attributing them to the same semantic domain is problematic.

5.4 Participant-related variation

Participants varied in their tendency to encode MANNER or PATH in the finite verb and in their elaboration of certain features, such as the expression of MANNER in adverbial constructions. Participant-related variation can be the consequence of general or momentary, conscious or unconscious, linguistic preferences and choices. In these idiosyncrasies, language dominance configurations can account for crucial differences between participants. The question of how participant-related idiosyncrasies, irrespective of language dominance, and differences due to language dominance constellations can be teased apart is addressed in chapter 6.

The boxplots in Figure 5.4 show the distribution of manner verbs and path verbs across mode conditions for each speaker, with the numbers corresponding to participants' identification numbers.

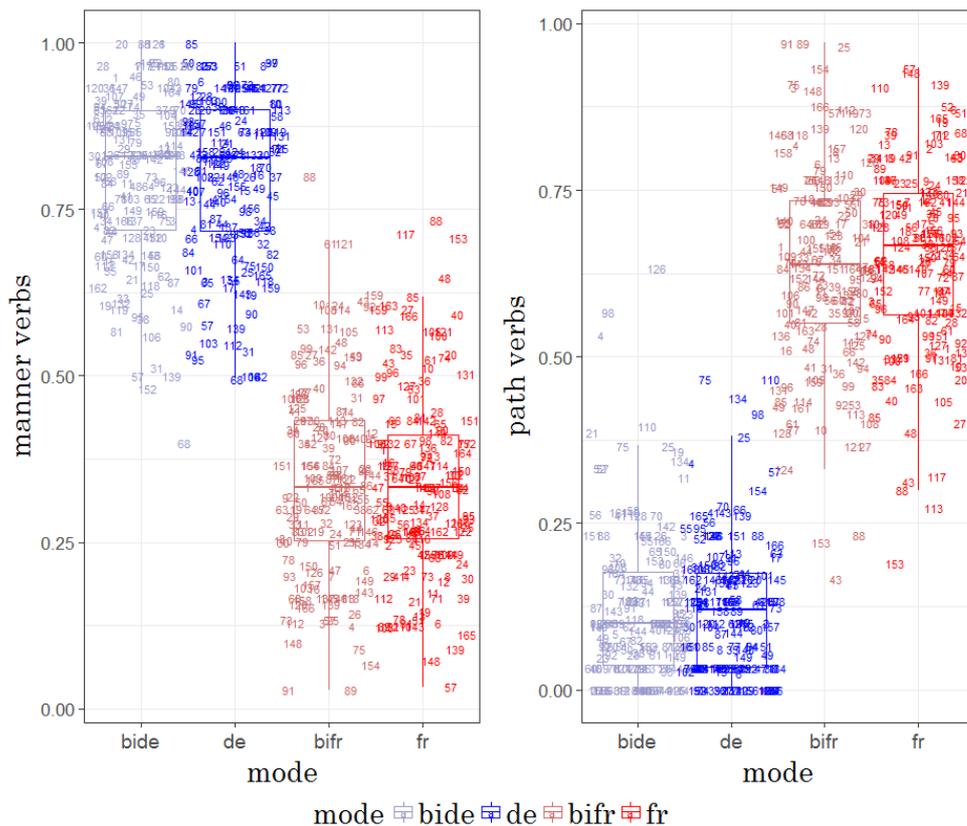


Figure 5.4: Boxplots for manner and path verbs across modes

The figure illustrates not only the cross-linguistic differences discussed in the previous section but also the distribution of participants. The proportion of manner and path verbs across participants shows a rather large range. Several participants used more manner verbs in French than some participants in German. The same overlap of language can be found in the use of path verbs. In all mode conditions, there are several outliers in the data points.

To show participant-related variation across modes for each participant, Figure 5.5 illustrates the mean proportion of manner verbs, path verbs, manner adverbials and path adverbials for each speaker.

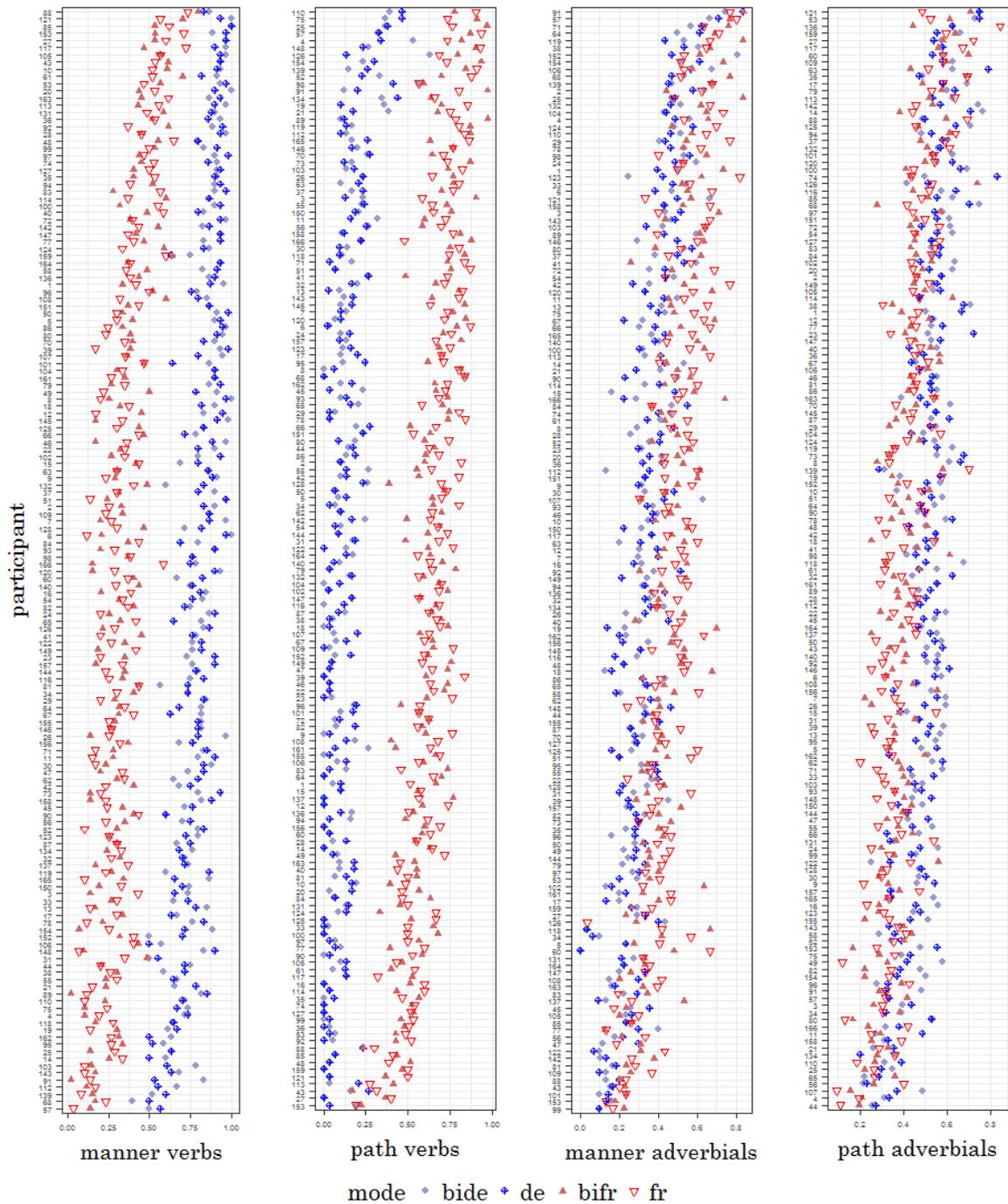


Figure 5.5: Proportions of dependent variables across mode for each participant

As can be drawn from this figure, participants vary not only across languages but also language modes. In other words, the cross-linguistic difference between French and German is more distinct for some participants than for others. Likewise, while some speakers show less variability between bilingual and monolingual language modes, others seem to be more sensitive to a language mode effect.

The fact that certain participants were more responsive to language mode manipulation and differed more strongly cross-linguistically is modeled in the

random slope adjustment of the mixed models. Systematic by-participant differences, which are not entirely covered by the fixed effects — including idiosyncrasies unrelated to the dominance effects discussed above — are modeled by the random intercepts by participant. Table 5.6 summarizes the modeled standard deviation (σ), which the GLMMs feature for the random slope condition ‘mode’ and ‘language’ and the intercept by participant. These by-participant differences are assumed to be drawn from a normal distribution with μ (i.e. mean) = 0, and the corresponding estimated standard deviation (σ) are expressed in log-odds.

Table 5.6: Random effect adjustment for participants

Outcome variable	Random intercept by participant	Random slope condition: mode	Random slope condition: language
manner verbs	0.66	0.17	0.80
path verbs	0.80	0.31	1.27
manner adverbials	0.76	0.32	0.66
path adverbials	0.65	0.22	0.80
path adverbals	0.95	0.30	-
BCC-violations	0.85	0.20	0.87

The standard deviation of the modeled by-participant intercept is highest for path adverbals and lowest for path adverbials. The standard deviations for the random slope condition mode suggests that language mode seems less culpable for variations in the probability of using a manner verb than using a manner adverbial across all participants. Differences between French and German vary mostly in terms of the probability of using a path verb and varies least in terms of using a manner adverbial. All in all, the standard deviations for the random slope condition ‘mode’ are less considerable than those of the random slope condition ‘language’.

5.5 Item-related variation

Depending on the stimuli item, certain aspects (e.g. MANNER or PATH) may be more salient than others, and thus, certain lexical or syntactic descriptions may be preferred. Furthermore, the description of certain PATHS brings along constraints in the mapping of semantic components on grammatical elements such as the BCC (cf. section 1.6).

Figure 5.6 shows the variation across language modes for the proportion of manner verbs, path verbs, manner adverbials and path adverbial constructions.

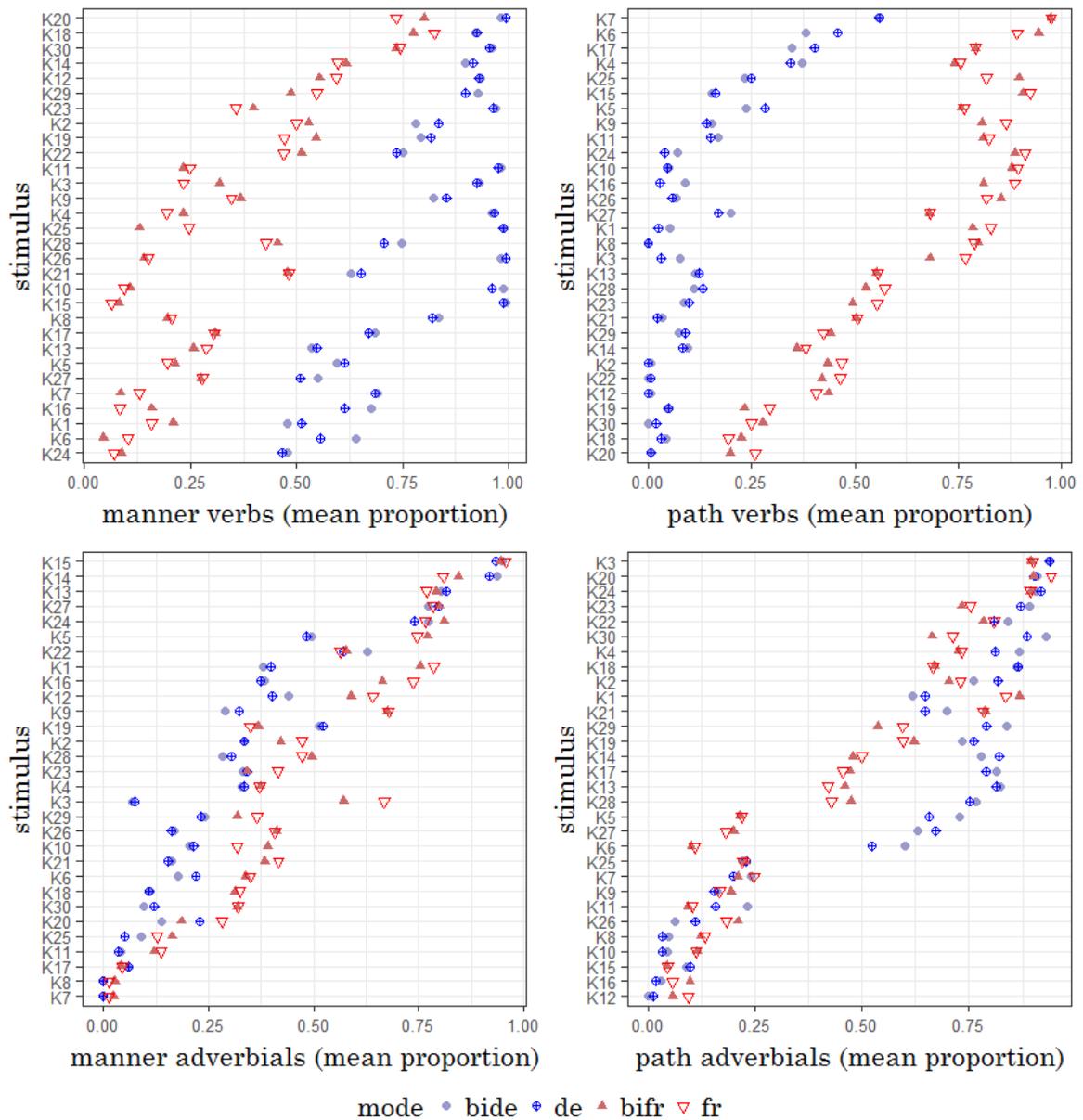


Figure 5.6: Proportions of dependent variables across language

As can be drawn from these four plots, stimuli differ largely in their proportions of these variables. The items also seem to account for more cross-linguistic difference than mode difference for manner verbs than for path verbs, since for the mean proportion of path verbs, the symbols representing the modes are less spread. Stimuli showing a high proportion of manner verbs often show a low proportion of path verbs, and vice versa. This is less often the case when comparing manner adverbials and path adverbials, which is not surprising since they do not “occupy” the same grammatical elements. Finally, cross-linguistic and cross-mode related differences are less considerable between adverbial components than between verbs.

Given this item-related variation, the stimuli had to be included as random effects in general in the GLMMs. Because some participants, with regard to their dominance

configurations and the differences between the languages, might be more sensitive to certain stimuli, by-item adjustments were modeled, as well. Table 5.7 shows the outcomes of the random effect adjustments.

Table 5.7: Random effect adjustments for the stimuli

Outcome variable	Random intercept by stimulus	Random slope condition: dominance	Random slope condition: language
manner verbs	1.07	0.20	1.80
path verbs	1.38	0.16	1.41
manner adverbials	1.86	0.18	0.94
path adverbials	1.92	0.25	1.20
path adverbals	2.06	0.31	-
BCC-violations	3.45	0.40	1.07

The modeled standard deviations (σ) for the by-item intercepts are higher for all dependent variables than the standard deviation for the by-participant intercepts, suggesting greater variation due more so to the items than to the participants. The standard deviation for the random slope of ‘dominance’ for stimuli is highest for BCC-violations and lowest for the model featuring path verbs as outcome variable. Like the random slope ‘language’ for participants, the random slope ‘language’ for stimuli is highest for manner verbs and lowest for manner adverbials. Overall, however, the effect of ‘language’ seems to contribute to more variation across stimuli than across participants, which may be due to inherent characteristics of the items discussed in the following subsections.

5.5.1 Manner saliency

As outlined in subsection 5.3.2, MANNER of motion was salient in most stimuli, as the FIGURE often moved in particular, unnatural or uncommon ways.

Finite manner verbs show up frequently and show many types in both languages. Although it is not the aim of the present thesis to analyze the MANNER types in a fine-grained way such as through an approach similar to Slobin et al. (2014), insights into the items resulting in high or low proportions of MANNER of motion descriptions elucidate different types of MANNER of motion.

The three items showing the highest proportion of manner verbs across all language modes are K20 (‘Figure hops out of sandbox’), K18 (‘Figure bounces over chain’) and K30 (‘Figure performs frog jumps out of flowerbed’). All these items show semantic similarity in terms of MANNER as they all refer to a jumping-movement. Furthermore, all these items involve the crossing of a spatial boundary. In French, the high proportion of manner verbs in these items can be

explained with a single verb, *sauter* ‘to jump’ (227 tokens for K20, 240 for K18 and 190 for K30). Similar constructions such as *faire des sauts* ‘to make jumps’ (two tokens for K20, eight for K18 and 17 for K30) or *sautiller* ‘to hop’ (one token for K20, ten for K18 and seven for K30) were also employed, but no other verb showed a comparable number of tokens⁶⁸. In German, there is more variation, as there are several types showing a high number of tokens: *springen* ‘to jump’ (146 tokens for K20, 136 for K18 and 134 for K30), *hüpfen* ‘to hop’ (96 tokens for K20, 115 for K18 and 106 for K30) and *gumpen* ‘to jump’ (55 tokens for K20, 43 for K18 and 52 for K30). All of these verbs imply some sort of effort in the motion event and can be referred to as “high energy motor patterns” or “instantaneous acts” in Slobin’s (2004, p. 7) terms. The use of verbs encoding effortful MANNER of motion would thus constitute an exception to the BCC (cf. section 1.6).

The lowest proportion of finite manner verbs was found in items K24 (‘figure crawls out of pond (reversed, crab-style)’), K6 (‘figure strolls across street’), and K1 (‘figure dances out of house (circling)’). Again, all these items predicate a boundary-crossing situation. While K24 and K6 imply smoother movement involving less energy, K1 does not necessarily imply less energy than the examples from the jumping domain. Although both languages showed a lower proportion of MANNER of motion verbs, French answers contained a few of these verbs in comparison to German. Manner verbs show up much less frequently in French. In German, K24 showed 174 verbs encoding MANNER (25 in French), K6 showed 210 manner verbs (24 in French) and K1 showed 274 manner verbs (61 in French).

The cross-linguistic difference in manner verbs was most considerable for items K15 (difference of ~ 0.92 in terms of proportions), K10 (~ 0.87) and K26 (~ 0.84) and was least considerable for items K18 (~ 0.12), K21 (~ 0.16) and K20 (~ 0.21). None of the items resulting in a large cross-language gap in manner verb proportions involve the crossing of a spatial boundary (see section A.1). However, the items resulting in the most similar proportions of manner verbs — and a high proportion of manner verbs in K18 and K20 — between French and German predicate the crossing of a spatial boundary. The difference between boundary-crossing items and non-boundary-crossing items is discussed in the next section.

5.5.2 Path type and boundary-crossing items

As outlined previously (subsubsection 4.2.3.1), the stimuli included five different PATH types: ‘in’, ‘out’, ‘up’, ‘down’, ‘across’. Three of these PATH types — ‘in’, ‘out’

⁶⁸ The particularity of the verb *sauter* has been acknowledged in previous studies on French motion verbs. According to Zubizarreta and Oh (2007, p. 162), the verb *sauter* “appears to function ambiguously, either as an unaccusative (with a directed-motion meaning) or as an unergative (with an activity meaning)”.

and ‘across’ items — imply the crossing of a spatial boundary.

To elucidate the dependency of the outcome variables on the PATH type encoded in the item, the different proportions are plotted across language modes in Figure 5.7. The figure illustrates that the proportion of these variables do not categorically behave the same way across the PATH types, which the item predicate. Given phenomena like the BCC, the highest proportion of manner verbs would be expected in the ‘up’- and ‘down’-items, especially in French clauses. Contrary to this expectation, manner verbs appear most frequently in the ‘in’ and ‘out’ boundary-crossing items. However, the use of finite manner verbs in boundary-crossing items does not necessarily “violate” the BCC as will be discussed in section 5.6. Furthermore, the figure illustrates the proportion of path verbs. Generally, the PATH categories showing a high proportion of manner verbs show a low proportion of path verbs and vice versa. In terms of manner adverbials, cross-linguistic differences are small as discussed above. The ‘out’-item seems to lead to the greatest discrepancy between languages in terms of manner adverbials. Path adverbials seem to depend highly on type of PATH as the ‘in’- and ‘out’-items yield a high proportion of this variable, and the ‘down’-item yield a relatively small proportion in all language mode conditions. In French, the ‘down’-items were usually described with path verbs such as *descendre* ‘to descend’ (920 tokens all in all in the five down-items), which do not need a PP. In German however, the verbs employed in the ‘down’-items — often deictic or light verbs — require a path adverbial, and responses show a high proportion (~ 0.62) of path adverbials in these items. Thus, it must be noted that PATH is still encoded in some verb-external element not plotted in Figure 5.7.

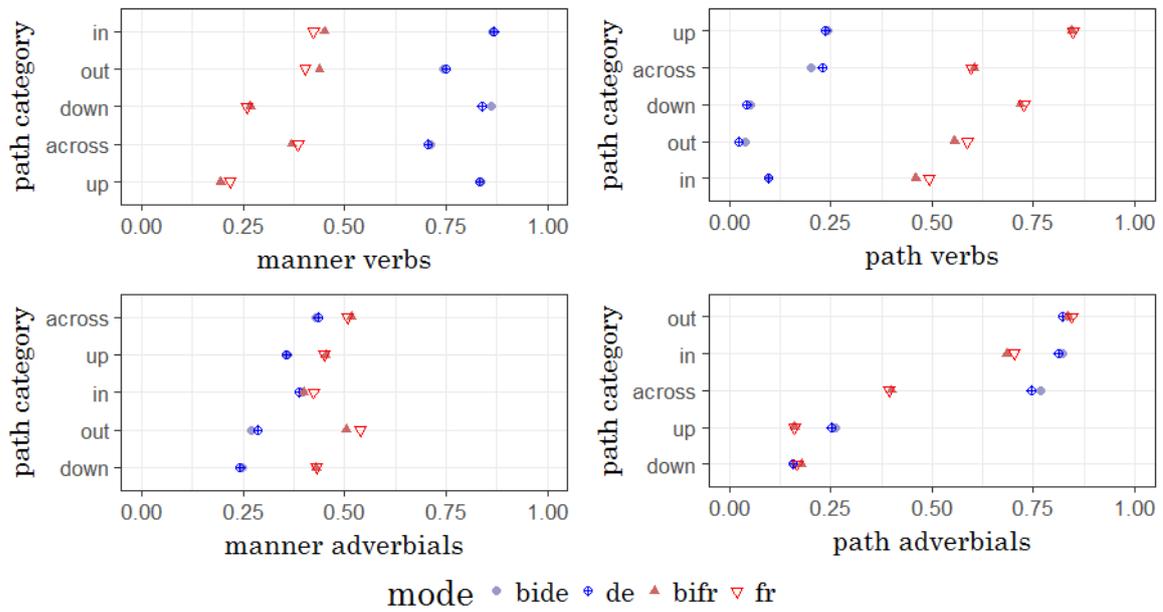


Figure 5.7: Proportions of dependent variables across PATH categories

The most salient item-related variation among the outcome variables was not, as expected, consistently in items predicating a boundary-crossing vs. items not predicating one.

When plotting the distribution of other variables, such as multiple- vs. simple-clause constructions, a subtle boundary-crossing (BC) predication effect can be observed in Figure 5.8.

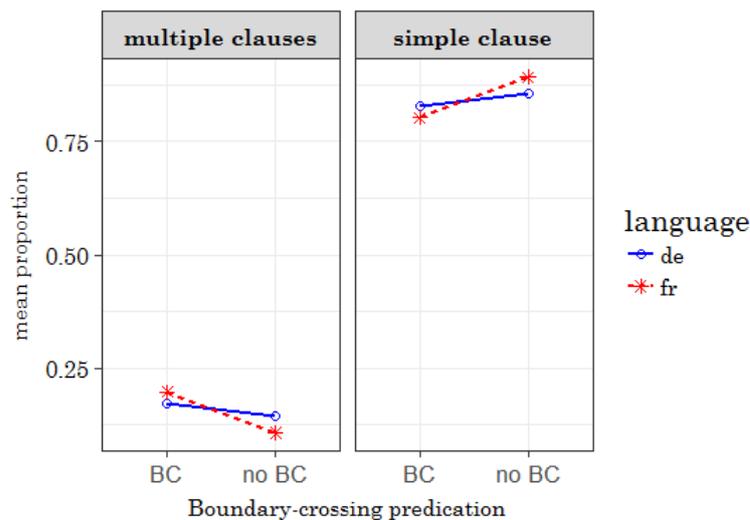


Figure 5.8: Proportions of multiple- and simple-clause constructions for items predicating a BC or not

Though the difference is fairly small, the figure shows that the proportion of multiple-clause constructions is slightly higher in French answers than in German

answers in boundary-crossing items and vice versa in items which do not predicate the crossing of a spatial boundary. In terms of proportion of simple clauses, there seems to be a similar — although reversed — interaction of French and German. There are somewhat more item descriptions in simple clauses in German than in French for boundary-crossing items and vice versa for items that do not predicate the crossing of a spatial boundary.

5.6 Alternative constructions and cross-linguistic influence

The data not only shows considerable cross-linguistic variation in the proportion of different variables and syntactic compositions across items and participants, but also a large range of constructional alternatives. While some variation in bilingual descriptions can be explained in terms of item- and/or participant-related features, there is a certain amount of variation that can result from CLI. The present section discusses alternative and idiosyncratic constructions that go beyond typical and typological motion patterns and may — in certain cases — be attributed to CLI. Due to grammatical constraints, especially in boundary-crossing situations, such phenomena not corresponding to typical patterns predicated by motion typology are particularly interesting in boundary-crossing contexts. Among these constructional variants are strategies of avoidance of boundary-crossing descriptions and strategies of circumventing constraints by means of constructional alternatives.

5.6.1 Missing description of boundary-crossing

Certain responses to items predicating a boundary-crossing situation do not describe the boundary-crossing and thus do not convey an adequate description of the item. Nevertheless, these constructions are syntactically appropriate and entail finite manner verbs in V-languages. Among the constructions where boundary-crossings are not described are missing descriptions of the *PATH* component, boundary-reaching constructions and constructions where the boundary-crossing is implicitly expressed.

5.6.1.1 Omission of Path

While *MANNER* descriptions are usually considered optional in the literature, “path is an obligatory component of motion event expressions” and “without a path verb or satellite or other path element, there is no motion event” (Slobin, 2004, p. 238). In the present data however, constructions omitting the *PATH* component appear

frequently in both German and French (see subsection 5.3.3 for the proportion of clauses including only manner verbs or manner verbs combined with manner adverbial constructions).

On the one hand, the omission of PATH may be due to the salience of the MANNER component in general in the items of the present study. MANNER information may be more marked than PATH information. In example 29, the speaker may focus on the salient MANNER component and thus “forget” to express the PATH information.

- (29) *il fait du moonwalking* (164-K14-fr-I)
 ‘he makes moonwalking’

On the other hand, in relation to the saliency of MANNER information, the speaker may omit the PATH information as he or she concentrates on exactly describing the MANNER component. In example 30, the speaker appears to be focusing on the specific description of the MANNER information and thus forgets to encode further semantic components of the motion event (i.e. the PATH information).

- (30) *er macht einen purzelkopf, das weiss ich nicht mehr wie man das sagt*
 ‘he makes a *somersault, that know I not anymore how one this says’
 (36-K21-de-I)

In several utterances, finite manner verbs show up with particles or prepositions. However, these verb-external components do not entail PATH information. Example 31 illustrates the use of a finite manner verb with a particle that bears locative information and may be referred to as a self-contained motion type.

- (31) *es hüpfet im bluemefäld ume* (43-K30-de-I)
 ‘it jumps in-the flowerbed around’

5.6.1.2 Boundary-reaching constructions

A further way to avoid boundary-crossing descriptions is through boundary-reaching constructions. These types of missing boundary-crossing descriptions are found in German (32) and French (33) utterances.

- (32) *er slidet zu einem sandkasten* (112-K19-bide-I)
 ‘he slides toward a sandbox’

- (33) *il fait des sauts de cabri vers une maison* (72-K2-bjfr-II)
 ‘he makes the jumps of-a mountain-goat toward a house’

In French and other V-languages, it is allowed to map the MANNER information on the main verb without “violating” any grammatical constraint. Boundary-reaching constructions in French have been observed in previous data as stated in Filipović (2007, p. 24):

“In French [...] when a boundary is not crossed, but only reached, manner verb + directional particle are used freely.”

5.6.1.3 Implicit boundary-crossing

As opposed to the boundary-reaching type, the implicit boundary-crossing construction implies the crossing of a spatial boundary:

“The figure moves toward a boundary and then is placed inside or outside the bounded region, with no explicit mention of the traversal of the boundary.” (Özçalışkan, 2013, p. 7)

Again, this strategy allows to employ a finite manner verb for a boundary-crossing item without violating normative grammatical constraints. In the present data, this strategy shows up mainly in multiple-clause constructions, especially in item K19 (section A.1). Implicit-boundary-crossing constructions predominantly appeared in French (example 34). However, there are cases when this strategy was also employed in German, such as in example 35.

(34) *il fait du skate (1) et atterit dans le bac à sable (2)* (149-K19-fr-III)
 ‘he makes skating (1) and stops in the box of sand (2)’

(35) *er fährt skateboard (1) und stoppt in einem sandkasten (2)* (31-K19-de-IV)
 ‘he drives skateboard (1) and stops in a sandbox (2)’

5.6.2 Strategies in describing boundary-crossing situations

Besides strategies of avoidance of boundary-crossing description, speakers use a handful of alternative constructions in boundary-crossing contexts where a finite manner verb can be employed without violating any grammatical constraint. The three strategies presented here appeared frequently in the data.

5.6.2.1 Multiple-clause constructions with finite manner verbs

As discussed in subsection 5.5.2, French and German answers differed slightly in the use of multiple- or simple-clause constructions when the item predicates a boundary-crossing as compared to ‘up’- and ‘down’-items.

As outlined in subsection 4.4.2, a clause-by-clause annotation was chosen, in particular because of the potential of circumventing the grammatical constraints of the BCC while employing a finite manner verb by means of a multiple-clause construction. To recall, a multiple-clause construction allows MANNER of motion to be mapped on the finite verb in one clause and describe the crossing of the boundary

by means of a path or deictic verb in another clause (subsection 4.4.2). This strategy appeared in both French (36) and German (37).

(36) *il saute très vivement* (1) *et il entre une sorte de bâtiment* (2) (4-K2-fr-1)
 ‘he jumps very swiftly (1) and he enters a kind of-a building’

(37) *er macht de hampelmaa* (1) *und geht durch nes tunnel* (2) (47-K22-bide-II)
 ‘he makes the jumping-jack (1) and goes through a tunnel’

While speakers mostly employ a path verb in the clause describing the boundary-crossing in French, they usually employ a deictic verb, such as *kommen* or *gehen* in German.

Although these constructions can be considered strategies to avoid violating grammatical constraints, the expression of a motion event in multiple- or super-subordinate constructions does not have to be a simplification (Daller et al., 2011, p. 113). Whether these are intentional strategies to avoid the BCC and to what degree these constructions are used consciously, remains subject to speculation.

5.6.2.2 Path-gérondif construction

In total, 242 syntactic constructions comprising the present participle of a path verb combined with the preposition *en* were identified in French descriptions. With the exception of a few path and deictic finite motion verbs, these constructions usually appear with a manner verb (e.g. *en rampant* in example 15 in subsection 1.7.1). The path-gérondif construction allows to employ a finite manner verb by expressing the boundary traversal in the same clause (cf. example 14). As discussed in subsection 1.7.1, these constructions under the heading of *reverse verb-framing pattern* (Pourcel & Kopecka, 2005, p. 11) are considered syntactically atypical by native French judges. In German, an analogous construction of a gérondif can be found in *hinab gehend* in example 38. Although verb-external PATH descriptions are the typical pattern in German, this construction is rather idiosyncratic:

(38) *er balanciert vom einen Bein auf das andere die Treppe hinab gehend*
 ‘he balances from one leg on the other the stairs down going’
 (107-K16-bide-IV)

Similarly, but expressed in a super-subordinate construction rather than in a single clause, example 39 is an idiosyncratic German construction and somehow reflects the French path-gérondif construction type:

(39) *er hinkt* (1) *indem er in einen bus steigt* (2) (163-K4-bide-IV)
 ‘he limps (1) while he in a bus ascends (2)’

Path-gérondif constructions, irrespective of the language in which they are

expressed, display a particularly interesting case of pattern convergence. While the structure is genuinely French, the encoding of the PATH in a verb-external element can be considered typically German.

5.6.2.3 Infinitif-de-but

The infinitif-de-but refers to a construction in French where the PATH is expressed via an infinitive verb form usually governed by a PP or a preposition, such as *pour* or *afin de*, which roughly translate to ‘in order to’⁶⁹.

In the present data set, 103 infinitif-de-but clauses were identified. Most of these constructions are made up of a finite manner verb combined with an infinite path verb in the *pour* construction, such as in example 40.

- (40) *il fait des roulades pour sortir du tunnel* (100-K21-fr-III)
‘he makes gymnastic-rolls to exit of-the tunnel’

A few infinitif-de-but constructions also comprise a finite verb governed by an adverbial phrase of purpose, such as *afin de* in example 41.

- (41) *personnage se trouve debout dans un carré de sable (1) et effectue un saut latéral afin d’en sortir (2)* (16-K20-fr-III)
‘a person himself-REFL finds standing in a box of sand (1) and performs a jump sideways to of-it exit’

As can be drawn from these examples, the infinitif-de-but construction allows to employ a finite manner verb in a boundary-crossing clause without violating any grammatical constraint in French. The displacement of the FIGURE, i.e. the boundary-crossing itself is not encoded in the finite verb, but in the infinite construction.

Although the syntactic composition of the infinitif-de-but construction is typical for French, the data showed a mapping of this pattern in German clauses, such as in example 42, which is potentially a French influence.

- (42) *ein mann macht purzelbäume um aus einem tunnel rauszukommen* (65-K7-de-II)
‘a man makes somersaults to out a tunnel out-of-to-come’

5.6.3 CLI at the morpho-lexical level

As the focus of this thesis is primarily on CLI at the semantic and syntactic level, the discussion of morpho-lexical transfer is limited. CLI phenomena on the morphological or lexical level are, compared to CLI phenomena on the syntactic

⁶⁹ This construction is typical for French. However, in the motion literature, a similar type is described in several languages and is referred to as the *motion-cum-purpose* type (e.g. Schmidtke-Bode, 2009, p. 181). As its name implies, the *motion-cum-purpose* construction refers to a combination of a motion verb with another verb that denotes purpose.

and semantic level, overtly and directly observable. However, some observations of morpho-lexical transfer are presented to demonstrate that CLI in bilingual speech manifested at different linguistic levels in the present data.

Lexical transfer occurs in specific nouns, which most participants presumably do not use often in their daily language — and even less so in their non-dominant language — such as *toboggan/Rutschbahn* ‘slide’ or *bac à sable/Sandkasten* ‘sandbox’. Some participants claimed to know the specific noun, but were not able to retrieve it at the moment of production. Others admitted that they had never known or used the word in the target language and freely filled the gap in their motion event descriptions by using a translation equivalent in the non-target language such as in 43.

- (43) *il monte* *die rutschbahn* (161-K7-bifr-III)
 ‘he ascends(French) the slide’

Transfer at the morpho-lexical level in main motion verbs and verb constructions appears in both languages. These constructions are listed in their infinite forms according to their frequency of occurrence:

Rouladen machen (17), rampen (12), faire des purzelbaum (7), passen (4), faire le hampelmann (3), (pas) chassés machen (2), Toboggan fahren (2), faire des petits überschläge (1), faire le guggelisturz (1), faire un heubürzel (1), Culbute machen (1), rouladen (1).⁷⁰

As can be drawn from this list, transfer at the morpho-lexical level in verbs and verb constructions occurs mainly on verbal phrases containing the verb ‘to do’ (*machen/faire*) and a noun denoting an activity. There are, however, several verbs or verb phrases that show direct CLI. The verb or verb phrase can be morphologically and syntactically integrated in the target language, as in examples 44 and 45.

- (44) *er rampt* *über eine strasse* (64-K5-bide-II)
 ‘he crawls(French) over a street’

- (45) *maintenant il est hinuntergerutscht* (128-K8-bifr-I)
 ‘now he is down-slided’

In cases like example 44, this morphological integration happens naturally and without hesitation. Whether or not this example of CLI can be interpreted as a nonce borrowing or as an unintended bilingual slip of the tongue is a matter of debate (cf. subsection 2.2.3). Further examples show how participants struggled to find

⁷⁰ To highlight the cross-linguistic mix of these expressions, lexical and morphological items reminiscent of the non-target language are transcribed in italics. An _(F) for French and a _(G) for German mark the target language: make *rolls*_(G) (17), *crawl*_(G) (12), to make a *somersault*_(F) (7), *pass*_(G) (4), to make a *jumping jack*_(F) (3), perform *ballet-style dancing*_(G) (2), slide a *slide*_(G) (2), make *small handsprings*_(F) (1), make *somersault*_(F) (1), make *somersault*_(F) (1), make *somersault*_(G) (1), *roll*_(G) (1).

the most appropriate motion verb in the target language. Example 46, for instance, illustrates how the participant tried to recall the specific German verb, interferes with his English competences⁷¹ and eventually employs the French motion verb *escalader*.

- (46) *der mann ja climb ja, nein, nicht climb, der mann escalade der*
'the man yeah climb(English) yeah, no, not climb, the man climbs the
berg (114-K9-bide-1)
mountain'

5.7 Discussion

This chapter explored general cross-linguistic differences in the data that follow the expected patterns and deviate from the predicted patterns. The variable showing the most considerable cross-linguistic difference is the semantic information expressed in the finite verb. As predicted, path verbs appear significantly more often in French constructions than in German ones, and manner verbs appear more often in German clauses than in French ones. Altogether, there were more manner verbs than path verbs. Manner verbs in boundary-crossing clauses, however, show up less frequently in both languages. As outlined, there are various strategies to circumvent a grammatical violation of the BCC. These strategies show up in both languages, and can be regarded as either strategies to avoid violating the BCC, a pattern of CLI like an infinitif-de-but construction in German or a construction going beyond or not conforming to the motion typology in another way.

Participant- and item-related idiosyncrasies were discussed and general patterns of CLI have been considered. The proportion of the main variables identified in this study depend considerably on the stimuli. While the video clips all depicted a self-propelled motion event performed by the same FIGURE, the type of the MANNER, GROUND and PATH information differs (cf. subsection 4.2.3). Comparing certain stimuli depicting different types of MANNER in terms of effort or intensity revealed a language dependency. More concretely, motion events featuring MANNER of motion implying instantaneousness, intensified effort or abruptness can be distinguished from motion events featuring smooth, continuous or less salient MANNERS of motion. The former yielded a higher number of manner verbs in French constructions and fewer discrepancies between French and German in terms of the manner verb variable. The PATH type of a motion event, however, does not seem to lead to predictable differences between the main variables. While there are certain differences depending on the PATH type, especially for verb-external PATH descriptions, these differences do not seem to manifest systematically.

The CLI phenomena in the present data pertain to concepts discussed in

⁷¹ The influence of English as a co-variate is discussed in subsection 6.6.3.

section 2.2, such as strategies of avoidance, momentary switches, and slips and patterns of semantic convergence. As emphasized in section 2.2, these phenomena overlap conceptually. In various examples, it is speculative whether a participant consciously employed a certain pattern as a strategy, whether the construction was a slip of the tongue at the moment of utterance or whether and to what degrees the constructional variants are entrenched.

Speaker-idiosyncrasies manifested as individual and collective tendencies. In the bilingual town of Fribourg, such collective idiosyncrasies do not always show traces of CLI in terms of momentary influences in the process of speaking, but could be patterns inherent to the language variety as traces of established CLI due to longtime contact between French and (Swiss-)German. As for individual idiosyncrasies, it is not easy to discern CLI phenomena like semantic patterns of convergence and separate them from speaker-related idiosyncrasies.

Furthermore, it is important to bear in mind that although participants recruited for the current study have high language skills in both French and German, general second language learner patterns and strategies may be mirrored in bilingual speech. Hence, universal language learner problems and strategies — as well as phenomena inherent to bilingual production, that do not conform to monolingual norms — can be confounded with general patterns of CLI. An example would be that the use of semantically light or deictic verbs in German constructions does not necessarily have to be an influence of French lexicalization patterns, but may account for an SLA-phenomena (Goschler, 2009). Whether certain variables are the result of universal language developmental patterns or whether they are indeed patterns of convergence in bilingual speech can only be addressed by modeling language dominance configurations as an independent variable. This will be the concern of the next chapter.

Chapter 6

The effect of language dominance

The present data shows cross-linguistic differences in the encoding of several elements in motion event clauses, as discussed in chapter 5. Language dominance effects are expected to explain variations between and within participants concerning the proportion of several variables. To explore the effect of language dominance on the main variables of interest in motion event descriptions, the outcome of the GLMMs, including dominance as fixed factor, are explored. This effect is compared across variables, and it is brought into discussion why certain components are more susceptible to language dominance effects than others. In line with a preceding study (subsection 3.4.1), the languages of the current study differed in their susceptibility to language dominance effects. Therefore, interactions between language and language dominance are modeled and discussed in this chapter.

6.1 General dominance effects

The fitted GLMM includes the fixed factor of language dominance, as scored by the BLP (subsection 4.2.1) as fixed factor. Table 6.1 summarizes the outcomes numerically in log-odds of this fixed factor in estimates, *p*-values and effect sizes⁷² for the main models.

⁷² Effect sizes for the fixed effect of language dominance are calculated as explained in subsection 4.6.2.2. For the model 'mv9' with manner verbs as outcome variable, this leads to the following equation: $0.2 \times |1.74 - (-2.02)|$.

Table 6.1: Dominance as a fixed factor

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	0.20 \pm 0.07	2.90e-14 ***	0.75 \pm 0.26	mv9, section D.1
path verbs	0.10 \pm 0.08	0.32	0.38 \pm 0.30	pv9, section D.2
manner adverbials	0.04 \pm 0.07	0.99	0.15 \pm 0.26	me9, section D.3
path adverbials	-0.06 \pm 0.07	0.37	-0.23 \pm 0.26	pai9, section D.4
path adverbals	0.60 \pm 0.10	1.21e-07 ***	2.26 \pm 0.38	pa7, section D.5
BCC-violations	0.04 \pm 0.12	0.56	0.15 \pm 0.45	bcc9, section D.6

As can be read from this table, the factor of dominance exerts different effects on different outcome variables. The effect of dominance seems to be strongest for path adverbial elements with an effect size of 2.26 ± 0.38 log-odds. Furthermore, dominance seems to be a more important predictor for manner verbs (ES: 0.75 ± 0.26) than path verbs (ES: 0.38 ± 0.30). The effect of dominance on manner adverbials, path adverbials and BCC-violations appears moderate.

It needs to be borne in mind, however, that the effect of dominance alone might be misinterpreted severely. Given that the models comprise the outcome variables in both French and (Swiss-)German, an analysis of the effect of dominance without considering an interaction between language and dominance could lead to faulty conclusions. In other terms, the effect of dominance may not be the same for French and German answers. Accordingly, the effect of dominance could be under- or overestimated in considerable ways.

To analyze the effect of dominance separately for both languages, the following calculations were conducted. Recall that the factor language was sum-coded with the values of -0.5 for German and 0.5 for French. To calculate the effect of dominance for German, the ES of dominance was summed up with the estimate of the interaction effect (see Table 6.2) multiplied by -0.5. This leads to the following equation with the example of manner verbs as outcome variable:

$$0.2 \times |1.74 - (-2.02)| + (-0.41) \times (-0.5) \times |1.74 - (-2.02)| \approx 1.52.$$

The effect of dominance for German was thus about 0.77 log-odds stronger than it was when language was disregarded. For French (0.5), the effect size for manner verbs is calculated likewise:

$$0.2 \times |1.74 - (-2.02)| + (-0.41) \times (0.5) \times |1.74 - (-2.02)| \approx -0.02.$$

This indicates an underestimation of the effect by 0.77 log-odds for French. In other words, the effect of language dominance on the probability of using a manner verb is much stronger in German than in French. The estimate of a general dominance

effect would thus seriously overestimate the dominance effect in French, which is weak if not negligible, as discussed below.

For path verbs, the dominance effect for German is, again, stronger than for French, i.e. 1.05 log-odds for German and -0.30 for French. As for manner verbs, this indicates an overestimation of the effect of dominance for French by about 0.68 log-odds and an underestimation for German by about 0.67 log-odds.

In terms of manner adverbial constructions as outcome variables, the models show over- and underestimation of the dominance effect which are equally strong for both languages. For French there is an overestimation of 1.13 log-odds (i.e. 0.15 - (-0.98)) and for German, there is an underestimation of about 1.13 log-odds (i.e. 1.28 - 0.15). As mentioned above, in terms of effect sizes, language dominance without distinguishing between the languages lead to a rather moderate effect and severe under- and overestimations of the actual effects.

For path adverbials, the effect for dominance for German was about 0.19 and -0.64 for French. The ES for dominance in general being -0.23, the effect diverges by about 0.42 for German and by about 0.41 for French.

As path adverbials only appear in German answers, the model did not contain French data, so an interaction between dominance and language is not included in the model.

Finally, for boundary-crossing constraint violations, the dominance effect sums up to 1.09 log-odds for German and -0.79 for French, indicating an overestimation of 0.94 for German and about 0.94 for French.

Following these calculations for dominance effects in French and German, the models show a clear dependency on language in all variables.

The language dependency of dominance effects on the outcome variables calls for modeling an interaction effect of dominance for the variables. The interaction effect of dominance and language⁷³ is summarized in Table 6.2 for the main models, including the calculated effect sizes in log-odds.

⁷³ The calculation for the interaction effect sizes and the standard error range is somewhat more complicated than that for the main effects. It can basically be understood as the difference between the dominance effects of German and French. Hence, effect sizes for the interaction of language and dominance in the model featuring manner verbs as an outcome variable are calculated as follows: $[0.2 \times |1.74 - (-2.02)| + (-0.41) \times (-0.5) \times |1.74 - (-2.02)|] - [0.2 \times |1.74 - (-2.02)| + (-0.41) \times (0.5) \times |1.74 - (-2.02)|] \approx 1.54$. This equation can be reduced to $(-0.41) \times |1.74 - (-2.02)| \times |(-0.5) - 0.5| \approx 1.54$, which corresponds to the difference between the effects of dominance for German and for French discussed above, i.e., 1.52- (-0.02). The standard error (SE) for the effect size of the interaction between language and dominance is calculated as follows for manner verbs: $0.08 \times |1.74 - (-2.02)| \times |(-0.5) - 0.5| \approx 0.30$.

Table 6.2: Interaction between dominance and language

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	-0.41 \pm 0.08	2.07e-07 ***	1.54 \pm 0.30	mv9, section D.1
path verbs	-0.36 \pm 0.12	0.003 **	1.35 \pm 0.45	pv9, section D.2
manner adverbials	-0.60 \pm 0.07	3.82e-16 ***	2.26 \pm 0.26	me9, section D.3
path adverbials	-0.22 \pm 0.08	0.004 **	0.83 \pm 0.30	pai9, section D.4
BCC-violations	-0.50 \pm 0.09	4.29e-08 ***	1.88 \pm 0.34	bcc9, section D.6

The table shows that the effect size for the interaction between language and dominance is strongest for manner adverbial constructions (ES: 2.26 ± 0.26). In other words, the difference between French and German dominance effects is highest for manner adverbials, followed by BCC-violations, manner verbs, path verbs and path adverbials.

The effect of dominance in German and French can also be measured by calculating the probability gradients of using manner verbs, path verbs, manner adverbials, path adverbials and BCC-violations. Table 6.3 summarizes the measured slopes of dominance for French and German⁷⁴.

Table 6.3: Gradients of dominance for dependent variables

Outcome variable	German	French
manner verbs	0.405	-0.005
path verbs	0.28	-0.08
manner adverbials	0.34	-0.26
path adverbials	0.05	-0.17
BCC-violations	0.29	-0.21

Following this table, dominance leads to a gradient of about 0.405 for German in relation to manner verbs and a neither falling nor rising slope of about -0.005 for French. This demonstrates that with regard to manner verbs, dominance shows an effect for German answers, but not for French. The rising slope of dominance for German and the horizontal slope for French in relation to manner verbs can also be seen in the first plot in Figure 6.1, as discussed below. For other variables, such as manner adverbials, the slope for French is negative. This can be seen in the second plot in Figure 6.5, indicating an increasing use of the dependent variable with increasing French dominance.

⁷⁴ Slopes are calculated by adding the estimate of the fixed factor of dominance to the estimate of the interaction of dominance and language which is multiplied by the numerical value for the language of interest. This leads to the following equation demonstrating the example of German manner verbs: $0.2 + (-0.5) \times (-0.41) \approx 0.405$.

6.2 Dominance effects in motion verbs

As language dominance configurations can account for a degree of CLI, motion verbs differing cross-linguistically in the semantic aspects they encode, can be prone to dominance effects to different degrees. As outlined in the preceding chapters, the GLMM show a strong language dependency of dominance effects for manner and path verbs. The goal of the present section is to better understand the GLMM outcomes through data visualization. To check whether a different semantic coding — taking the example of the German motion verb *gehen* — leads to different results in terms of manner verbs, two additional models featuring the outcome variable of manner verbs are calculated. Furthermore, dominance effects and the interaction between dominance and language are related to typological influences and general linguistic strategies of speakers with lower levels of dominance. To do so, lexical diversity and the use of generic or deictic verbs are discussed.

6.2.1 Manner, path and deictic verbs

The aim of the present section is to analyze and discuss language dominance effects in the encoding of MANNER, PATH, and deictic information on the main finite verb in the motion clause.

Based on the output of the GLMMs discussed in the preceding section, the effect of dominance is not the same for German and French with regard to manner and path verbs. Deictic verbs barely appeared in French descriptions (only 3 types were distributed over 159 tokens), but there were a few instances of deictic verbs in German (cf. Table 5.1). However, there were only two types identified in German: *gehen* (1,033 tokens) and *kommen* (336 tokens). Although the number of deictic verbs is small compared to those of manner and path verbs, slight dominance effects can be expected, as the deictic verb *gehen* usually functions as a generic verb used for simplified constructions (Goschler et al., 2013). Thus, with increasing German dominance, the use of the deictic verb *gehen* is expected to decrease. Figure 6.1 visualizes the relation of the proportions of manner, path and deictic verbs across the dominance scale.

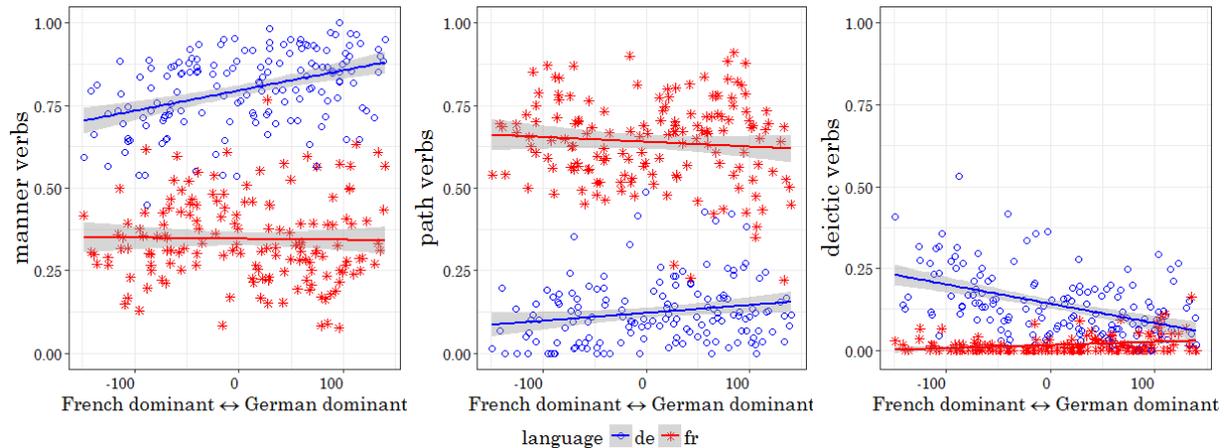


Figure 6.1: Effects of dominance for manner, path and deictic verbs

In each figure, the x-axis refers to the dominance scale ranging from French-dominant on the left to German-dominant on the right. The y-axis shows the proportion of the verbs distributed across the language. The graph for manner verbs suggests that dominance exerts more influence on German manner verbs than French manner verbs, since proportion of manner verbs tends to increase as German dominance increases. For French, the null effect of dominance is visualized by the smoothed conditional mean line, which is nearly horizontal. The middle figure shows the effect of dominance was weaker for path verbs than for manner verbs. Furthermore, it shows a slight dominance effect for French path verbs as the proportion decreases as German dominance increases. On the other hand, there is a slight increase of proportion of German path verbs with increasing German dominance — contrary of the prediction concerning the influence of the French pattern of using more path verbs. This counterintuitive finding of greater use of path verbs with increasing German dominance, however, has appeared in the preceding study (subsection 3.4.2). The reason for this unexpected outcome may relate to vocabulary size. Several path verbs are stylistically marked pertaining to a higher register and may thus increase with increasing dominance, irrespective of typological influences (Berthele & Stocker, 2016, p. 22). Comparing examples 47 and 48, both describe the stimulus K5, but the former includes a path verb and is somewhat more sophisticated than the latter, which includes a manner verb.

(47) *es oranges männdli überquert chrüchend uf allne viere e strass* (110-K5-bide-III)
 ‘an orange manikin crosses crawling on all fours a street’

(48) *jemand der auf der strasse, auf dem boden läuft* (15-K5-de-III)
 ‘someone who on the street, on the floor walks’

While in example 47, the speaker (110) is dominant in German (BLP score of 56.04), the speaker in example 48 is dominant in French (BLP score of -56.31). In these

examples, a German-dominant speaker uses a path verb and produces a stylistically more sophisticated clause than the French-dominant speaker using a manner verb. However, this dominance effect in German is not considerable, as discussed in the preceding section.

Given the low number of deictic verbs in French, effects of language dominance are barely visible in quantitative terms. For German however, the figure suggests a dominance effect in that the more dominant a speaker is in French, the more deictic verbs are used in German.

Language dominance manifests not only in that speakers may have more influence from one typical language variety-related construction onto the other (such as typological influence), but also in that they more often use light or deictic verbs because they do not know the target-language equivalents. As mentioned in section 5.7, it is not possible to clearly tease apart both phenomena. Example 49 illustrates how a potential typological influence interferes with a lack of French knowledge in manner verb choice.

- (49) *je sais plus comment on appelle ça, il sort d'un tunnel en, je sais pas*
 'I know not-anymore how one calls this, he exits out-of-a tunnel while, I know not'
(24-K21-fr-III)

The speaker seems to intend to use a manner verb, but since the specific verb does not come to her mind at the moment of production, she simply uses a path verb. According to her BLP score of 69.2, the participant is German-dominant (see section B.1). The German dominance may thus account for the intention to use a manner verb. The lack of knowledge of the specific verb, however, inhibits typological influence at the semantic level.

6.2.2 Different coding of a verb — different outcome?

To analyze whether a different coding of the polysemic verb *gehen*, which was coded as either a deictic or manner verb depending on the context (section C.4), led to different outcomes in manner verbs, two additional codings were applied to the data. In one data set, the verb *gehen* was coded as a deictic verb. In the other data set, it was coded as a manner verb throughout all items — irrespective of context. The verb *gehen* appeared 1,777 times in the data in its finite form and thus shows the second largest number of tokens in German clauses, following *laufen* with 1,930 tokens. The high number of the verb *gehen* is largely due to some participants' frequent use of the verb. Participant 68, for instance, used *gehen* in nearly every description, i.e. in 53 clauses.

In Figure 6.2⁷⁵, the mean proportion of manner verbs of the data featuring *gehen* as a deictic verb is plotted across the dominance scale for the monolingual and bilingual modes.

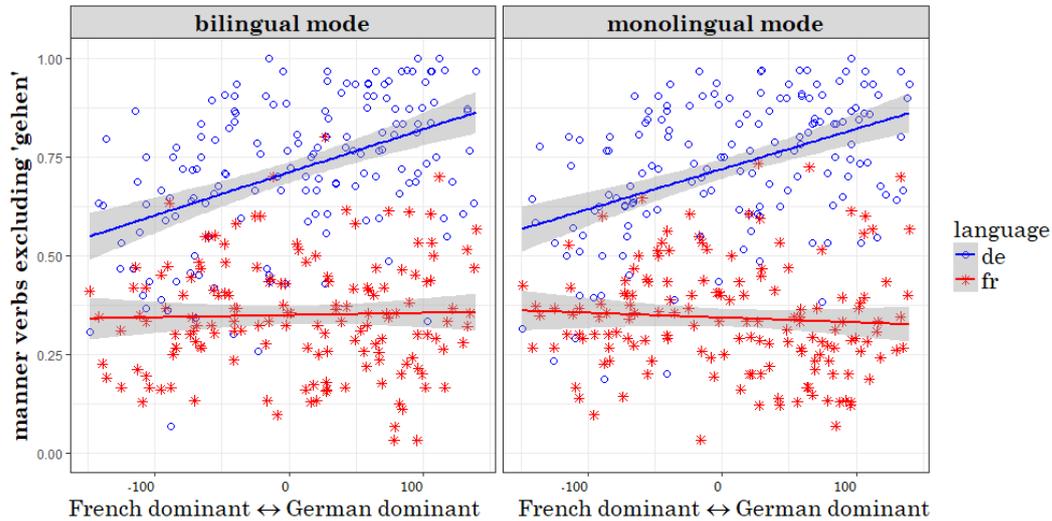


Figure 6.2: Manner verbs excluding 'gehen'

If *gehen* is excluded from the data as a manner verb, the outcome resembles the first plot in Figure 6.1, where the verb is coded as manner or deictic verb according to context. Thus, increasing German dominance increases the employment of a finite manner verb in a German clause. However, the dominance effect seems even stronger when *gehen* is not considered a manner verb throughout the items as the gradient is steeper. In other words, French dominance leads to lower use of manner verbs if *gehen* is not considered a manner verb.

In Figure 6.3, the mean proportion of manner verbs is plotted across the dominance scale and modes of the data set, including *gehen* as a manner verb.

⁷⁵ This and the subsequent figure feature the outcomes for both language modes for the purpose of plotting the outcome of a different coding across all variables. There does not seem to be a considerable difference between the monolingual and bilingual mode for these data sets. Language mode manipulation effects, however, are explored in chapter 7.

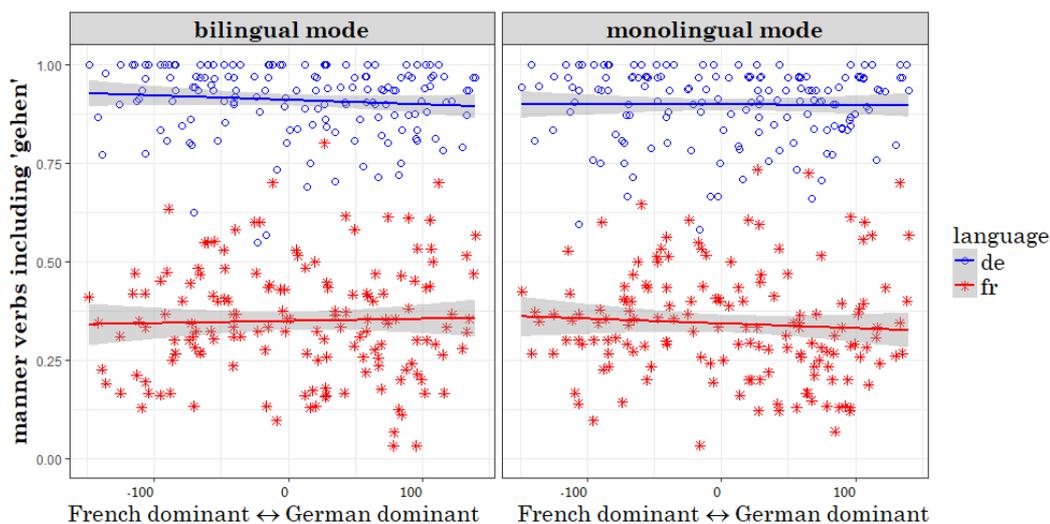


Figure 6.3: Manner verbs including ‘gehen’

Surprisingly, the effect of dominance on German manner verbs seems to disappear altogether. Particularly in the bilingual mode, the graph suggests a slight increase in German manner verbs with increasing French dominance. Regardless of dominance configurations, manner verbs appear often in German clauses. A different coding of a single verb with a high frequency of occurrence, thus leads to a completely different outcome.

To inferentially analyze the outcomes of these different coding systems, two additional models featuring the outcome variable of manner verbs were calculated. In one model (section D.8), *gehen* was coded as a deictic verb throughout all items (leading to 10,582 manner verbs, as opposed to 11,327 in the data for section D.1). In the other model (section D.7), *gehen* was coded as a manner verb (12,359 manner verbs in total in the data). The models now feature different data points and are fitted differently in terms of random effect adjustment. The outcome confirms the descriptive analysis above. If *gehen* is coded as a deictic verb, the factor of dominance leads to a significant increase in manner verb use in German. If *gehen* is coded as a manner verb, there is no dominance effect and no interaction between language and dominance. Thus, coding *gehen* as a manner verb throughout all items leads to a null effect of dominance for both languages.

These outcomes relate to the fact that *gehen*, regardless of the semantic meaning it conveys, is referred to as light verb. As described earlier, the tendency to use light or generic verbs such as *gehen* more often with lower German dominance leads to an effect concurrent with the tendency to use more manner verbs with higher German dominance. These competing effects balance out the increase or decrease of manner verbs across the dominance scale, leading to the horizontal graph visualized in Figure 6.3.

It needs to be pointed out, however, that the use of the light verb *gehen* may often be embedded in a simpler, i.e. semantically lighter construction, but does not automatically imply an overall simplification of the clause in all cases (cf. Daller et al., 2011; Goschler & Stefanowitsch, 2013). In example 50, participant 60, who is clearly dominant in French (BLP score of -106.8), uses *gehen* in a simple construction without describing the MANNER of motion, which is rather salient, in item K1. To describe the same video clip, participant 40 (BLP score of 20.07) who also uses the finite verb *geht*, encodes the item more complexly with the manner adverbial *kreiselnd* and a double-framing of the PATH component through the path adverbial *aus* and the path adverbial *heraus* (example 51).

- (50) *er geht aus einem haus* (60-K1-bide-IV)
 'he goes out a house'
- (51) *ein oranger roboter geht kreiselnd aus einem haus hinaus* (40-K1-bide-I)
 'an orange robot goes circling out a house out-of'

6.2.3 Verb diversity and dominance

The diversity of verb types differs not only from item to item, depending on item-related idiosyncrasies (subsection 5.3.2), but also from participant to participant.

Given that lexical diversity is usually said to reflect, or even define, language proficiency, a correlation between verb diversity and language dominance is highly likely. As verbs and verbal constructions encoding MANNER showed more types than the rather low number of path or deictic verb types in both languages (24 path verb types for French and 13 for German compared to 161 manner verb and verb construction types for French and 172 for German), the present subsection focuses exclusively on diversity in verbs and verb constructions encoding MANNER.

Along these lines, TTRs were calculated⁷⁶ for each participant. These diversity scores were plotted for German and French manner verbs across the dominance scale for each participant in Figure 6.4.

⁷⁶ Even though the traditional method of TTR-calculation of dividing the number of types by the number of tokens has several drawbacks (e.g. it does not account for unequal number of manner verb types across participants), it was sufficiently valid for exploring whether there was a correlation tendency between diversity and dominance. Additional measures accounting for the low number of verbs and unequal verb sizes across participants, by algebraically transforming TTR calculations, such as Dugast's *Uber* formula, were also adopted (see e.g. Pavlenko and Volynsky (2015) for a similar analysis). The *Uber* formula calculates the squared logarithm of all the manner verbs produced by a participant divided by the difference of the logarithm of all manner verb tokens and the logarithm of the manner verb types produced by the participant. The *Uber* scores led to an outcome similar to the TTR calculations. However, the *Uber* transformation led to several outliers (e.g. participants with a very high diversity score and nontranslatable transformations, i.e. a logarithm of 0). Therefore, the simple TTR calculation was deemed suitable for the present demonstration.

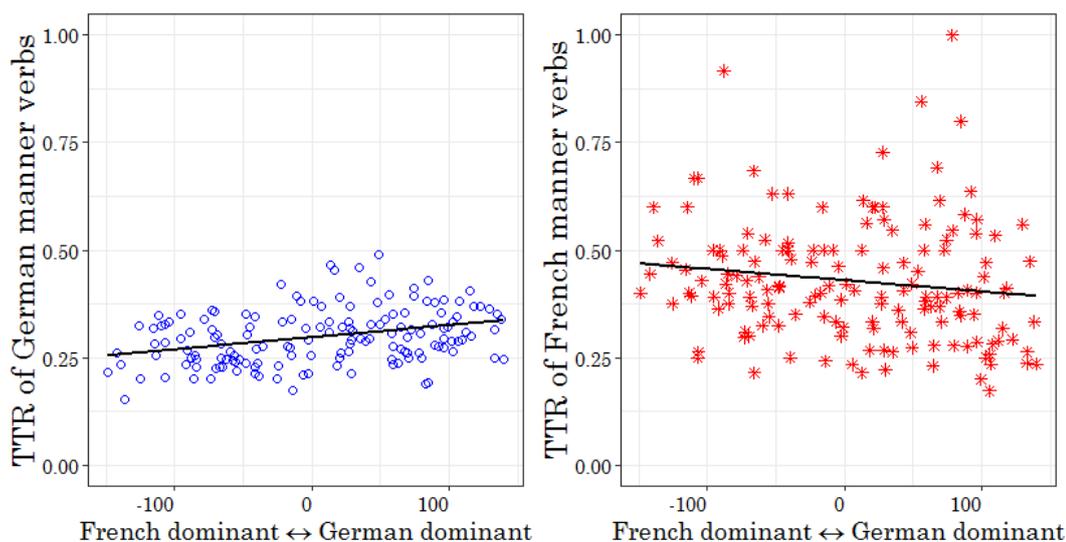


Figure 6.4: Dominance effects for manner, path and deictic verbs

As can be seen from these plots, language dominance and lexical diversity in manner verbs seem to correlate. With increasing German dominance, diversity in German verbs encoding MANNER information increases, and with increasing French dominance, diversity of these verb types increase in French. There seems to be more variation in French manner verbs than in German manner verbs, i.e. speakers vary more in their tendency to use different types of manner verbs in French across their dominance profile than those in German clauses. The TTRs and language dominance show correlations of 0.36⁷⁷ in German and -0.14 in French.

6.3 Dominance effects in verb-external motion expressions

Verb-external components encoding MANNER or PATH have shown fewer cross-linguistic differences (section 5.3). As outlined in section 6.1, however, manner adverbials seem to depend more on dominance configurations than path adverbials do. Potentially, the interaction of language and dominance for manner adverbials can be explained by vocabulary size. To gain an idea on vocabulary sizes of the participants, the TTRs for manner adverbials in French and German were calculated and plotted across the dominance scale. Path adverbials in German show a clear language dominance effect. Clauses encoding a combination of adverbial and adverbial — which often leads to an elaboration of the PATH component or redundant constructions — is potentially a further variable susceptible to language dominance effects. This chapter explores these cross-linguistic differences and dependencies on

⁷⁷ Correlation coefficients are expressed in Pearson's r .

dominance configurations by visualizing the relationship of the variables with the dominance scale.

6.3.1 Manner elaboration

The encoding of MANNER in verb-external elements serves as strategy to encode MANNER in the clause and encode PATH in the finite verb. This construction would apply to the typical verb-framed pattern or in an elaboration of the MANNER information yet — or to be — expressed in the finite verb. Figure 6.5 visualizes this variable's dependence on language dominance configurations.

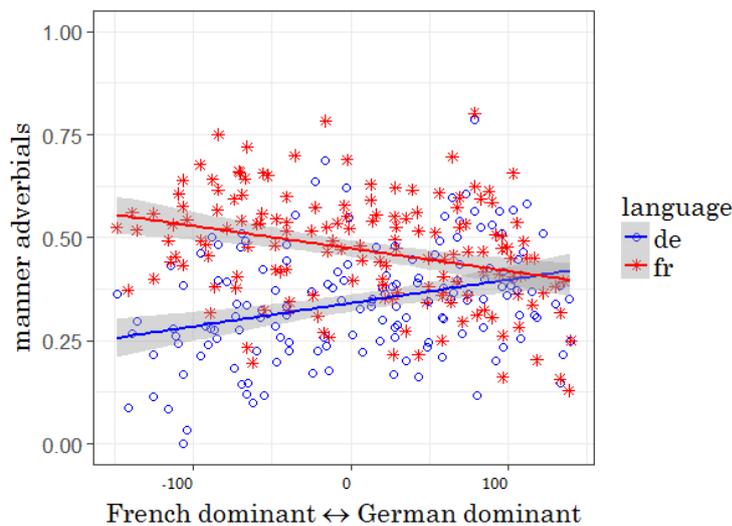


Figure 6.5: Manner adverbials across the dominance scale for French and German

On the one hand, the figure shows the interaction of language; there is an increasing use of manner adverbials and adverbial constructions in French with increasing French dominance and an increasing use of manner adverbials and adverbial constructions in German with increasing German dominance. On the other hand, the figure also shows that the effects converge; with increasing German dominance, the cross-linguistic differences get smaller. In other words, a speaker with a high dominance score in German may use as many manner adverbials in his or her French as in his or her German constructions.

As with manner verbs, manner adverbials belong to the variables showing a high number of tokens in both languages (section 5.1) which allows us to calculate lexical diversity. Adopting the same measures used for manner verbs as outlined in subsection 6.2.3, Figure 6.6 shows the diversity index across the dominance scale.

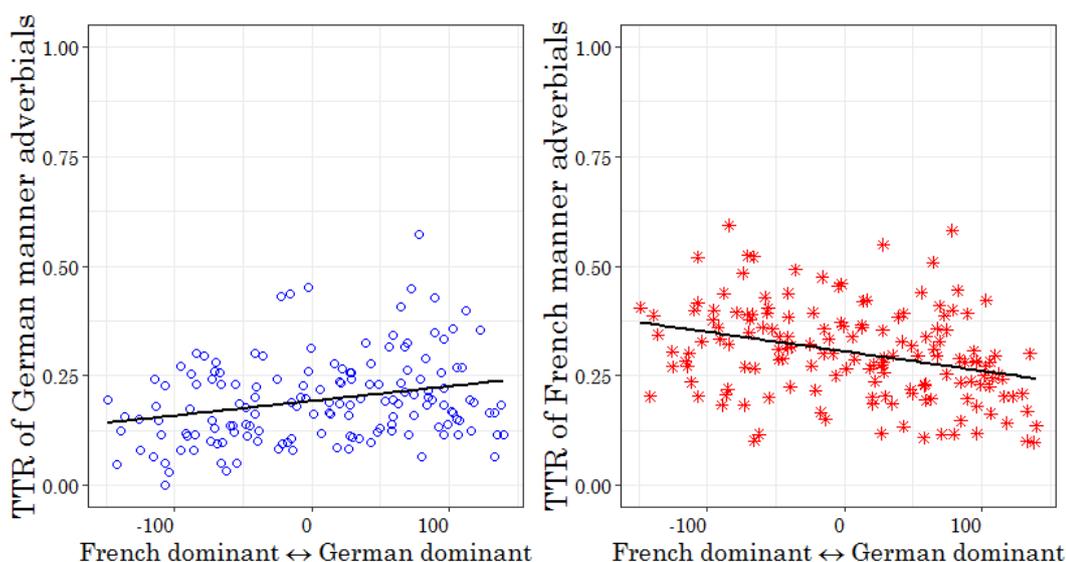


Figure 6.6: TTR in German and French manner adverbials across the dominance scale

The general tendency which can be drawn from this figure is again an increasing diversity with increasing language dominance. The distribution of TTR across the dominance scale shows less cross-linguistic variation than for the variable of manner verbs seen in Figure 6.4. Correlation coefficients for TTR and language dominance are also comparable across language, i.e. -0.32 in French and 0.27 in German.

6.3.2 Path granularity and pleonastic constructions

As for *MANNER*, the description of the *PATH* component can also take on different levels of elaboration. This granularity in *PATH* description is not only a feature of *S*-languages, but depends on the language variety and the speaker's profile, as well (cf. subsection 1.4.2).

The data shows, in line with the expectations, more path adverbials in German than in French answers (section 5.3). The difference however, is not considerable. In terms of dominance effects, the GLMM for path adverbials as outcome variable does not show a significant effect of dominance alone, but a significant interaction between dominance and language.

As can be drawn from the scatter plot on the left in Figure 6.7, there seems to be a slight increase in path adverbials with increasing German dominance, but a tendency in the unexpected direction for French path adverbials. In other words, increasing German dominance seems to lead to a decrease of path adverbials in French. For path adverbials, on the other hand, a language dominance effect is expected through the increased use of path adverbials with increasing German dominance. The graph on the right in Figure 6.7 confirms this hypothesis.

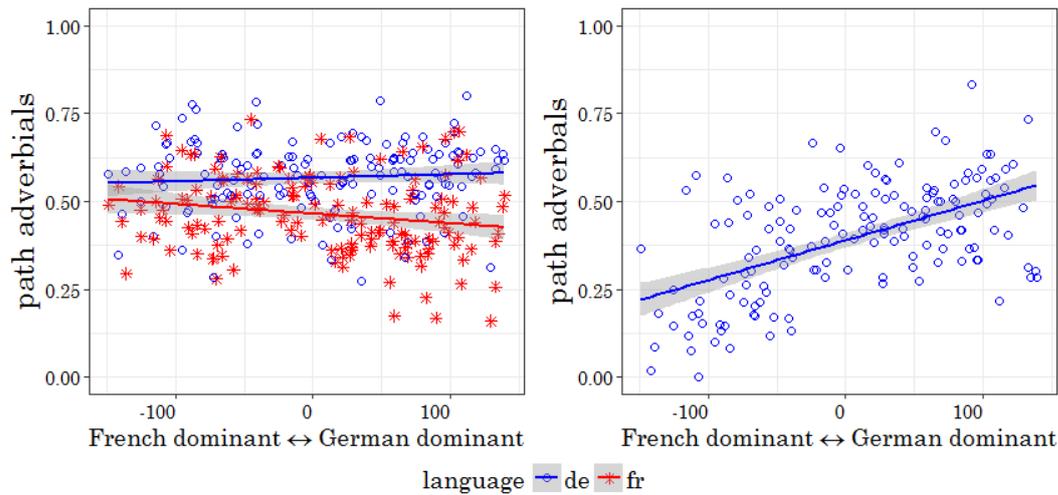


Figure 6.7: Path adverbials and path adverbials across the dominance scale

The significant increase of path adverbial use with increasing German dominance is confirmed in the outcome of model 'pa7' (see section D.5 and section 6.1).

In order to visualize then the distribution of pleonastic constructions and constructions of verb-external path elaborations in German, constructions combining path adverbials and path adverbials across the dominance scale are plotted in Figure 6.8.

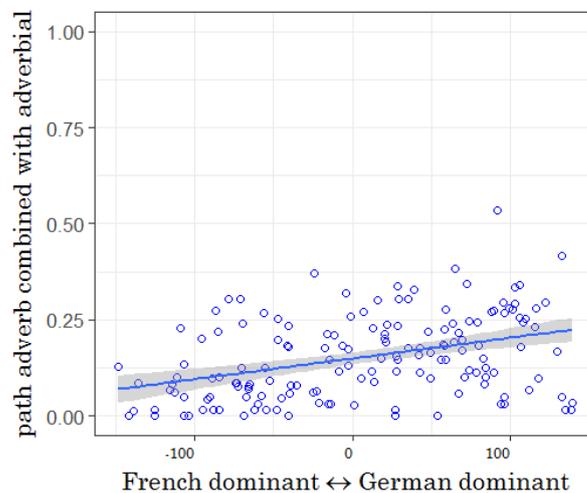


Figure 6.8: Path adverbials and path adverbials combined across the dominance scale

The proportion of these constructions is not high, and a language dominance effect does not appear very strong. Note that the proportion of these constructions correlates with language dominance more than path adverbials but less than path adverbials seems intuitive and predictable following Figure 6.7. Theoretically however, the use of these pleonastic constructions may be more dependent on German dominance than on path adverbials alone, implying less semantic complexity.

Further constructions and combinations of different semantic components and their mapping on syntactic elements is the subject of the next section.

6.4 Construction-based dominance dependency

Following Figure 5.3, only the following constructions, besides manner and path verb-only constructions, show instances in both languages and a certain cross-linguistic difference: PVME (path verb + manner adverbial), MVPAIME (manner verb + path adverbial + manner adverbial), MVPAI (manner verb + path adverbial) and MVME (manner verb + manner adverbial). The proportion of these constructions is plotted across the dominance scale in Figure 6.9⁷⁸.

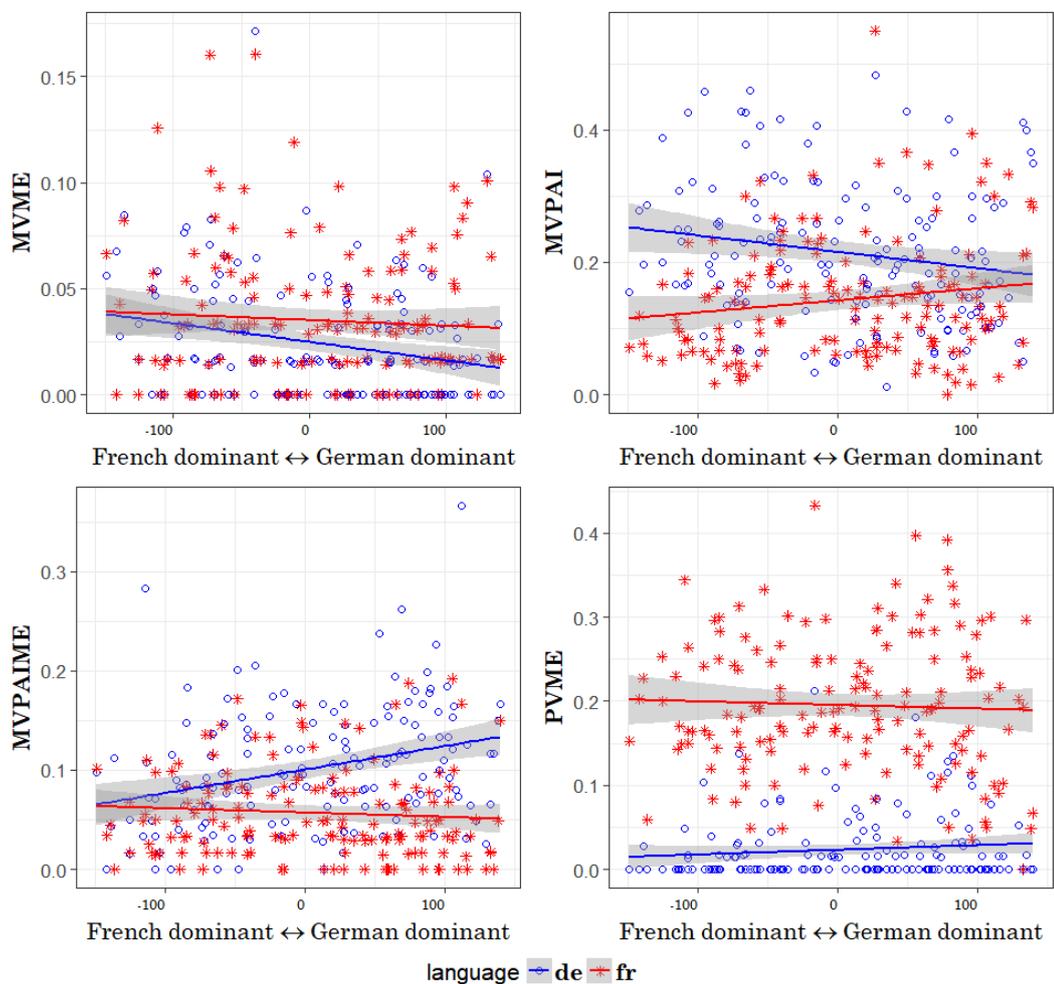


Figure 6.9: Proportions of constructions across the dominance scale

The combination of manner verbs and manner adverbials (MVME) shows a

⁷⁸ Note that the y-axes feature different values for these constructions, given that they show considerable differences in proportions. Potential dominance effects would be less visible if the y-axes were equal in scale (cf. Figure 5.3).

low proportion in both French and German. Such constructions usually show a specification of *MANNER* of motion expressed in the verb. Being semantically dense, these constructions were expected to depend on dominance configurations. The graph, however, points to the contrary. In German, a slightly lower proportion of these constructions appeared with increasing French dominance. However, the overall proportion being very low and the dependency on few outliers suggests that this outcome is not considerable and could be due to pure chance. MVPAI and MVPAlME seem to point in the reverse direction in German clauses; manner verbs combined with path adverbials seem to be a feature of French-dominant speakers, while these constructions combined with a manner adverbials are rather used by German-dominant speakers. In French, this tendency is slightly mirrored. Adding a manner adverbial to a manner verb - path adverbial combination and thus enhancing the semantic density is a feature of speakers being more dominant in the respective languages. The combination of path verbs and manner adverbials (PVME), a typical V-language pattern, shows that overall, this construction shows up more in French, conforming to the predictions. However, a dominance-dependency does not seem to exist.

The analysis of a dominance-dependency of different constructions has shown that in particular in combinations of manner verbs and path adverbials, there seems to be a dependency on dominance configurations depending on the additional manner adverbial. This is in line with the prediction that semantically denser constructions are rather used by speakers being dominant in the language. The subsequent section further explores construction-based dependencies by focusing on boundary-crossing contexts.

6.5 Dominance effects in boundary-crossing-constructions

Theoretically, constructions violating the BCC may be particularly prone to dominance effects given that the mastery of this constraint requires high French proficiency (see e.g. Larrañaga et al., 2012). As mentioned above, the outcome of the model 'bcc9' (see section D.6 and section 6.1) for the predictor of language dominance does not indicate a significant effect. However, in lines with the typological predictions and as is the case for the outcome variable of manner verbs alone, clauses combining a finite manner verb with the prediction of a boundary-crossing clause strongly depend on language. Hence, the GLMM show a significant interaction of dominance and language.

Figure 6.10 visualizes the distribution of BCC-violations across the dominance scale for both French and German clauses.

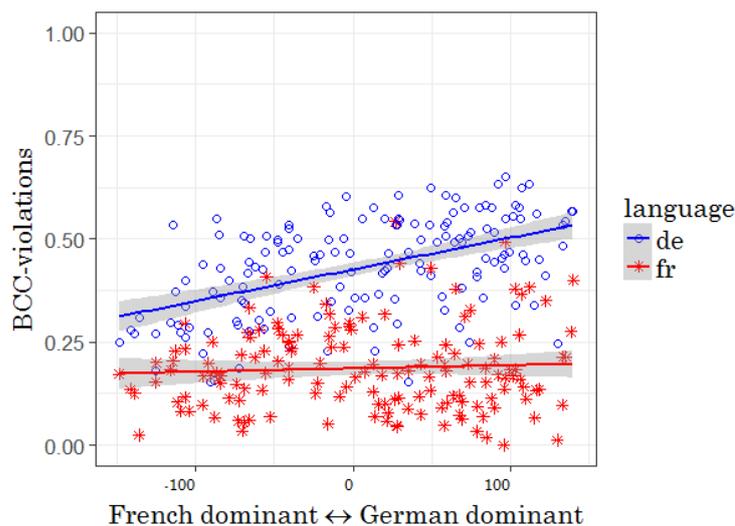


Figure 6.10: BCC-violations across the dominance scale

It turns out that there is a similar distribution for BCC-violations as for manner verbs; increased use of BCC-violations correlate with increasing German dominance. Furthermore, the figure shows a seemingly non-existent effect for French, as in the case of manner verbs. Thus, the use of manner verbs combined with BC-predications in a clause decreases with increasing French dominance in German, which confirms the hypothesis. However, the non-existence of an effect — for French BCC-violations counters the hypothesis.

Although French, and not German, shows grammatical constraints in boundary-crossing situations, German-dominant participants did not seem to violate this constraint more often than French-dominant speakers. As discussed previously (subsection 5.5.1), the French verb *sauter* pertains to the domain of movement implying force or instantaneousness and tends to be referred to as an exception to the BCC. Hypothesizing that boundary-crossing clauses containing the manner verb *sauter* do not violate any constraint in French, dominance effects may be less pronounced in these clauses. To put it another way, boundary-crossing clauses containing manner verbs other than *sauter* may show a greater language dominance effect in French. Therefore, the distribution of these BCC-violations across the dominance scale was plotted for a data set excluding *sauter*. The resulting data set then comprised 10,496 instead of 11,327 manner verbs in total. Figure 6.11 illustrates this distribution for both language modes.

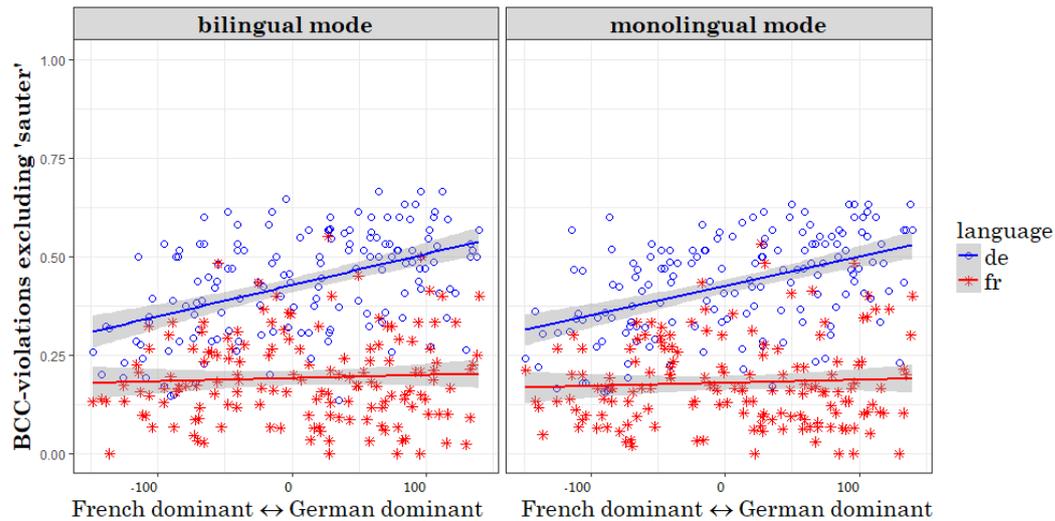


Figure 6.11: BCC-violations across the dominance scale excluding the verb ‘sauter’

The figure features two plots which do not seem to differ from Figure 6.10. The effect of dominance in terms of French BCC-violations does not change if the manner verb *sauter* is excluded from the data set. The manipulation of language mode, which will be explored in chapter 7, does not seem to contribute to any change, either.

As discussed earlier in section 5.6, there are many ways to avoid “violating” this grammatical constraint in both German and French. These alternative constructions have been excluded from the data comprising only the mean proportion of BCC-violations. To see whether these alternative constructions change with the function of language dominance, the mean proportion of these constructions is plotted across the dominance scale in Figure 6.12⁷⁹.

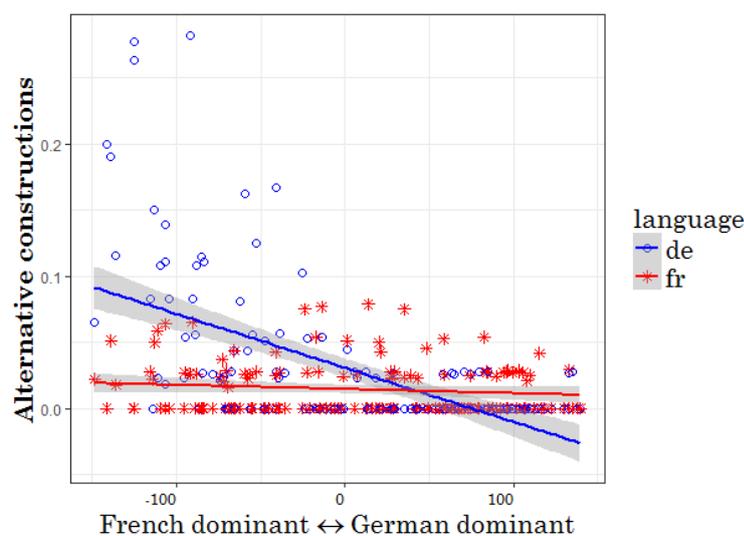


Figure 6.12: BCC-violations across dominance scores for French and German

⁷⁹ Note that the y-axis representing the mean proportions does not range from 0 – 1 as in most plots due to the general low number of occurrences of these constructions.

These alternative constructions do not show a high proportion in either language, i.e. there are only 171 such constructions in German and 92 in French. As can be drawn from the figure, there seems to be a decreasing use of these constructions in German with increasing German dominance. French constructions again do not seem to be affected by language dominance constellations.

6.6 Additional dominance calculations

As outlined in subsection 4.2.1, language dominance configurations were assessed with an online version of the BLP. Scoring was conducted as suggested by the developers with equal score distributions across language use, history, proficiency and attitudes. As the BLP features four different components, the individual scores of the four BLP components were compared. In addition, and primarily to check whether self-assessment ratings correlated with objective measures, language tests were conducted (subsection 4.2.2).

The scores for language proficiency in the BLP, which is the most explored component in terms of dominance across the literature (see subsection 2.3.1), were compared to the scores in the language tests.

Finally, only scores for the individual dominance component were extracted and the mean proportion of the outcome variables were plotted across this new scale. In order to stay within the scope of this work, only the plots for manner verbs are reported.

6.6.1 Correlation of measures

First, the scores for language history, use, proficiency and attitudes were compared against each other. Even though these components do not have to correlate, they usually show some correlation in the same direction.

In Table 6.4, the correlation coefficients of these variables, expressed in Pearson's r , are summarized.

Table 6.4: Correlation coefficients of BLP components

	history	use	proficiency	attitudes
history		0.73	0.63	0.56
use			0.60	0.49
proficiency				0.60

These coefficients indicate that the components of language history and language use seem to correlate most, while language attitudes and language use correlate the

least. All in all however, all components of the BLP are significantly correlated.

The LexTALE (LT) vocabulary test and the second test (T2), including aspects of grammar, vocabulary, phraseological competence, text coherence and comprehension (see subsection 4.2.2) correlated more in German (0.73) than in French (0.53). Both tests and the total of both tests, adding up the scores for both parts, were compared with the total BLP and the proficiency component in Table 6.5.

Table 6.5: Correlation coefficients of BLP and language tests

	Dominance		Proficiency	
	French	German	French	German
LT	0.72	0.66	0.65	0.66
T2	0.63	0.74	0.57	0.69
Total	0.77	0.76	0.69	0.73

Surprisingly, a score including all language dominance components seems to correlate slightly more with the language tests than with the component of proficiency alone. The strongest correlation was between both French and German dominance scores and the total language test scores. However, all scores seem to correlate to some degree.

6.6.2 Additional scoring

In addition to the classic BLP scores, separate scorings of the dominance components were conducted. Naturally, the range of these scores is much smaller and narrower than the BLP score summing up these components. The mean proportions of several variables are plotted across these different scores. None of the plots show a remarkable difference in the distribution of the mean proportion across the four additional scores. The tendencies in the plots mirror the distribution of the mean proportions across the classic BLP-score.

The plots featuring the mean proportion of manner verbs, which seem to lead to the greatest cross-linguistic influence and dominance effects, are shown in Figure 6.13.

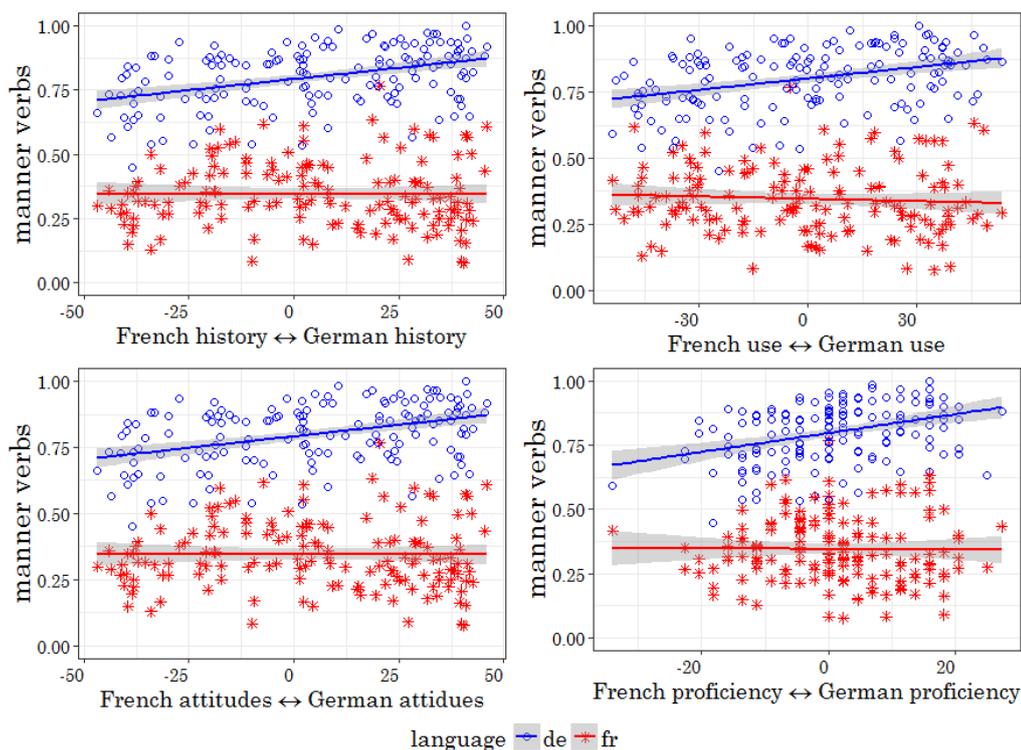


Figure 6.13: Proportions of manner verbs across different BLP-dominance components

These plots show, on the one hand, that ranges for the four component scores are different even though each component was weighted equally. The scores for language attitudes and language history range from -50 to 50. However, the scores for language use center around 0, and the score for proficiency does as well, showing only a few outliers below -20 and above +20. Participants seem to be more balanced in terms of proficiency than in attitudes or history. However, the plots illustrate that the additional scoring did not lead to a different outcome. Regardless of the scores, the effects of these dominance components lead to a similar distribution of the mean proportions of manner verbs: an increasing use of manner verbs in German with increasing German use, a more German-dominant language history, more positive attitudes toward German and higher German proficiency. For French, on the other hand, none of the scores led to any considerable increase or decrease in manner verb use.

If considering the component of language history alone, for instance, the graph suggests that there may be a difference between early and late bilinguals — categories into which the speakers may be grouped according to the questions in this module in the BLP (cf. subsection 4.2.1). This confirms the importance of considering the effect of language history, as suggested in previous studies (see discussion in Engemann, 2012, pp. 61-63). Likewise, there seems to be an effect of language attitudes, often-neglected in assessing language dominance. More positive attitudes

toward German seem to lead to constructions conforming more to the dominant patterns in German, but this does not seem to be the case for French.

In sum, the graphs confirm that these individual components all make-up language dominance and should be considered in combination when investigating language dominance effects.

6.6.3 Further language skills as co-variate?

Other languages than French and (Swiss-)German in the multilingual repertoire of the participants can be confounding variables in identifying CLI in motion event descriptions. Self-reported skills in languages other than French and (Swiss-)German are listed in section B.2 and are grouped across six levels. In the higher language levels from B2 to C2, English clearly dominates. While only 14 participants did not indicate any English skills, the remaining 140 participants indicated mostly high English skills. English could be a confounding variable in the possible convergence toward a satellite-framed pattern in, say, a higher proportion of manner verbs with higher English skills, for instance. The influence of English knowledge on lexicalization patterns is also discussed in Cadierno (2010).

Figure 6.14 illustrates in descriptive terms, the relationship between the participants' different English levels and the proportions of the main variables.

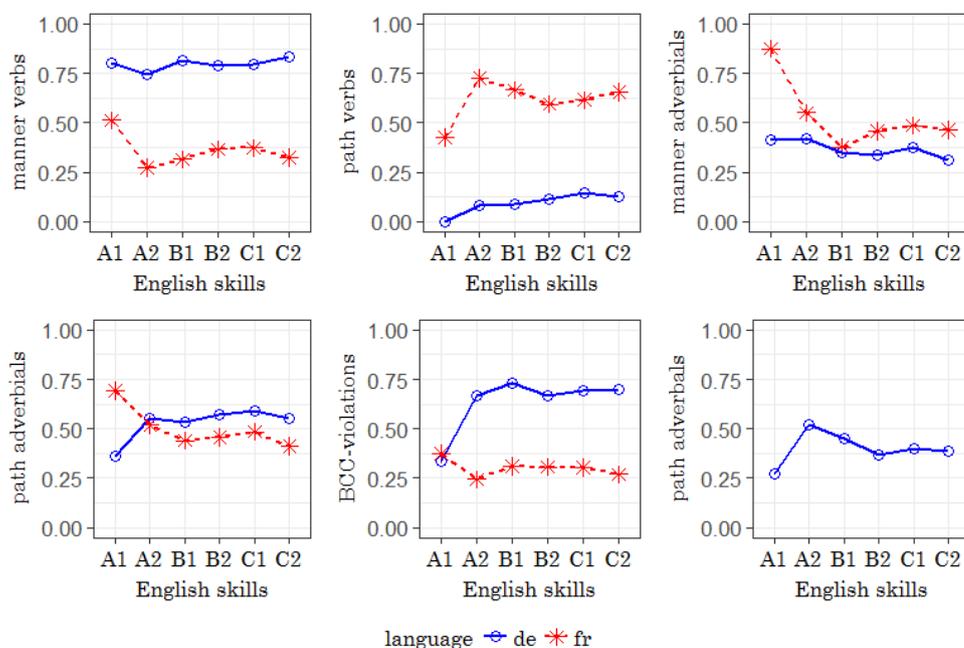


Figure 6.14: Proportions of dependent variables across English skills

These plots demonstrate that the cross-linguistic discrepancy between French and German in terms of manner verbs, path verbs, manner adverbials, path adverbials

and BCC-violations does not seem to differ considerably between the higher levels B2 – C2. At lower competence levels, however, all variables show some (rather unpredictable) variation. There seem to be fewer path adverbials in German and more in French with those who have lower English skills. With higher self-indicated English skills, however, speakers used more path adverbials in German than they did in French. There does not appear to be a difference between French and (Swiss-)German in terms of BCC-violations in speakers with lower English skills, but more BCC-violations occurred in German than in French for all other English levels, which is consistent with the analysis thus far.

The variation for lower English proficiency in terms of the proportions of these variables may be explained by the fact that few participants indicated having low English proficiency. Therefore, the proportions of the variables across the participants' competence levels must be plotted. To this end, the six self-assessed English skill levels were coded numerically ranging from -1.5 (A1) to +1.5 (C2) and were plotted across some of the dependent variables⁸⁰. As visualized in Figure 6.15, the modeled linear smooths are rather broad, which indicates considerable variation due to having only a few participants on lower levels.

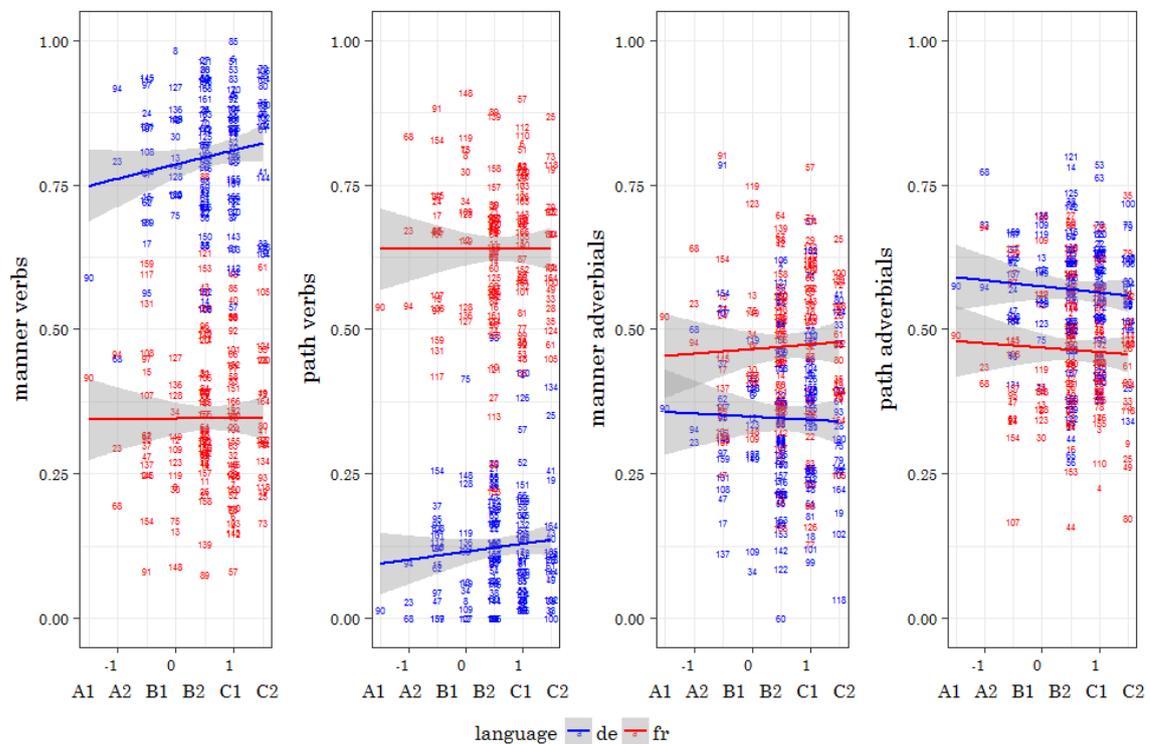


Figure 6.15: Proportions of dependent variables across English skill levels for each participant

⁸⁰ As the aim was not to plot the distribution of every single variable for each English level, but to get a general understanding of how English skills may influence cross-linguistic differences, only the distributions of some of the main variables are plotted for reasons of space.

The variable of English skills was also attempted to be controlled by including it as a co-variate in the models. Log-likelihood ratio tests however, showed that English as a fixed factor did not lead to a significant difference in comparison to the models not including English as a co-variate⁸¹. Other languages were not included as co-variates, given the lower proficiency levels as well as the lower use of these languages.

6.7 Discussion

As demonstrated at the beginning of this chapter, it is important to consider the effect of dominance alone and to model the interaction of dominance and language, because language dominance effects can appear differently in French and (Swiss-)German.

Across the variables discussed in this thesis, language dominance effect seems stronger for German than for French with regard to motion verbs. For French manner verbs, dominance did not yield the slightest difference in manner verb use. This result is in line with the findings of Berthele & Stocker, 2016 and Berthele, 2017. In terms of path verbs, the results resemble those of the preceding studies, with a weak, opposite effect of dominance in German path verbs. For French path verbs, the dominance effect was rather weak, if not negligible. The outcome for BCC-violations was similar to that of manner verbs: a dominance effect was present in German, but not in French. This result is rather surprising when considering that boundary-crossing situations are highly likely to be a locus of CLI due to French's grammatical constraints. Manner adverbials seem to depend on dominance configurations; there is an increasing use of these adverbials with increasing dominance for both languages. The same is true for path adverbials, but to a lesser extent than manner adverbials.

The role of CLI in manner adverbials and path adverbials is not clear, as dominance effects only point in one direction. With increasing dominance, there is an increased use of adverbials, regardless of the preferred pattern of German or French. However, the cross-linguistic discrepancy between these elements is less pronounced than those of manner or path verbs (see chapter 5). Thus, the potential CLI may be overshadowed by other effects of general proficiency — that correlate with language dominance — in the respective languages.

As discussed by Berthele and Stocker (2016, p. 22), the counterintuitive tendency of dominance effects for German path verbs can be explained by vocabulary size. Arguably, several German path verbs pertain to a higher register and occur less frequently than certain generic and manner verbs. With increasing dominance, vocabulary size usually increases. Hence, there may be two factors that are both

⁸¹ As with the plots for French-German dominance, displaying the outcomes for all the models featuring English as co-variate is beyond the scope of this work. These models are described in the R-script and not reported here.

governed by language dominance, that concur with each other and push tendencies toward different directions during language production. On the one hand, there are different encoding patterns in French and German, leading to the influence of one pattern over the other in the description of a motion event. On the other hand, there is the factor of vocabulary size and lexical sophistication. While particular verbs pertain to a higher register and are usually only mastered with a high level of language proficiency, they could convey a semantic meaning that would not account for the preferred pattern according to the motion typology of the respective language. A higher level of dominance thus does not compellingly lead to lower CLI. Hence, there are concurrent forces that blur language dominance effects on patterns of CLI in the process of language production.

While for most variables, the effect of dominance on French variables is rather weak or non-existent, there is a clear dominance effect in French manner adverbials. Again, as discussed in subsection 6.3.1, this effect may be — or may partly be ascribed to — a general effect of language skills or vocabulary knowledge rather than be the outcome of CLI. With increasing dominance, speakers may provide more nuanced descriptions of events and thus use optional manner adverbials to either describe MANNER or provide a more nuanced description of the MANNER information already provided. Moreover, the direction of CLI for manner adverbials is subject to discussion. The “empty slot attractor theory” (Berthele, 2017, p. 41) would predict a higher number of manner adverbials in French. Greater dominance in French would thus predict more of these variables than in German-dominant speakers, irrespective of the language one answers in. Referring back to Slobin (2004), on the other hand, MANNER elaboration is a characteristic of the S-language German not only in terms of verbal diversity but also frequency. Manner adverbials and adverbial constructions are thus not uncommon in the S-language German. According to this position, a higher number of manner adverbials coinciding with increased German dominance is also possible, again irrespective of the language of the answer. The fact that the proportion of manner adverbials show opposite trends in German and in French suggests that there are factors other than pure CLI leading to this outcome.

In terms of BCC-violations, the findings counter the hypothesis for French. Given that a boundary-crossing situation constitutes a locus for potential transfer, especially for German-dominant speakers, it was expected that the BCC-violation would appear in higher proportions in French for speakers being more dominant in French. The outcome, however, differ not considerably from the outcome of the variable of finite manner verbs overall. The use of alternative constructions does not explain the absence of language dominance effect in French answers, as the frequency of these constructions does not reach significance. An explanation for the absence of

dominance effect in French may be that the speakers in the present study showed very high proficiency in both languages. Although they “violated” the BCC and used these constructions in about 18.16% on average of their clauses for boundary-crossing items, they did so independently of their dominance configurations. How much one can talk about CLI from German in these 1,626 constructions is questionable.

Across the literature, it has been suggested that the French manner verb *sauter* is an exception to the BCC and would thus be an acceptable choice, even for native judges. However, excluding these “acceptable” constructions from the category of “BCC-violations” did not change the picture. This finding can be interpreted in two ways. On the one hand, bilinguals may master this particular constraint to the same degree, regardless of their dominance configurations. On the other hand, there may not be language dominance effects in the BCC, but rather in other variables such as manner verb use. Manner verb use in general and BCC-violation constructions naturally correlate. In other words, the difference would not be due to a grammatical constraint, but rather to the general preference for manner verbs in German.

Thus, the analysis shows that one must distinguish between the different dependent variables, as typological influence can be overshadowed by general language dominance effects. Furthermore, the dependence of dominance effects on CLI on the one hand and on general effects like vocabulary size on the other hand, confirms that a higher number of manner verbs does not imply a lower number of path verbs, and the picture gets even more complicated. The question of which verb is chosen in a motion event clause by speakers with advanced language skills and a high level of dominance does not only depend on the conceptualization pattern of the target language, but on the whole make-up of the clause, verbal sophistication and the context in which the verb is embedded. As discussed previously (see e.g. section 1.5 and subsection 5.3.4), the components of MANNER and PATH do not seem to belong to the same semantic domain, as there is no systematic correlation between these components.

The variables identified here — encoding one, both or none of the components of MANNER and PATH — show different language dominance effects in French and (Swiss-)German. The question of why the effect of dominance seems stronger for one language than for the other — generally stronger in German than in French answers — should be discussed briefly at this point. In Berthele (2017), French seems rather resistant to language dominance effects with regard to the variables investigated. Berthele (2017, p. 66) interprets this outcome as a result of the simplicity of the French system in comparison to the German system. In French, a small set of highly frequent path verbs, combined or not with directional prepositional phrases and optional manner adverbials can cover most expressive requirements. This relatively simple

and convenient pattern seems to be more entrenched than patterns in the German system and thus seems more resistant to restructuring processes. Accordingly, there might be system-related psycholinguistic factors, such as the ease of construction, contributing to French's relative immunity to language dominance effects. Besides simpler constructions, there is also the argument that the French system seems to impose more constraints (Berthele & Stocker, 2016, p. 24), which may also lead to reduced interference from German. The (Swiss-)German system may be more prone to dominance effects, because it is more flexible and less rigid than the French system. On the other hand, normativity, which applies more to French than to Swiss-German dialects, is discussed as a potential factor contributing to this outcome (Berthele, 2017, p. 66). In the present study, participants were free to use either a dialect or the standard language, so the effects of normativity cannot be excluded.

However, a striking finding in the data emerged, which may partly explain different language dominance effects in the languages. As outlined in this chapter, a different coding of a frequently occurring verb can change the outcomes in significant ways. The example of *gehen* showed in descriptive and inferential ways that an interaction of language and language dominance can be made insignificant by simply changing the semantic coding of the verb. Although *gehen* may be considered a light verb, it still conveys MANNER or deictic information according to the context, and a different coding does not seem legitimate. However, this exploration of the different coding system confirms the effect of light or heavy verbs. Thus, this finding suggests that dominance effects depend less on language-inherent factors, such as typological preferences, but may be more prone to effects of general vocabulary size and sophistication. In other words, the use of semantically lighter verbs seems to be the preferred pattern for speakers with lower dominance levels in the target language.⁸²

Language dominance and vocabulary size have been assessed through different measures in the present study, and both components largely correlate. The fact that language attitudes, language proficiency, language use and language history all seem to lead to different results when calculated separately confirms that they all make up language dominance and should be considered in combination rather than individually.

In sum, different findings emerged from the analysis of the language dominance effect. Most importantly, the outcome showed that while some lexicalization patterns are influenced by dominance configurations, others are not. Given that factors other than typological ones, irrespective of directionality, may show language dominance effects, the patterns in the present data seem to result from a mix of such factors.

⁸² Recall however, that the use of a semantically light verb does not imply a simplification in every case, as demonstrated in examples 50 and 51.

Chapter 7

The effect of language mode manipulation

This chapter discusses the results of language mode manipulation on motion event descriptions in French and German. Beginning with a short qualitative analysis of key examples, the chapter continues by statistically exploring language mode manipulation. As with language dominance, an interaction effect between language and mode is included in the analysis. In order to explore the influence of language mode on other variables and a selection of stimuli and participants, different additional analyses were conducted, some of which are reported in this chapter.

7.1 Language mode differences

The language mode manipulation in the present study is assumed to affect the speakers' encoding of different variables. In a monolingual French mode, participants are expected to conform more with the dominant French pattern and show a higher proportion of path verbs and manner adverbial and fewer manner verbs in boundary-crossing clauses than in the French bilingual mode, where German is supposed to be activated simultaneously. In a monolingual German mode, speakers are expected to show more manner verbs, fewer path verbs and more violations of the BCC in their lexicalization patterns. Taking a qualitative approach and analyzing the description of the item K3 of participant 56 (BLP-score: 34.88, i.e. on the German-dominant side, but close to "balanced"), the variables conform to the predictions of language mode manipulation.

(52) *il court en sortant d'un bus, du bus* (56-K3-bjfr-1)
'he runs by exiting of-a bus, of-the bus'

- (53) *le bonhomme sort du de l'autobus en courant* (56-K3-fr-II)
'the manikin exists of-the of the-bus by running'
- (54) *e person stiiigt rennend us em bus use* (56-K3-bide-III)
'a person alights running from a bus out-of'
- (55) *d person rennt laufend us em bus* (56-K3-de-IV)
'the person runs walking of a bus'

In the first session (example 52), the speaker was in the bilingual French mode. To describe the motion event, she encoded the MANNER information in the finite verb *court*, while PATH was encoded in the gérondif construction *en sortant de*. The manner verb may have been triggered because of the simultaneous activation of German, in which the previous video clip was described (filler item F21). Two weeks later, the participant was set in a monolingual French mode. Her description of item K3 (example 53) in this session conformed with the dominant French pattern, as MANNER is encoded in an adverbial construction (*en courant*) and the PATH information is mapped on the finite verb *sort*. The “deactivation” of German in comparison to the bilingual mode may thus lead to less influence from German in the monolingual French mode. In the bilingual German mode, two months after the second session, the participant described the item by employing the finite path verb *steigt* and mapping the MANNER information on the present participle *rennend* (example 54). This conforms to the V-language pattern, arguably because of an influence of French, which was supposed to activate simultaneously. In the final session, the construction with which the event was described (example 55) follows the German-dominant pattern of a manner verb and the mapping of the PATH component on a path preposition, complying with the expectations of the monolingual German mode.

However, such conformity with the predictions does not appear systematically. The variation in the data shows patterns that go in the reverse direction of these predictions, such as the following examples of descriptions of the same item as in the above examples 52 – 53, but from participant 151 (BLP-score: -40.96, i.e. French-dominant).

- (56) *une personne qui court dans le bus* (151-K3-fr-III)
'a person who runs in the bus'
- (57) *quelqu'un qui sort d'un bus en courant* (151-K3-bifr-IV)
'somebody who exists of-a bus by running'

In example 56, the participants used a manner verb, even though he was in a monolingual French mode. In the bilingual French mode (example 57), on the other hand, he mapped the MANNER information on the gérondif construction *en courant*

and encoded PATH in the finite verb *sort*, showing the typical French pattern despite the simultaneous “activation” of German.

This variation within the data calls for statistical exploration of mode effects on the dependent variables to reveal potential systematic differences between the monolingual and bilingual language modes. This will be the focus of the following sections.

7.2 Mode effects on dependent variables

To provide an overview of the effects of language mode on the main dependent variables, Figure 7.1 illustrates the mean proportion of these variables across the four different mode conditions.

Referring back to Figure 5.2, there are hardly any differences between the two figures. In other words, cross-linguistic differences across the variables are eminent, while differences between the monolingual and bilingual language modes do not seem to persist, as the symbols representing the different modes either overlap or completely cover each other. Comparing French and German, a greater difference between the French language modes seems to occur, which does not appear noteworthy in the first place.

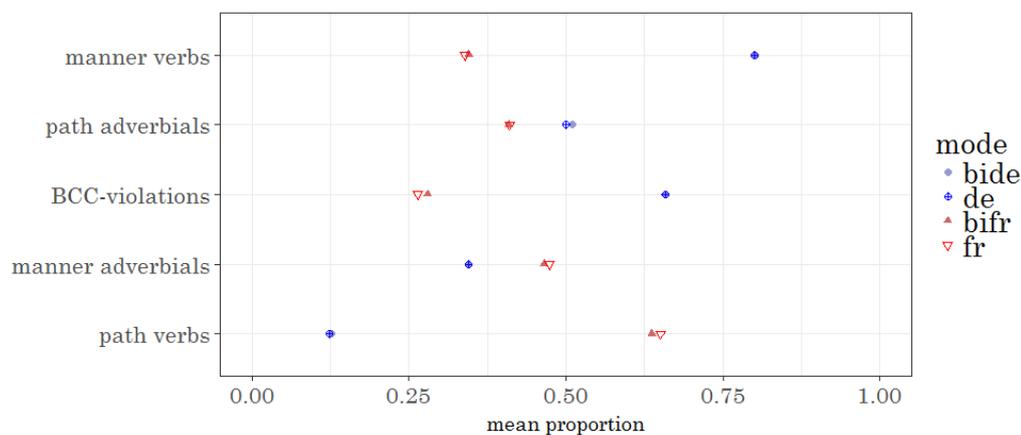


Figure 7.1: Proportions of dependent variables across mode condition

To recall, the fitted GLMMs feature language mode as fixed factor. Table 7.1 summarizes the outcomes of the mode as a factor for the outcome variables of the main models.

Table 7.1: Mode as a fixed factor

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	-0.04 \pm 0.04	0.19	-0.04 \pm 0.04	mv9, section D.1
path verbs	0.04 \pm 0.05	0.31	0.04 \pm 0.05	pv9, section D.2
manner adverbials	0.03 \pm 0.05	0.51	0.03 \pm 0.05	me9, section D.3
path adverbials	-0.04 \pm 0.04	0.44	-0.04 \pm 0.04	pai9, section D.4
path adverbals	-0.06 \pm 0.06	0.32	-0.06 \pm 0.06	pa7, section D.5
BCC-violations	-0.09 \pm 0.05	0.09	-0.09 \pm 0.05	bcc9, section D.6

As can be drawn from this table, the estimate for language mode is considerably low for all outcome variables. Furthermore, none of the *p*-values indicate a significant effect of this factor. The model with the *p*-value showing at least a certain trend towards significance, i.e. is closest to the cut-off of 0.05, is that featuring BCC-violations as an outcome variable.

The effect sizes are the same as the estimates⁸³ and are low in all outcome variables. Ultimately, the effect of language mode seems to be strongest for BCC-violations with an effect size of -0.09 ± 0.05 log-odds.

Figure 7.1 suggests that language mode might have had a slightly stronger effect on French variables than on German variables, implying a marginal interaction between language mode and language of response. To calculate the effect of language mode on French and German separately, the analogous calculation for language dominance was conducted (cf. section 6.1). Hence, for German manner verbs, the equation was defined as:

$$-0.04 \times |0.5 - (-0.5)| + (-0.01) \times (-0.5) \times |0.5 - (-0.5)| \approx -0.035$$

This outcome corresponds to an overestimation of about 0.045 for the effect on German. For French, on the other hand, the calculation was:

$$-0.04 \times |0.5 - (-0.5)| + (-0.01) \times (0.5) \times |0.5 - (-0.5)| \approx -0.045$$

For French, the overestimation of the effect would be about 0.055. Looking at path verbs, the effect of language mode is about 0.015 for German and about 0.065 for French. The effect of mode is about 0.005 for German manner adverbials and about 0.055 for French. Concerning path adverbials, the effect of mode is 0.015 for German and -0.095 for French. For BCC-violations, mode effects of about -0.05 for German and about -0.13 for French were detected. Thus, compared to the effect of language

⁸³ The effect sizes are calculated as follows for language mode effects using the example of model 'mv9': $-0.04 \times |0.5 - (-0.5)|$. As the difference between the dichotomous mode variables corresponds to 1, estimate and effect sizes are equal for this fixed effect.

dominance, the over- or underestimation of the mode effects that depend on language of response, were fairly modest. Table 7.2 summarizes the outcomes for language and language mode interaction in the models⁸⁴.

Table 7.2: Interaction between mode and language

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	-0.01 \pm 0.08	0.95	0.01 \pm -0.08	mv9, section D.1
path verbs	0.05 \pm 0.09	0.27	-0.05 \pm -0.09	pv9, section D.2
manner adverbials	0.05 \pm 0.07	0.54	-0.05 \pm -0.07	me9, section D.3
path adverbials	0.11 \pm 0.08	0.14	-0.11 \pm -0.08	pai9, section D.4
BCC-violations	-0.08 \pm 0.09	0.40	0.08 \pm -0.09	bcc9, section D.6

As can be deduced from this table, the effect sizes of the interaction effects on the outcome variables are all rather small.

Language mode and language interaction effects dependent on language dominance are explored in depth in chapter 8.

7.3 Task-related mode effects

While certain task-related factors, such as experimenter-related differences in the descriptions, cannot be modeled due to the fact that each experimenter induced a different mode, other factors, such as item orders and differences between sessions, can be examined.

As outlined in subsection 4.2.3, stimuli were arranged across four different orders and the order of mode conditions was also arranged in four different orders, resulting in a total of 16 conditions.

7.3.1 Difference of item orders

To explore whether language mode showed an effect across the order ranks — whether, for instance, there was a difference between the monolingual and bilingual modes when the items showed up toward the beginning or the end of the task — the mean proportion of manner verbs was plotted across these order ranks for all stimuli. Here, it is noteworthy to recall that each stimulus was arranged across four different ranks. Stimulus K29, for instance, was shown once as the sixth video clip, once as the 11th, once as the 50th and once as the 55th (see below). The high variability of

⁸⁴ The effect sizes of the interaction effects were calculated as follows: $(-0.01) \times |0.5 - (-0.5)| \times |(-0.5) - 0.5| \approx -0.01$. The standard error (SE) for the effect size of the interaction between language and language mode was calculated as follows for manner verbs: $(-0.08) \times |0.5 - (-0.5)| \times |(-0.5) - 0.5| \approx -0.08$.

mean proportions of manner verbs in Figure 7.2 can therefore be explained by the differences between the stimuli surveyed in section 5.5.

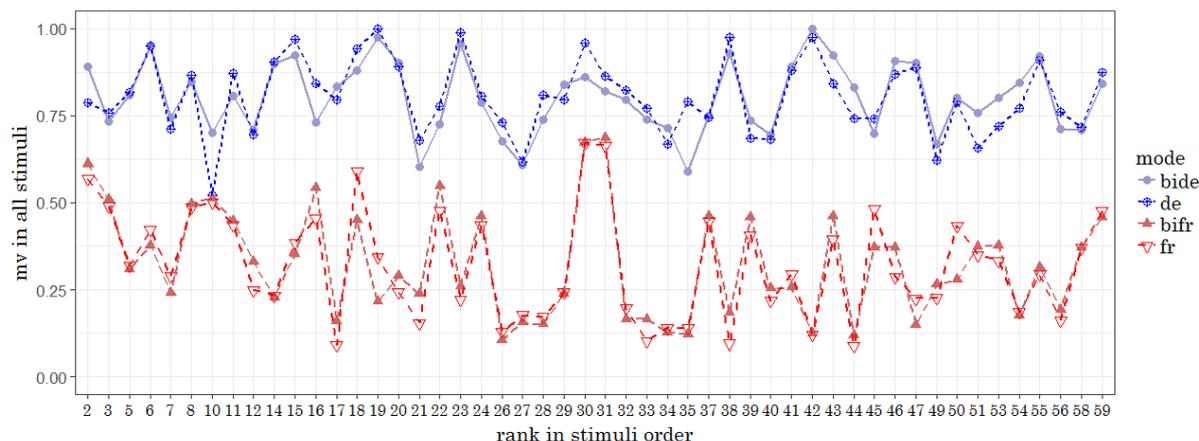


Figure 7.2: Proportions of manner verbs across all order ranks for all stimuli

While the figure demonstrates again that the question whether a manner verb was chosen or not depends considerably on the item, there does not seem to be a considerable difference between language modes as the lines and the symbols representing the modes mostly coincide.

As Figure 7.2 does not differ among stimuli, and groups four stimuli within an order rank position, an analysis of the outcomes of individual stimuli across their order ranks was conducted. Thus, the mean proportion of manner verbs was plotted independently across the order ranks of stimuli K29, K6, K1 and K16 in Figure 7.3. These stimuli were chosen because they yield rather different proportions of manner verbs.

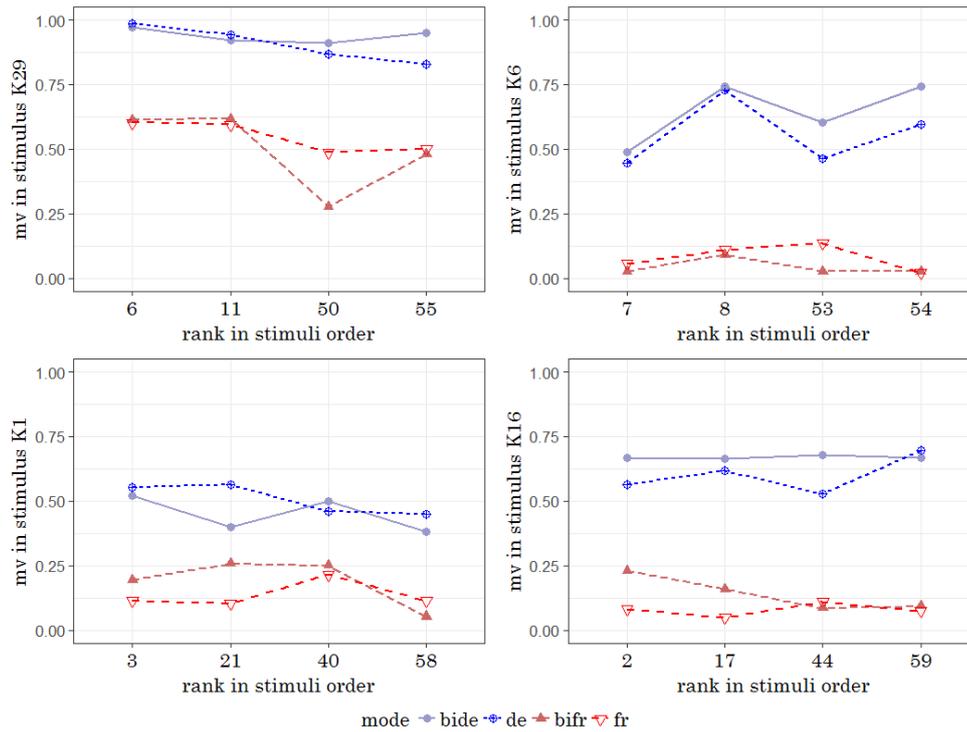


Figure 7.3: Proportions of manner verbs across order ranks

As these figures suggest, differences between the language modes arise depending on the order rank. Although there was hardly a difference between the monolingual and bilingual modes when the stimuli was in position 6 or 11 in K29, there seems to be a difference in manner verbs when the stimuli was in position 50 or 55. Stimulus K6 shows a similar trend; the modes distinguish themselves when the stimuli appeared toward the end of the task. In contrast, the difference between the monolingual and bilingual modes seems to decrease when stimulus K16 emerged at the end of the task. Stimulus K1 depicts the greatest difference between the modes when it appeared as the 21st clip. Nonetheless, such differences do not warrant further attention, as the figures only represent a few data points; each rank of each stimulus had only 154 data points, which naturally showed variation.

7.3.2 Difference between sessions

During the consideration of possible mode effects, another question arises: Did language mode cause an effect in the first and second sessions, and did this effect diminish over the course of the four sessions?

To address this question, the mean proportion of manner verbs, path verbs, manner adverbials and path adverbials are plotted across the four sessions for each language mode in Figure 7.4.

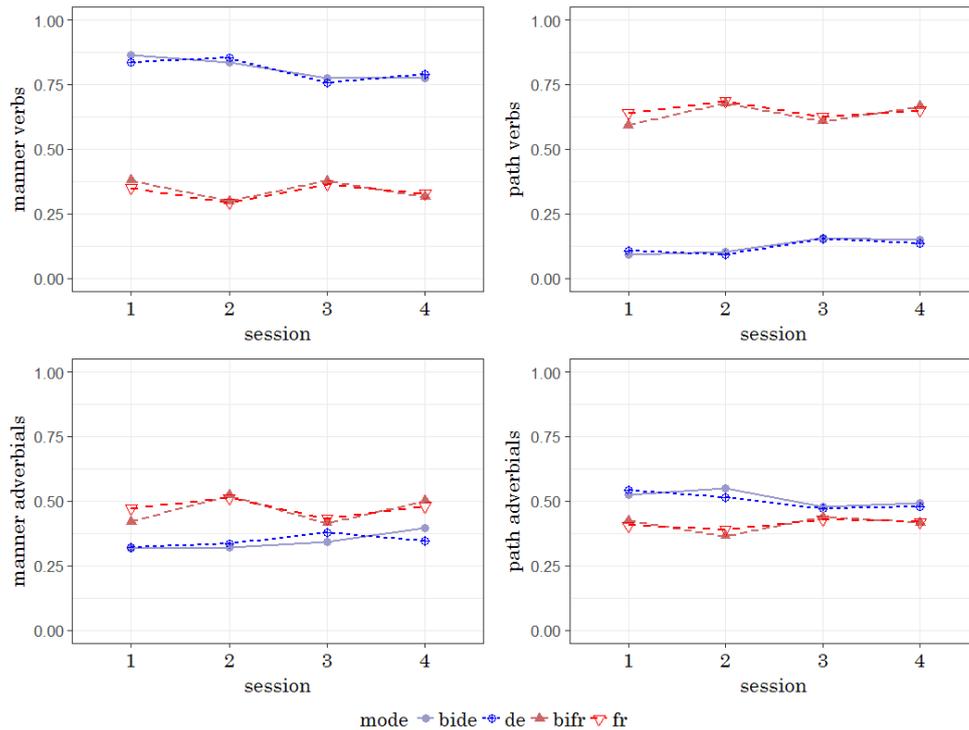


Figure 7.4: Proportions across sessions

As can be drawn from these figures, a difference between mode conditions across the sessions is seemingly lacking, since the lines and symbols representing the different modes are mostly superimposed on each others across the sessions. Even though there are slight general differences between the sessions, the difference between the modes is not remarkable in any of the graphs.

Whether the outcome variable of manner verbs changed depending on the session was investigated inferentially by including the variable of 'session' as co-variate in the GLMM. Compared to language mode, the session seemed to yield an effect. A log-likelihood ratio test comparing the model with session as a fixed factor to model 'mv9' (section D.1) yielded a significant difference of $p=7.11e-09$ ***. This suggests that a difference in terms of manner verbs depended more on whether the participant described the stimuli on the first, second, third or fourth time than on the language mode condition the participant was in. Drawing from Figure 7.4, however, the difference between the sessions in terms of the proportion of outcome variables does not seem predictable, as the mean proportions do not show a tendency in one direction such as a linear lower use of manner verbs from session I to IV.

7.4 Code-switching practice

Whether participants regularly code-switched was included as an additional question in the BLP (subsection 4.2.1). The inclusion was motivated by the theoretical proposition that bilingual speakers, depending on their daily interactions, differed in whether they found themselves more often toward the monolingual or the bilingual end of the language mode continuum. As a result, a practice in code-switching might influence their susceptibility to language mode manipulation. Although this question does not elicit exact accounts of code-switching practices and because a subjective assessment on a scale from 0 (never) to 100 (always) must be taken with precaution, it may offer some indication of whether participants code-switch in their daily interactions.

If an effect of language mode depended on the code-switching practices of a participant, the difference between the monolingual and bilingual modes would be more striking for participants who rarely code-switch in their daily interactions. Frequent code-switchers would be less affected by language mode effect.

Figure 7.5 exhibits the mean proportion of manner verbs and manner adverbials for the language modes across the code-switching scale.

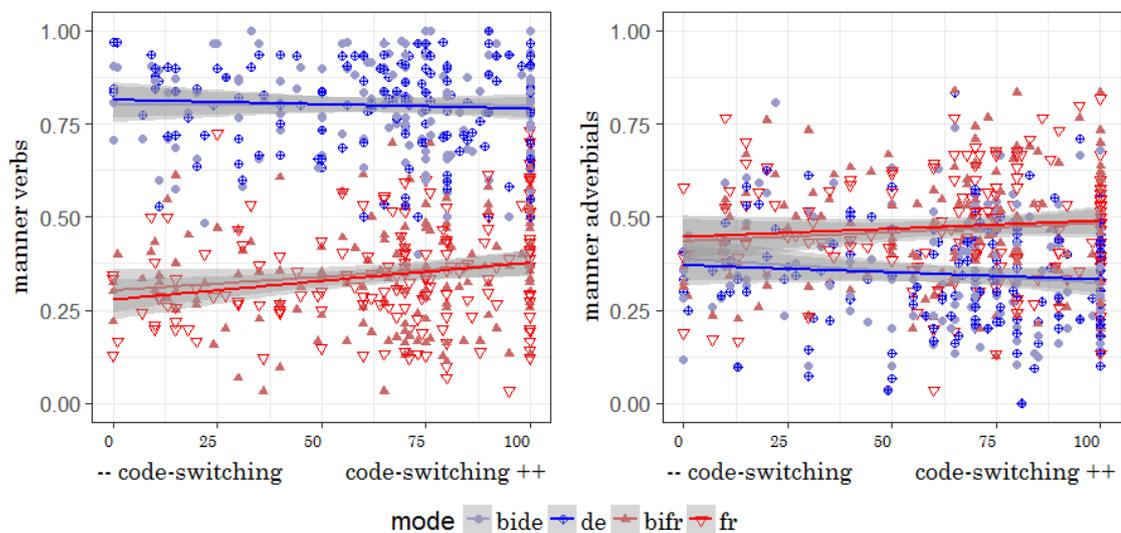


Figure 7.5: Manner verbs and adverbials across code-switching practice

As these plots demonstrate, a slight difference in language mode occurs on the left side of the left graph featuring mean proportions of manner verbs, i.e. on the “few code-switcher”’s side. This contrast diminishes as participants’ were more inclined to code-switch on a daily basis. Nevertheless, the difference does not seem significant because the confidence intervals of the modes overlap, and more participants indicated frequent code-switching. In terms of manner adverbials, the trend is the same.

7.5 Model-robustness check

A series of additional models were calculated⁸⁵ including the ten stimuli showing the largest discrepancies across the language modes. Further models featuring the ten participants most susceptible to language mode effects were fitted. These additional calculations were conducted to check the robustness of the models for language mode effects.

7.5.1 Stimuli sub-group

The ten critical stimuli indicating the largest discrepancy between the French monolingual mode and French bilingual mode in manner verb proportions were selected. Moreover, a data set including only French answers to the stimuli in both modes was created. A model with the new data set featuring language mode and dominance as well as the interaction between these factors was fitted. Likewise, a model resulting from the same selection procedure was calculated for German answers to the ten stimuli showing the largest mode discrepancies. The same procedure was conducted for the proportion of path verbs, resulting in four additional models.

For manner verbs, none of the models displayed a significant mode effect. For path verbs, the model including only the French data showed a significant p -value (≈ 0.02). The ten stimuli in this sub-group did not show a striking difference to other stimuli. They show four 'out', two 'in', two 'up', one 'down' and one 'across' situation. As can be drawn from Figure 7.6, the mean proportion of path verbs was higher for monolingual French than for bilingual French in eight of the ten stimuli. Therefore, these stimuli conform to the expected pattern; a lower proportion of path verbs in the bilingual mode when German was activated simultaneously with French. However, seeking a mode effect in only those stimuli and only in French does not counter language mode's overall insignificant influence on the outcome variables.

⁸⁵ These additional models are not reported in this work, but can be consulted in the R-script.

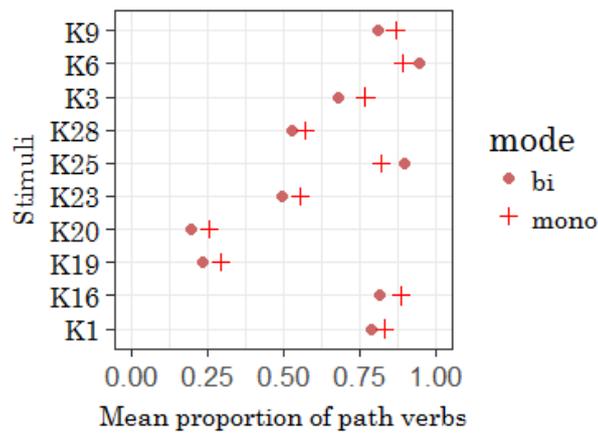


Figure 7.6: Path verbs for 10 stimuli

7.5.2 Participant sub-group

The ten participants who were most susceptible to language mode manipulation in terms of manner verb use in French and the ten participants most susceptible to language mode manipulation in German were extracted from the data set. Next, new data sets with only these participants were created. The same procedure was conducted with regard to path verbs, resulting in another block of four models.

The only combination of the models leading to a significant mode effect was in terms of path verbs in German. In other words, the ten participants whose responses indicated the highest discrepancies between language modes in terms of path verbs only showed a significant difference (p -value ≈ 0.01) in German. The ten participants did not have different dominance configurations from other participants. On the contrary, they were distributed equally across the scale, with five French-dominant participants with BLP scores ranging from -95.72 to -14.9 and five German-dominant participants with scores ranging from 5.72 to 95.9. In Figure 7.7, the difference between the monolingual and bilingual German modes is plotted for these ten participants.

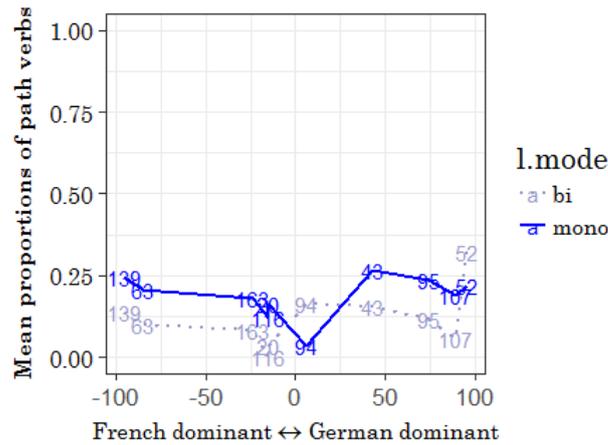


Figure 7.7: Path verbs of 10 participants

The graph reveals that eight of the ten participants uttered a higher proportion of path verbs in the monolingual mode, which would be counterintuitive. The simultaneous activation of French in the bilingual mode seemingly did not trigger an increased use of path verbs in the condition. On the contrary, the participants displaying the highest difference between modes apparently used more path verbs in the monolingual German mode. The figure also shows a distribution of the participants across the dominance scale, which, however, does not show a remarkable trend in any direction.

Given that these models only include data from ten participants, a significant loss of statistical power must be taken into account. As seen in the preceding subsection, the fishing for a significant mode effect for a group of participants did not change the fact that participants generally did not seem affected by language mode manipulation.

7.6 Discussion

Regardless of how the data are analyzed, language mode did not play a significant role in the present experiment, indicating that the hypotheses concerning language mode outlined in section 4.1 do not hold true for the present data. However, this raises two points of discussion.

First, the bilingual language mode induced by using both languages equally and constantly switching between them may sound unusual or unnatural to some speakers. However, changing the languages in natural conversation may not be an uncommon task for most of the participants living in the bilingual town of Fribourg. Most participants also indicated using both languages on a daily basis, which renders the task of pushing them on the monolingual side of the language mode continuum

rather difficult, if not impossible. Language mode manipulation may thus not have shown an effect due to participant practice effects or an experimental failure in establishing a true monolingual mode. Linked to this possibility is a methodological problem. Participants in the present study were aware that the experiment was about bilingualism, given that only bilingual speakers were asked to apply for a participation in the study. Knowing that the interest of the project was not solely on the target language in the monolingual mode may have inhibited participants of “switching-off” the non-target language to a certain degree (cf. Grosjean, 2008, p. 45).

Second, the results of Berthele and Stocker (2016) — adopting a very similar research design — were not replicated. To recall, mode effects were obtained in a higher probability of using manner verbs in the monolingual German mode and a higher probability of using path verbs in a bilingual German mode, in which French was supposedly activated simultaneously. The questions that spring to mind in this context are: Why did the preceding study yield an effect of language mode manipulation, but the present study did not? Were there subtle methodological dissimilarities between these studies, and if so, could they explain why language mode manipulation did not show an effect in the present study?

A difference between the present study and the preceding experiment, which may explain the absence of a mode effect centers on the question of formality. In Berthele and Stocker (2016), the 44 participants were recruited and examined by students at the University of Fribourg and were mostly acquainted with the data collectors. Thus, the recordings were usually conducted in a rather informal setting. In contrast, during the realization of the present project, only a few of the 154 participants knew the examiners. All the sessions were conducted at the university, the participants applied to participate in the experiment via the BLP and they were financially compensated. Hence, the degree of formality was considerably higher in the present study than it was in the previous one. Whether this difference in formality explains the outcome is mere speculation. However, besides the difference in formality, the language mode manipulations did not differ in any notable way. On the contrary, language mode manipulation was optimized by conforming even more to Grosjean’s proposition of having different experimenters, larger time intervals between the sessions and inducing the modes with additional tasks such as reading a text before starting the main experiment (cf. subsection 2.4.3).

In contrast to the control for language mode, language mode manipulation has presently not been the subject of many empirical investigations. As mentioned above, the first study that sought to empirically test the language mode hypothesis in the domain of bilingual motion event encoding and specifically to focus on patterns of semantic convergence, was the preceding study to the project of Berthele & Stocker,

2016. Hence, with only two empirical examinations in this field, the inconclusive outcomes call for further research with a control for formality (see section 9.4 for elaboration on this topic).

Furthermore, the present findings also give rise to questions revolving around the ongoing debate on the degrees of independence vs. interdependence in bilingual language processing, on selective or non-selective bilingual lexical access and on processes of lexical activation and deactivation. Referring to the psycholinguistic models proposed on language activation — the activation of lemmas and task schemas respectively — outlined in subsection 2.4.3.1, the null effect of the language mode manipulation speaks in favor of non-selective bilingual lexical access. In other words, the French and (Swiss-)German lexicalization patterns could have been co-activated to the same degree, irrespective of whether only one or two languages were used in the task. In the monolingual French mode, then, the mapping of the MANNER information on the finite verb would not be more suppressed than the mapping in a bilingual French mode. However, it can be further questioned whether and how processes of lexical access, which dominate research questions in this field, can/have to be distinguished from semantic and structural access. These questions are then associated with questions of how semantic, structural and lexical aspects of motion event components are represented in bilinguals' linguistic systems.

The findings here support the growing empirical evidence in psycholinguistic research that the non-target language may affect the target language even when not used (e.g. Dijkstra & Van Hell, 2003; Marian, Spivey, & Hirsch, 2003; Kroll, Bobb, & Wodniecka, 2006; Kroll, Bobb, Misra, & Guo, 2008; Costa, 2008). Although Grosjean repeatedly stresses that a bilingual's languages are never fully inactivated, even in a maximally monolingual mode (e.g. Grosjean, 2001, 2008), the language mode hypothesis presupposes a "partial deactivation" of one language and thus the existence of a monolingual language mode or a different state of activation from a bilingual mode with a deliberate use of both languages. If however, a monolingual language mode does not exist and languages are always activated in parallel — to the same degrees and in terms of the same aspects — research on CLI phenomena faces a crucial problem. Namely, the types of CLI phenomena and the mechanisms underlying CLI patterns, such as interdependent vs. independent processing, are even harder to identify. Disentangling which phenomena are due to bilingual representation and processing and which patterns are due to the bilingual mode the participants are in, becomes even more challenging.

While effects of language mode manipulation in the present study were investigated for different variables, and potential influences of item order and session order have been explored in this chapter, an important factor which may change

the picture has been left unexplored thus far. That is, the language dominance configurations of the participants may interfere with language mode manipulation — and potentially hide mode effects that are not visible when not controlling for dominance. In other words, there may be different language mode effects across participants and their dominance configurations. These potential language mode and language dominance interactions are examined in the next chapter.

Chapter 8

Interaction between language dominance and language mode

The previous chapters outlined the importance of modeling interactions between language and dominance (chapter 6) and between language and mode (chapter 7). In section 2.5, the theoretical background of the probability of an interaction between mode and dominance were discussed. The basic assumption is that the further away a bilingual speaker is from being “balanced” in both languages — i.e. dominant in the target-language — the more he or she will be affected by language mode manipulation.

This chapter further models and discusses a three-way interaction. The rationale for doing so is the mutual dependence of language dominance, language of response and language mode.

8.1 Mode differences as a function of language dominance

While the preceding chapter has shown that language mode manipulation did not influence the variables, the possibility of a dominance-mode interaction cannot be discarded. In other words, there may be an interaction effect even if there is no effect of language mode alone. In the present data, this would be the case if, for instance, a bilingual French mode triggered more manner verbs in French answers than a monolingual mode, but only for German-dominant speakers. For French-dominant speakers, the contrary would be the case. They would use less manner verbs in a bilingual mode than in a monolingual mode, disregarding the interpretation of this potential outcome for the moment. Concerning the proportion of manner verbs in total, there would be no significant difference across the modes. If we follow

the theoretical proposition outlined in section 2.5, however, balanced speakers and target-language-dominant speakers would differ from speakers dominant in the non-target language. Thus, the following scenario should explain the absence of a language mode effect and introduce the possibility of a dominance-mode interaction. Speakers less balanced in both languages and more dominant in the non-target language may show a language mode difference. This difference, however, becomes either insignificant due to the minimal language mode effect in more balanced speakers and speakers dominant in the target-language or due to the possibility that those speakers may show a counterintuitive tendency across language modes. A counterintuitive tendency would, for instance, be a higher proportion of path verbs in the monolingual German mode than in the bilingual German mode. This counterintuitive tendency in path verb use is not unlikely, given the outcomes in subsection 6.2.1. For the other variables, however, such an outcome would require further explanation. Notwithstanding the interpretation of such outcomes for the moment, the interaction effects are examined for all dependent variables.

Sticking to this latter proposition, it is supposed that the more balanced or dominant in the target-language a participant is, the less he or she will be affected by language mode manipulation. When French is the target language, speakers with a dominance score close to and below zero would consequently show smaller language mode discrepancies than German-dominant speakers. If the target-language is German, speakers with a BLP score close to and above zero would show smaller language mode discrepancies than speakers with scores below zero. Figure 8.1 features two graphs where these suggestions are plotted, with the proportions of German manner verbs on the left and French on the right.

The figures are built as follows: the mean proportion of manner verbs for the German bilingual mode was subtracted from the mean proportion of manner verbs for the German monolingual mode. The dots representing this value for each participant are distributed across the dominance scale (on the x-axis). Dots below zero (on the y-axis) indicate that the mean proportion of manner verbs was higher in the bilingual mode than in the monolingual mode and dots above zero indicate that more manner verbs were used in the monolingual mode. The lighter (yellow) the dots, the closer they are to zero and thus the smaller the difference between the monolingual and bilingual modes. The figure on the right follows the same logic: dots above zero on the y-axis indicate more manner verbs were used in the monolingual French mode, and dots below zero indicate a higher use of manner verbs in the bilingual French mode.

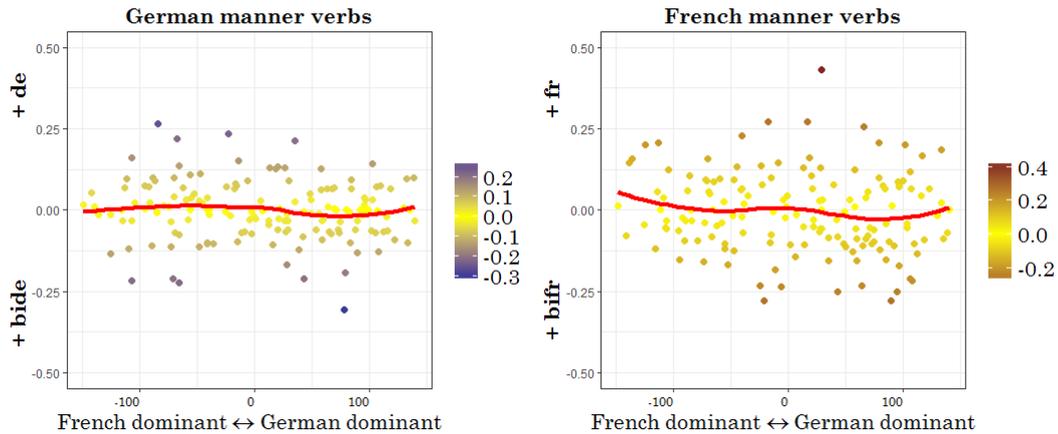


Figure 8.1: Mode differences across the dominance scale for manner verbs

If there were a clear interaction between mode and dominance, the line on the x-axis representing the means would behave differently toward the middle of the graph, i.e. at the “balanced” area of the dominance continuum, and there would be a significant difference between the left and right sides. The prediction for German would be that the dots would be grouped closer to zero and show fewer discrepancies between the modes the further to the right. For French manner verbs, the dots would be grouped the further to the left. However, the graphs do not show this.

As seen in the preceding chapter, language mode manipulation does not seem to lead to a difference in the proportion of manner verbs used, which is supported in these figures; the dots seem to be distributed equally on both sides. Furthermore, there seems to be as much mode difference when the proportion of manner verbs is higher (i.e. toward the German-dominant side of the continuum) in the monolingual mode as in the bilingual mode.

As can be drawn from the figures, the graphs for French and German manner verbs seem to be fairly identical — with the exception of a slight rise in the curve toward the dominant ends and the “balanced” middle for French manner verbs. If there were a clear language mode interaction with language dominance and a difference between the left and the right graphs, we could suppose a three-way interaction. The possibility of a three-way interaction is integrated into the mixed models, and the outcomes are discussed below.

For path verbs, the same procedure as for manner verbs was conducted, and the difference between the modes was calculated for each participant and plotted in Figure 8.2.

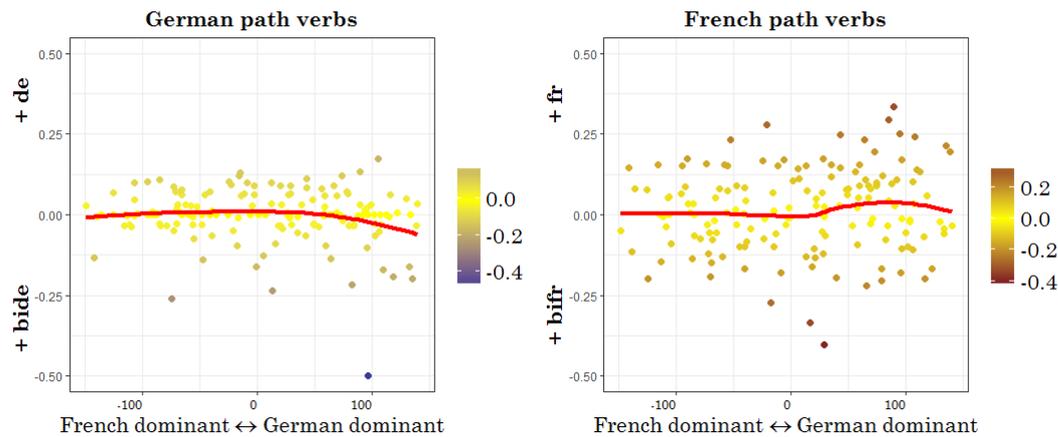


Figure 8.2: Mode differences across the dominance scale for path verbs

The results seem to differ only slightly in terms of a mode-dominance interaction. With increasing German dominance, there seems to be a slight trend toward more frequent path verbs in the bilingual mode. This mode difference seems stronger than that of French-dominant or balanced speakers. This tendency runs counter to the predictions, which says that speakers dominant in the target language show less difference between language modes. However, the tendency is considerably weak and seems to result from an outlier (blue dot at the bottom right of the left graph, i.e. a mode difference of about 0.5 (=50%) in terms of proportion of path verbs and a BLP-score of about 100). The same is true for French path verbs. A slight change in the data pattern toward the German-dominant end of the BLP, this time conforming to the prediction of a language mode difference for German-dominant speakers in French, seems to be due to a couple of outliers. All in all, the discrepancy between the modes appears to be more considerable for French path verbs than for German path verbs, as the dots representing the language mode difference in path verbs are more spread and are darker.

For German path adverbials (left graph in Figure 8.3), the distribution of the mode differences across the dominance scale seems to point to a slight mode-dominance interaction in line with the expectations. A slight rise of the curve toward the 0-difference level indicate less difference between modes with an increasing balance between the languages. However, the curve is unspectacular and seems greatly influenced by outliers.

There seems to be a similar rise in the curve toward the balanced area of the dominance continuum for French path adverbials and a fall toward the German-dominant side. However, it must be recognized that the curve in this graph is again unspectacular and could be regarded as nearly horizontal.

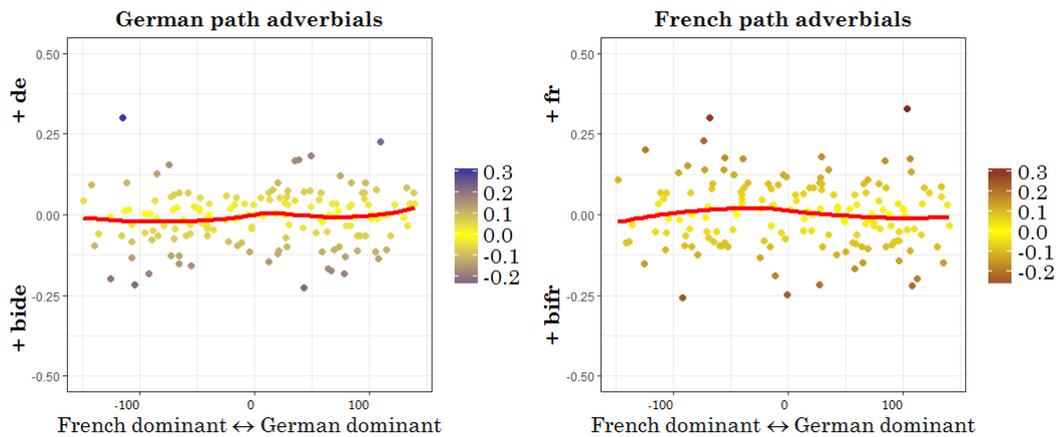


Figure 8.3: Mode differences across the dominance scale for path adverbials

For German manner adverbials (left graph in Figure 8.4), there seems to be a greater discrepancy between the modes, with the bilingual mode leading to more manner adverbials overall for French-dominant speakers. This pattern would conform to the predictions. Again, however, this trend is only due to very few participants. In general, the difference between the monolingual and bilingual mode seems to be larger in French than in German. As discussed in section 7.2, the effect size of the language mode and language interaction seems stronger for manner adverbials than for manner verbs, which is mirrored in these graphs.

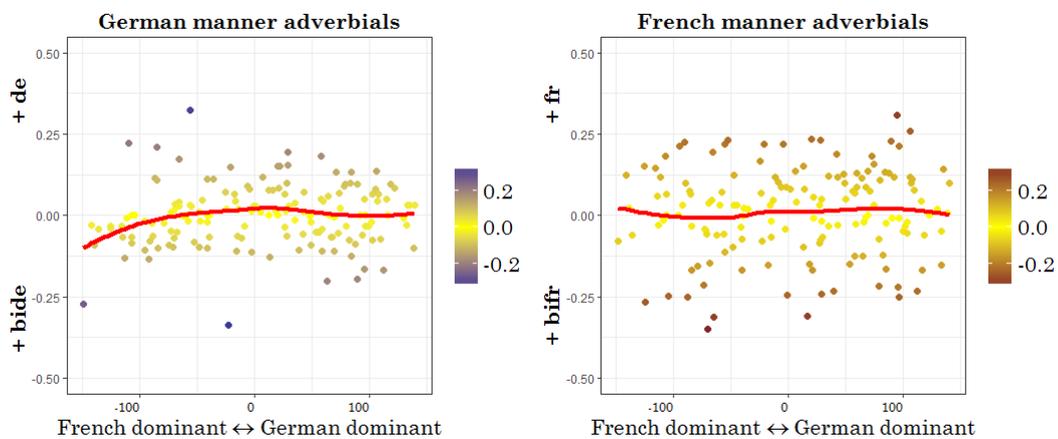


Figure 8.4: Mode differences across the dominance scale for manner adverbials

Finally, the difference between the monolingual and bilingual mode in terms of BCC-violations was calculated for each participant and plotted in Figure 8.5. The figure does not show a clear tendency in either direction or a large difference between the languages.

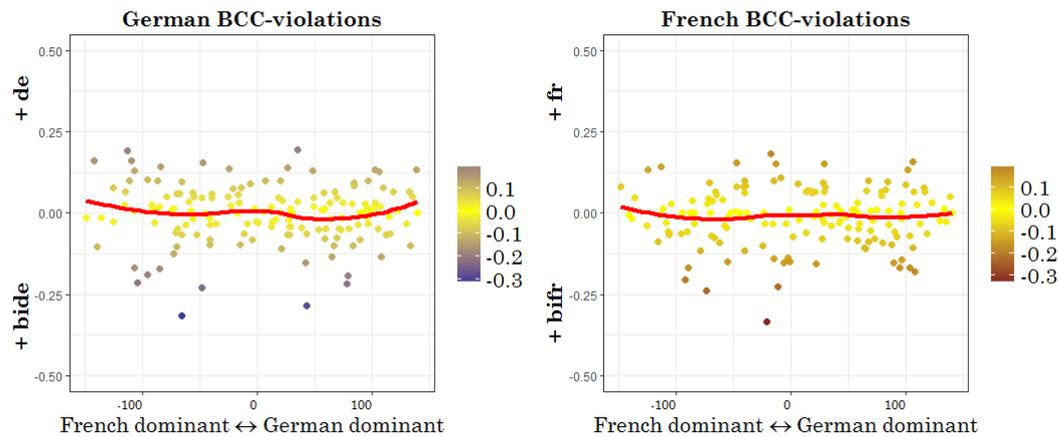


Figure 8.5: Mode differences across dominance scale for BCC-violations

In general, these graphs show that the difference between the monolingual and the bilingual mode is relatively small and does not lead to considerable change across the dominance scale. Moreover, for certain outcome variables, there is a cross-linguistic difference in the distribution of participants in terms of mode differences across the dominance scale. Although this cross-linguistic difference seems small, it could point to a three-way interaction, which is included in the GLMMs discussed in section 8.3.

8.2 Dominance and language mode interaction

As it has been shown in the previous section, there does not appear to be a considerable language mode difference across the dominance scale. In the present chapter, the possibility of a dominance-mode interaction is explored by visualizing the distribution of the outcome variables for both modes separately.

In order to visualize manner verb use across the dominance scale for the bilingual mode and monolingual mode, the mean proportion of manner verbs for each participant is illustrated in Figure 8.6.

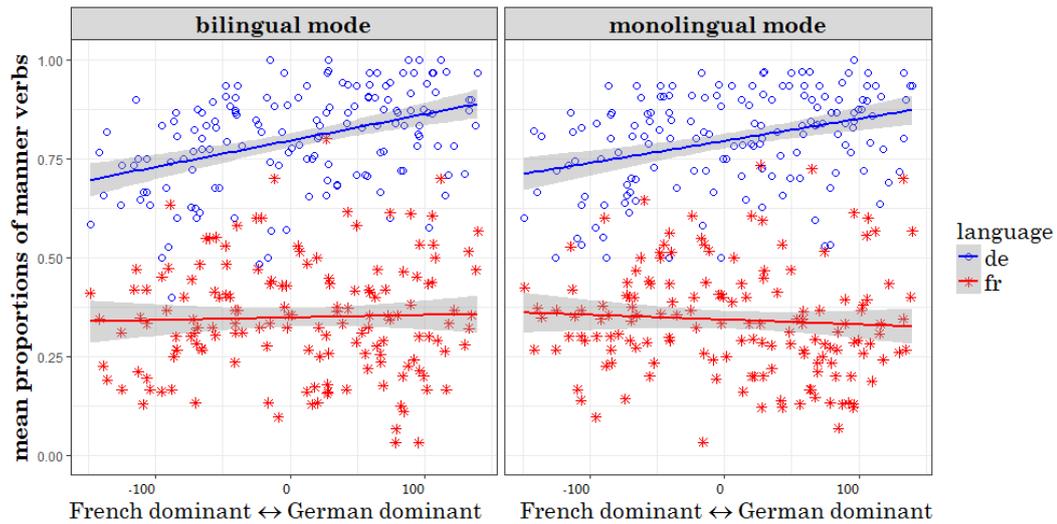


Figure 8.6: Proportion of manner verbs across the dominance scale and the modes

The figure shows the striking absence of a mode effect, as the graph on the left largely mirrors the graph on the right. The mean proportion of German manner verbs increases with increasing German dominance, but remains largely the same for French manner verbs regardless of participants' dominance configurations, as seen in subsection 6.2.1. When looking at the conditional mean for French manner verbs, there seems to be a slight increase in the proportion of manner verbs in the bilingual mode with increasing German dominance and an increase in the proportion of manner verbs with increasing French dominance in the monolingual French mode. However, this difference does not appear considerable, as there is large variation in the distribution of the red star-symbols.

An interaction between language mode manipulation and language dominance conforming to the predictions would manifest if there were a difference between the graph on the left, the graph on the right and the distribution across the dominance scale in the following terms. In the bilingual language mode on the left, we would expect the German mean proportion of manner verbs to become smaller, the French mean proportion to become higher and a difference in distribution across the dominance scale. In other words, the lines would be closer to each other and steeper in the bilingual mode than in the monolingual mode, because more balanced and dominant speakers in the target-language would be expected to increase or decrease the proportion. In addition, if the graphs showed different results for the languages in the distribution of the mean proportions across the dominance scale for the language modes, a three-way interaction would be likely. This however, does not seem to be the case.

In terms of path verbs, the expected pattern would be a smaller difference between German and French in the bilingual mode. Figure 8.7 shows the distribution of the

mean proportion of path verbs across the dominance scale for each mode.

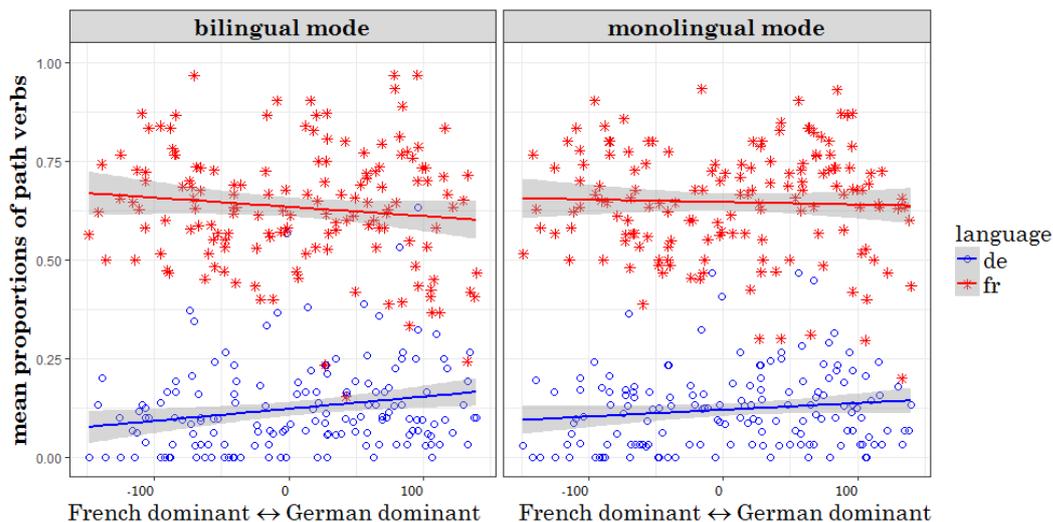


Figure 8.7: Proportion of path verbs across the dominance scale and the modes

Some differences across the modes can be found in French path verbs. French path verbs seem to decrease with increasing German dominance more considerably in the bilingual mode. The mean proportion of French path verbs seems the same for French-dominant speakers, but shows a slight mode difference in German-dominant speakers. For German path verbs, the general trend remains the same for both modes: a decreasing use of path verbs with increasing German dominance in French, and an increasing use of path verbs with increasing German dominance in German. The fact that there might be a mode-dominance interaction, but only for French, may hint at a three-way interaction in path verbs, which is discussed below.

In comparison to manner verbs, the graphs for BCC-violations are closer together and overlap more in both language modes (Figure 8.8). Thus, in both modes and with all dominance scores, some participants use as many clauses comprising a manner verb and a description of boundary-crossing in German as others use in French. In addition, the cross-linguistic differences in BCC-violations appear smaller than those of manner verbs.

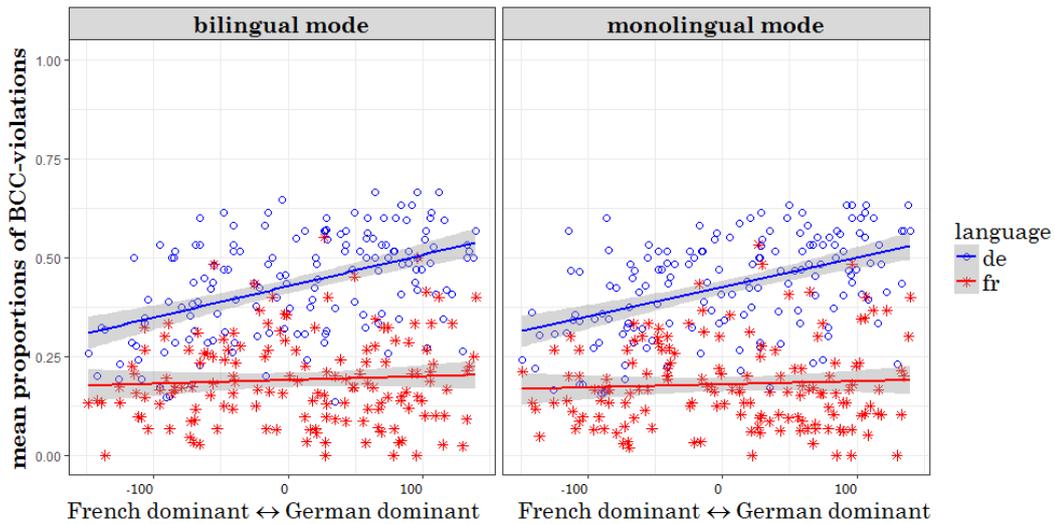


Figure 8.8: Proportion of BCC-violations across the dominance scale and the modes

As seen in Table 7.2, path adverbials show a significant interaction effect of language mode and language. If this interaction effect differs across the dominance scale, this would indicate a three-way interaction. As can be drawn from Figure 8.9, there seems to be a difference between languages for French-dominant speakers (i.e. a greater discrepancy between the languages in the bilingual mode than in the monolingual mode). Overall, the smoothed conditional mean seems steeper in the monolingual mode. Whether these differences are mirrored and show significance in the GLMM is explored further below.

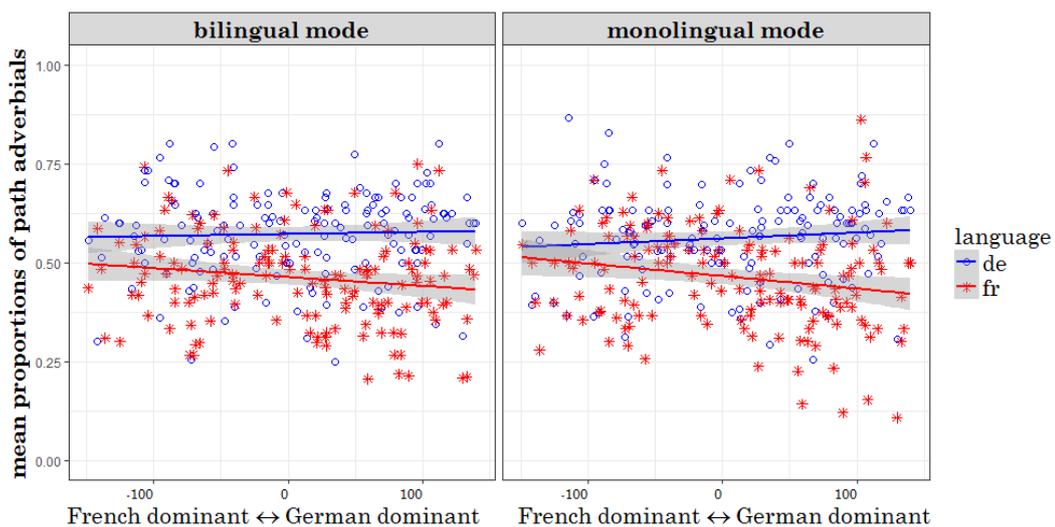


Figure 8.9: Proportion of path adverbials across dominance scale and modes

As demonstrated in subsection 6.3.1, there is a clear interaction between language and dominance for manner adverbials, with an increased use of manner adverbials with increasing French dominance for French and with an increasing German

dominance for German.

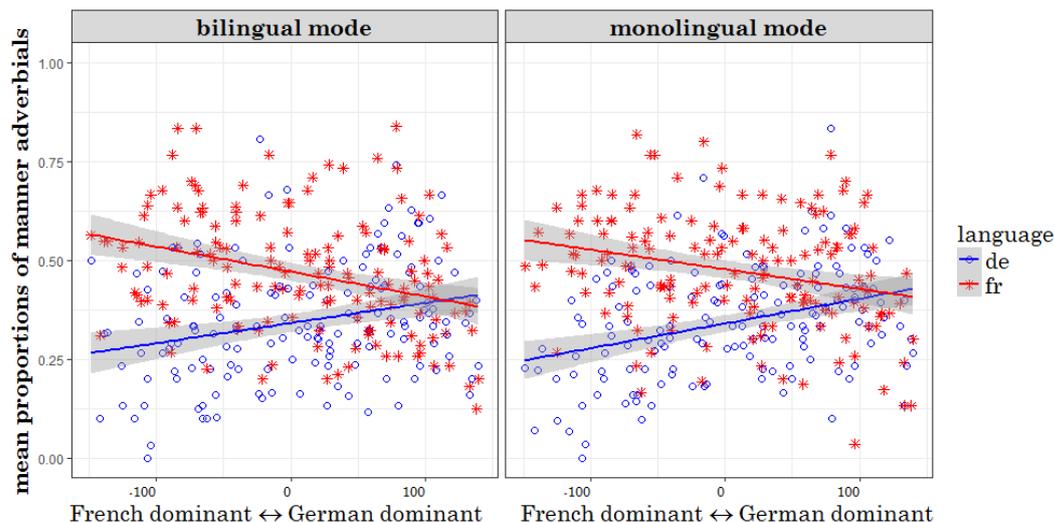


Figure 8.10: Proportion of manner adverbials across the dominance scale and the modes

Whether these interaction effects are due to — or partly due to — differences in vocabulary size rather than typological influence is discussed in section 6.7. Be that as it may, there does not seem to be a difference between the language modes in terms of dominance effects.

The subsequent chapter reports the outcome of the modeled interaction of dominance and mode and the three-way interaction of language, dominance and mode in the mixed models.

8.3 Modeled interactions

To complete the descriptive analysis of possible interaction effects, this section discusses the inferential analysis of the interaction effects via the GLMMs.

In the descriptive analysis in the preceding sections, a striking difference was not found between the proportion of manner verbs across the modes as a function of language dominance or in comparison to the other outcome variables. The modeled interaction between language mode and language dominance are summarized in Table 8.1.

Table 8.1: Interaction between dominance and language mode

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	-0.07 \pm 0.04	0.07	0.26 \pm 0.15	mv9, section D.1
path verbs	-0.04 \pm 0.05	0.87	0.15 \pm 0.19	pv9, section D.2
manner adverbials	0.06 \pm 0.05	0.15	-0.23 \pm 0.19	me9, section D.3
path adverbials	0.00 \pm 0.04	0.99	0.00 \pm 0.15	pai9, section D.4
path adverbials	-0.06 \pm 0.06	0.34	0.26 \pm 0.26	pai9, section D.5
BCC-violations	-0.02 \pm 0.05	0.70	0.08 \pm 0.19	bcc9, section D.6

As can be drawn from this table, the interaction between dominance and mode shows very low estimates and rather weak effect sizes. None of the outcome variables in the models led to statistically significant *p*-values. A similar result is found for the fixed factor language mode reported in Table 7.1. The closest *p*-value to the cut-off of 0.05 is the model featuring manner verbs as an outcome variable.

To account for a mode effect depending on language dominance, which can be different depending on the language of response, a three-way interaction was also included in the model. The logic behind a three-way interaction can be expressed in three ways:

- The interaction of language dominance and language varies depending on language mode.
- The interaction of language and mode varies across the dominance continuum.
- The interaction of mode and dominance is different for French than it is for (Swiss-)German.

While these formulations describe the same phenomena, the most logical interpretations for the present data are the first or third as the understanding of a two-way interaction interacting with a continuous variable seems rather difficult to conceptualize. Interaction effects in this three-way interaction of the models are summarized in Table 8.2⁸⁶.

⁸⁶ The effect sizes for the three-way interaction were calculated by multiplying the centered dominance range by the estimate of the three-way interaction. For manner verbs, the effect size was thus calculated as follows: $-0.02 \times |1.74 - (-2.02)|$ and the standard error analogously: $0.08 \times |1.74 - (-2.02)|$.

Table 8.2: Three-way interaction of language, dominance and mode

Outcome variable	Estimate \pm SE	<i>p</i> -value (LRT)	Effect size \pm SE	Model
manner verbs	-0.02 \pm 0.08	0.76	0.08 \pm 0.30	mv9, section D.1
path verbs	0.20 \pm 0.09	3.71e-06 ***	0.75 \pm 0.34	pv9, section D.2
manner adverbials	0.00 \pm 0.07	1	0 \pm 0.26	me9, section D.3
path adverbials	-0.07 \pm 0.08	0.37	-0.26 \pm -0.30	pai9, section D.4
BCC-violations	0.02 \pm 0.09	0.81	-0.08 \pm 0.34	bcc9, section D.6

As can be drawn from this table, there is a significant three-way interaction for the outcome variable of path verbs, with an effect size of 0.75 ± 0.34 log-odds. The modeled three-way interaction does not seem to influence the other outcome variables to a significant degree. The only significant two-way interaction in the model for path verbs (section D.2) is the interaction between language and dominance. The null effects of the interactions between language and mode and language and dominance render the significant outcome of the three-way interaction difficult to interpret. Following the first interpretation of a three-way interaction outlined above, however, the outcome can be formulated as follows: there is an effect of language dominance and language that differs between the monolingual and bilingual language mode for the outcome variable of path verbs. Referring back to Figure 8.2, there seems to be an increasing discrepancy between the modes with increasing German dominance in terms of the mean proportion of path verbs used. However, this discrepancy does not go in the same direction for German and French. German path verbs were used more frequently in the bilingual mode than in the monolingual mode for German-dominant speakers. In French, path verbs were used more often in the monolingual than in the bilingual mode for German-dominant speakers. As the trends go in opposite directions for German and French, the two-way interaction of mode and dominance does not lead to a significant outcome. Including only a two-way interaction would thus result in a misinterpretation of the outcome and demonstrates the importance of modeling the three-way interaction.

8.4 Discussion

The motivation behind analyzing language mode and dominance interaction effects lies, as mentioned previously, in theoretical proposition rather than empirical support of this hypothesis found in the literature reviewed. A similar theoretical motivation applies to analyzing the three-way interaction, which can be interpreted in three different ways, as discussed in this chapter. Although interaction effects can be present even though the effects of the factors alone do not yield significant outcomes,

interactions of language mode with language and/or dominance are intuitively less expected given the striking absence of language mode manipulation effects. The results of these modeled interactions are thus likely to show null effects.

The difference between the language modes has been calculated in terms of proportions of the outcome variables for each participant and was plotted across the dominance scale. In the descriptive and statistical analyses, a difference between language modes dependent on language dominance was not found. According to this outcome, speakers being dominant in the non-target language or being less balanced in both languages than others did not seem to be (more) affected by language mode manipulation effects. On the one hand, this suggests that language mode manipulation does not lead to a significant outcome, irrespective of language dominance configurations of the participants. On the other hand, the findings may call into question whether the language dominance configurations between the participants in the present study showed enough discrepancies to lead to language mode differences. As the differences that are expected across the dominance scale depending on language mode may intuitively be subtle, participants might not be “strong” enough in one language to show a difference across language modes in comparison to “weak” participants, and vice versa.

The modeled three-way interaction led to a significant outcome only in path verbs. The question of what this significant three-way interaction says about bilingual motion event encoding is not easily answered. This outcome neither follows a logical prediction nor is it clearly explainable by typological factors or general language dominance effects. In the magnitude of data points and the investigation of different factors, however, this three-way interaction can also be merely coincidental and not as meaningful as the p -value indicates.

Notwithstanding the interpretation of the outcomes of these interaction effects, variation can depend on a mix of factors that are not easily separable and that must be modeled with and without their mutual dependencies.

Chapter 9

General discussion and conclusions

This dissertation set out to explore the role of language dominance configurations and language mode as well as the interaction between these variables in bilingual motion event descriptions modulated by two typologically different language systems.

In the following sections, the main findings of the present study are summarized globally. Drawing on the results of the empirical study, several points of discussion emerge. One of the general goals of this thesis was to advance awareness and contribute to the understanding and a cumulative knowledge of the factors influencing bilingual production patterns. Assuming that language dominance and language mode are crucial in bilingual production, it was hypothesized that they significantly explain variation in motion event descriptions. The inconclusive findings in relation to these predictions both enrich and complicate the understanding of crucial factors in bilingual production.

Although the study aimed to cover certain methodological and theoretical issues of previous studies, there were limitations and shortcomings, as outlined in section 9.3. Finally, this thesis concludes with a short presentation of possible avenues for future research.

9.1 Summary

In the present study, 154 French-German bilingual speakers with different language dominance profiles were asked to describe 60 video clips in four mode conditions: twice in a monolingual mode in both German and French and twice in a bilingual mode with a simultaneous activation of both languages, once with the target language German (i.e., critical stimuli were in German) and once with the target language French (i.e., critical stimuli were in French).

In line with previous studies in the field, the descriptions of the video clips

featuring self-propelled motion showed different encoding patterns in French and (Swiss-)German answers. The proportion of finite manner verbs was significantly higher in German clauses than in French ones, while the proportion of path verbs was significantly lower in German clauses than in French ones. The proportion of manner adverbials and path adverbials differed cross-linguistically, but to a lesser extent than manner and path verbs. Constructions featuring a finite manner verb in a clause describing a boundary-crossing were found in a significantly higher proportion in German clauses than in French clauses. However, such BCC-violations were also frequently used in French answers. Furthermore, these patterns present great variation across stimuli, participants and constructions that go beyond the Talmyan typology. The cross-linguistic differences and constructional variants were explored and discussed in chapter 5.

Consistent with Berthele (2017), German manner verbs vary across the dominance configurations of the speakers; an increasing use of German manner verbs was found with increasing German dominance. The effect of language dominance on French manner verbs, on the other hand, was not significant, which is also consistent with the preceding study. In terms of path verbs, the effects of language dominance did not follow the expected pattern of increased path verb use with increasing French dominance. On the contrary, the use of path verbs seemed to decrease with increasing French dominance, which is consistent with Berthele and Stocker (2016). Issues related to the effect of language dominance were the focus of chapter 6.

Language mode manipulation, on the other hand, did not lead to a significant difference in the variables investigated. Concretely, neither motion verbs nor motion components encoded in adverbial constructions differed between the monolingual and bilingual language mode. In chapter 7, this null result was explored by analyzing the differences between item order, session order and the code-switching practices of the participants. A sub-group of stimuli and participants with the highest language mode discrepancies was extracted from the data and was analyzed separately for mode effects. However, neither the stimuli nor the participants differed in any striking way from the other stimuli and participants. The predictions of an effect of language mode manipulation did not hold.

Finally, the question of whether language mode effects differ according to the dominance configurations of the participants was discussed in chapter 8. While language mode manipulation did not yield significant effects in the proportions of the variables investigated, the question of whether language dominance may hide the effects of language mode was addressed. In other terms, it was investigated whether language mode manipulation led to variation only within production patterns of speakers who were dominant in one of the languages or to a counter-predictive

language mode effect in dominant speakers compared to more balanced speakers, or vice versa. While the results show some variation in terms of language mode across the dominance scale, these differences are neither systematic nor significant.

9.2 General discussion

The hypotheses are only partly supported by the present data. While the data show cross-linguistic variation, and while language dominance can be a factor explaining this variation for some variables and not to the same extent in both languages, the language mode hypothesis did not hold true, regardless of how the data were analyzed. These results raise three points of discussion, which are outlined below.

9.2.1 Pattern variation and CLI

In line with preceding studies, lexicalization patterns of motion events differ with respect to several variables in German and in French. There are generally more finite manner verbs in German clauses, which conforms to the satellite-framed pattern and more finite path verbs in French clauses, which conforms to the verb-framed pattern. To a lesser degree, in terms of cross-linguistic differences, French clauses show fewer path adverbials, and German clauses show fewer manner adverbials. In clauses predicating the crossing of a spatial boundary, speakers more often use a finite manner verb in German than they do in French. As recognized in the bulk of research on motion event descriptions, satellite-framed patterns are, more or less frequently, also found in V-languages and verb-framed patterns more or less frequently appear in S-languages, as well (see section 1.4). The encoding of, for instance, *MANNER* of motion in the finite verb in French clauses and *PATH* of motion in the finite verb in German clauses would thus constitute less typical patterns, but they are still constructions conforming to the characteristics of the variety of French and German. Pattern variation, or the degree of typical and atypical patterns, can thus be an inherent characteristic of French or German — and is subject to confusion with patterns of CLI. Concretely, if the choice of a particular manner verb in French-German bilingual production patterns is due to an influence of German, or whether the speaker would also choose it without having German or any other S-language in the repertoire, remains open to speculation. In chapter 5, it was demonstrated that stimuli and participants contribute considerably to pattern variation. While the proportion of manner verbs in French constructions may increase with CLI, attenuated with French-language dominance of the participant or otherwise, the fact that patterns vary due to the characteristics of the languages

themselves renders the identification of CLI phenomena on the semantic and structural level notoriously difficult.

In quantitative terms, only trends of potential CLI in lexicalization patterns can be observed along the dominance scale. Since language dominance and language mode contribute less to the identification of CLI in the data than was previously assumed, the task of CLI identification is further complicated. In this way, CLI can only, if at all, be observed indirectly. This type of CLI would refer to *covert inter-systemic transfer* (Mougeon et al., 2005, p. 103) (cf. subsection 2.2.7). On the other hand, however, qualitative analysis has allowed the identification of CLI phenomena directly and thus allowed to distinguish pattern variations due to target language-inherent characteristics from those due to CLI phenomena. This latter type of CLI has been called *overt inter-systemic transfer* (ibid.). French patterns reminiscent of German and German patterns reminiscent of French are particularly prone to use in boundary-crossing contexts with limited pattern variations in one language. On the one hand, typical French structures such as *gérondif*-constructions (subsubsection 5.6.2.2) or *infinitif-de-but* constructions (subsubsection 5.6.2.3), can be grammatically integrated in German patterns. As noted in subsubsection 5.6.2.2, constructions featuring the *PATH* component in a *gérondif* show the convergence of both French and German characteristics. While these constructions can be grammatically correct, they pertain to the category of what Ochsenbauer and Engemann (2011, p. 121) call having a “non-native flavor”. Thus, in a qualitative analysis of such constructions, more direct CLI can be identified in terms of mapping of typically French structures in German and traces of German structures in French answers.

9.2.2 CLI and general effects of bilingualism

For several variables, irrespective of the extent to which these variables differ cross-linguistically, language dominance influence was either weak, non-existent or ran counter to the predictions. The proportion of *path* verbs, which are found significantly more often in French clauses, increases in German clauses with increasing German dominance. The proportion of *manner* adverbials, which appear more in French than in German, increases with dominance in the respective language. In other words, speakers who are dominant in French use more *manner* adverbials in French than speakers who are dominant in German. On the other hand, speakers who are dominant in German use more *manner* adverbials in German than speakers who are more French dominant. For *path* adverbials, which generally show up more often in German, the dominance effect is comparable to that of *manner* adverbials. Hence, the cross-linguistic difference between the variables does not lead to CLI

patterns predicted by language dominance configurations. Thus, an increase in French dominance does not lead to an increasing use of path verbs in German clauses. Likewise, an increase in German dominance cannot predict a decreased use of German manner adverbials. As a matter of fact, an increase of a variable with increasing dominance is only found in increasing target-language dominance. In section 6.7, it was argued that cross-linguistic difference may be only partly responsible for differences across the dominance scale. Other dominance-related factors such as vocabulary inventory may compete with CLI effects and lead to counter-intuitive outcomes.

Moreover, further analyses of the variables' conformity with the dominance predictions seem to confirm this argumentation. In manner verbs, the general trends were in line with Berthele's (2017) findings: the more dominant a speaker is in German, the more manner verbs he or she uses in German. In French answers, however, speakers seem to use as many manner verbs in French, regardless of their dominance profiles. An analysis excluding the light manner verb *gehen* from the data set featuring proportions of manner verbs across participants showed that dominance profiles led to a null effect in German answers. Thus, with the coding of the verb *gehen* as a deictic verb, dominance configurations did not predict the proportion of manner verbs used in either French or German. Light verbs are generally a feature of lower dominance levels and may explain the effect of language dominance in German manner verbs. Accordingly, it is less the PATH or MANNER characteristics of the verb that predict variation across the dominance scale than it is the more nuanced characteristics of the verb. These characteristics concern the verb's frequency of occurrence, whether it pertains to advanced or less-advanced vocabulary and whether it is semantically and conceptually complex and specific. Along these lines, the more fine-grained analysis of the semantic aspects of the motion verbs corroborates the critiques of motion typology. The categories of MANNER and PATH seem too general to capture cross-linguistic differences and similarities (Filipović & Ibarretxe-Antuñano, 2015, p. 531) and thus obliterate CLI effects.

To what extent the patterns in the present data conform to the predictions, show CLI or are the result of other factors of bilingual performance remains an unanswered question. In order to distinguish patterns of CLI from dominance-related factors like vocabulary knowledge, it would be necessary to include other languages in the analysis, as recognized by Brown and Gullberg (2013, p. 490):

“In addition, data from other language pairings would serve to tease apart language specific, cross-linguistic influences from more general effects of bilingualism [...]”

In order to dissociate thus the later effects, called “macro effects of bilingualism” by Bassetti and Cook (2011) from the former, language-specific effects, termed “micro effects of bilingualism” (ibid), a list of factors must be taken into consideration. Jarvis (2000, pp. 260-261) lists several variables which need to be controlled for when identifying CLI-phenomena. While most of these variables have been controlled for in the present study by holding them constant (e.g. educational background and language distance between target and non-target language) or by actively investigating them (e.g. language task), others were not taken into consideration. Among the variables not controlled for are personality traits, motivation and language aptitude. How these variables may blur the effects of CLI remains a question subject for potential further investigation (section 9.4). Moreover, the inclusion of further languages implies difficulties given the factor of inter- and intratypological variation discussed in subsection 1.5.2.

In sum, the tendencies observed support the observation of previous examinations that certain variables appear more frequently to result from factors other than CLI. These variables may depend more strongly on language dominance configurations than on CLI phenomena. Certain variables, such as constructions including light verbs like *gehen*, may represent simplifications (e.g. Schroeder, 2009; Goschler, 2009). However, it needs to be noted that it is important to consider the entire clause when talking about simplification (Goschler, 2013; Daller et al., 2011). The use of a light verb does not imply less-complex constructions in the whole clause and could be associated with CLI. Constructional preferences are thus the result of both CLI and the general effects of bilingualism.

9.2.3 Language activation and extent of CLI

As alluded to in section 7.6, the null effect of language mode manipulation raises larger psycholinguistic questions associated with topics on combined versus separate mental lexicons, activation and deactivation of languages and inhibitory control mechanisms. In this sense, questions on the general relationship between language and cognition emerge.

As discussed in section 7.6, a growing body of psycholinguistics literature has found evidence that both languages of a bilingual are constantly activated in parallel (e.g. Dijkstra & Van Hell, 2003; Marian et al., 2003; Kroll et al., 2006, 2008; Costa, 2008). This hypothesis is in line with Grosjean’s theory (Grosjean, 2001, 2008). However, the deliberate language mode manipulation in the present study has sought to investigate whether there are states of activation leading to diverging results in terms of CLI-phenomena on the semantic level. The findings do not allow to generalize beyond the specific sample and task of the present study and cannot

be taken as corroborating evidence for the existence or non-existence of such states of activation. While it is possible that such states of activation and different states of lexical access do not exist, as the present findings seem to suggest, there are alternative explanations.

Thus, the findings may indicate either that CLI effects may not depend as much on activation as was previously assumed. While it is possible that there are different states of activation in a bilingual's language systems, they may only concern certain aspects and not others. CLI in semantic aspects of motion events may thus not be among the variables susceptible to language mode manipulation.

On the other hand, language mode may lead to significant effects in the variables as predicted and as found in the previous study by Berthele and Stocker (2016). However, these effects may not have been obtained in the present study due to drawbacks in the study design resulting in the failure to partially deactivate one language (see section 9.3).

In general, however, the null effect of language mode manipulation cannot answer the crucial question of whether bilingual processing and production patterns in one language occur separately or interdependently of the other language. Although the overwhelming empirical evidence indicates that bilinguals are able to differentiate between their two language systems, whether both languages and mental lexicons are handled completely autonomously (independent) or allow for some degree of interplay (interdependent) lacks conclusive evidence and is still debated (see pp. 63-67 in Engemann, 2012). The latter proposition allowing for the interconnection of the two systems, presupposes that CLI is a phenomenon resulting from this interdependence of the two language systems. As discussed in subsection 9.2.1, CLI phenomena in for instance typical French constructions, such as the infinitif-de-but in German, support that bilingual language processing does not happen completely separately, at least not on the lexical and structural level. Drawing on the interpretation of empirical findings corroborating propositions of certain psycholinguistic models, different linguistic aspects may be stored differently and storing may even change over time. For example, vocabulary may be separate and in a shared store later, or it may be in a shared store with syntax in a partially separate store (Dong, Gui, & Macwhinney, 2005). It is thus plausible that semantic aspects may be stored differently. How semantic information is stored, activated and retrieved in the course of production remains to be explored.

The discussion of shared vs. separate storage of lexical, structural or semantic information can be pushed further to questions of shared vs. separate conceptual representations. Along these lines, the crucial questions emerging from inquiries into language mode and activation are linked to questions emerging from the relativistic

debate in motion events (section 1.1).

9.3 Limitations of the study

While this study has tried to fill several methodological gaps in previous studies, there are limitations and shortcomings that must be addressed at this point.

The present study explicitly addresses the language mode hypothesis by deliberately manipulating language modes. Although the findings point to a null result of language mode effects, alternative interpretations explaining the probability that such effects may not be present due to drawbacks of the research design need not to be ruled out, because language mode manipulation led to effects in previous studies. The language mode hypothesis may hold true for certain participants, with certain language combinations and under certain conditions that diverge from the present study.

As discussed in section 7.6, most of the bilingual speakers in the present study live in the bilingual town of Fribourg, where the use of both French and German in conversation is not uncommon. In Grosjean's term, they can thus be referred to as those type of bilinguals, who rarely find themselves at the monolingual end of the language mode continuum (2008, p. 251). Furthermore, the recruitment of the participants required bilingual speakers. It cannot be excluded that the awareness of the study's interest in their production patterns in French and German may have inhibited the partial "deactivation" of the non-target language. Irrespective of the mode condition, both languages may have been "switched on" to the same extent. A control for these variables to ensure a monolingual language mode would require a different sample of participants who do not live in a bilingual town and only use their respective languages with different people, not in conversations where language switches are common. An alternative explanation for the weak impact of language dominance and mode would be that the speakers in the present study were not far enough apart from each other on the dominance scale. Given that they all mastered French and German at highly advanced levels, effects from the above mentioned factors, which may exist only subtly, may not be illuminated in the present sample. A different sample with participants more dominant in either French or German than the least-balanced participants in this study, however, would imply even stronger effects of the co-variate of general effects of bilingualism.

The next point of discussion concerning the methodological limitations would be the question of formality. While formality is listed among the factors that can influence language mode (Grosjean, 2008, p. 42), the impact of it remains to be investigated. The fact that formality is the only striking difference between the

preceding study and the present study, both of which led to different outcomes, formality may — at least partly — have caused this contrast.

However, these theoretical explanations are tentative, several questions remain unanswered and further research is needed to corroborate these interpretations.

9.4 Future research directions

The present findings leave much room for future research. On the one hand, replication studies and advancements to the present study with a different group of bilinguals and different language constellations could be conducted for two reasons. On the one hand, further empirical investigations may increase the validity of the interpretations. On the other hand, further research tends to push reflections further and contributes to an understanding of the fundamental questions on bilingualism.

As alluded to in the previous section, it can be speculated that language mode manipulation only leads to effects in bilinguals not using and mixing both languages in daily conversation, but rather associating their different languages with different people and contexts. To test this, a different group of bilingual speakers who fulfill these requirements should be examined. Furthermore, bilinguals who have sufficient command to describe motion events but whose dominance scores are more widely distributed across the BLP would constitute an interesting group of participants.

As discussed in subsection 9.2.2, it would be necessary to integrate other languages to dissociate general effects of bilingualism from CLI. This could be achieved by comparing the present results with data from a replication of the study using speakers who are bilingual in two S-languages or two V-languages. This will help investigate whether the proportions of the variables still differ along the dominance scale to the same degree. If, for instance, the proportion of manner verbs for two V-languages is lower than the proportion of manner verbs in French in the present study, the relatively high proportion of manner verbs in the present study could be explained by CLI.

As the focus of the present investigation is primarily on individual variation, it would be interesting not only to compare language pairs, but to analyze different language constellations within an individual. Along these lines, motion event descriptions of trilinguals in, for instance, German, French and Spanish (another V-language) or German, French and Swedish (another S-language) would be of particular interest. Although obtaining a sample comparable in size to the sample in this study implies major difficulties, the potential research questions of such a study are theoretically interesting and relevant for the present purposes. In terms of language mode, the study could distinguish between monolingual modes in each

language and a multilingual mode with an alternation between the three. Activating multiple languages versus a single language is theoretically interesting. Setting a language dominance continuum with three languages could be realized through three different scales. Plotting the mean proportion of the identified variables along these scales and comparing them may provide interesting insights on the effect of language dominance in typologically different and similar language varieties. Again however, the factor of inter- and intratypological variation needs to be considered (subsection 1.5.2) as two S-languages or two V-languages do not necessarily show the same patterns in terms of the expected variables.

The propositions and theoretical implications of the language mode hypothesis associated with fundamental psycholinguistic research on the activation or deactivation of languages calls for further investigation. Concretely, how languages and different linguistic aspects are activated and retrieved and which factors are at play in these processes requires further empirical investigation. A better understanding of these processes may eventually help to determine how or if languages or linguistic aspects can be deactivated.

Addressing these questions in a rigorous research design that covers the potential drawbacks in language mode induction of the present investigation seems theoretically interesting, but practically notoriously challenging.

Besides replications and extensions of this study with different groups of bilinguals and language combinations, the present data could be explored more deeply and beyond the scope and aims of the present work.

Drawing on the different outcomes by manipulating the coding of a single verb (see subsection 6.2.2) suggests that a more fine-grained distinction, rather than the dichotomous attribution of MANNER and PATH information, seems promising. Hence, the motion verbs and verbal constructions in the present study could be arrayed on a semantic continuum, ranging from semantically light to semantically dense (or sophisticated), according to factors like frequency of occurrence and specificity. This would help examine how (Swiss-)German and French motion verbs differ and whether there is a clear correlation between semanticity and dominance (e.g. whether semantically light verbs systematically correlate with lower dominance).

Another interesting line of inquiry in the present data would be acceptability judgments similar to those conducted by Pourcel and Kopecka (2005). Participants with different dominance profiles in German and French could be asked to judge productions showing atypical patterns in motion typology as well as constructions with direct CLI. This would help exploring whether individual language repertoire has an effect on acceptability judgments of bilingual language productions and whether bilinguals are aware of different language-specific patterns. Furthermore,

such an examination potentially has implications for the field of applied linguistics as it may contribute to understand and examine the awareness and needs of highly advanced language learners.

The inconclusive findings of the present investigation thus stimulate propositions for further studies, which would be both challenging and promising in future contributions to the knowledge of factors interacting within bilingual production patterns.

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Appendix A

Item maps

The following tables show the scene descriptions of the critical (K1-K30) and filler items (F1-F30).

A.1 Critical stimuli

Critical items are categorized across the five different path types. The following table indicates furthermore whether the item involves the crossing of a spatial boundary or not (i.e. for the 'across', 'out of' and 'in/into' path category).

Item	Scene description	Path category	BC
K1	figure dances out of house (circling)	out of	yes
K2	figure dances into house (ballet-style)	into	yes
K3	figure runs out of bus	out of	yes
K4	figure weaves into bus	into	yes
K5	figure crawls across street	across	yes
K6	figure strolls across street	across	yes
K7	figure climbs up slide	up	no
K8	figure slides down slide	down	no
K9	figure crawls up hill	up	no
K10	figure struts down hill	down	no
K11	figure wades up hill (through snow)	up	no
K12	figure waltzes down hill (with snowboard)	down	no
K13	figure crawls across carpet (sideways)	across	yes

K14	figure jogs across carpet (backwards)	across	yes
K15	figure walks up stairs (backwards)	up	yes
K16	figure dances down stairs (moving the hips)	out of	yes
K17	figure steps across chain	across	yes
K18	figure bounces over chain	across	yes
K19	figure skates in sandbox (with skateboard)	in	yes
K20	figure hops out of sandbox	out of	yes
K21	figure performs somersaults out of cave	out of	yes
K22	figure performs jumping jacks into cave	into	yes
K23	figure lurks into pond	into	yes
K24	figure crawls out of pond (reversed, crab-style)	out of	yes
K25	figure marches up a rooftop	up	no
K26	figure balances down rooftop	down	no
K27	figure performs a handstand up the bridge	up	no
K28	figure sea-crawls down bridge	down	no
K29	figure limps into flowerbed	into	yes
K30	figure performs frog-jump out of flowerbed	out of	yes

A.2 Fillers

As described in subsection 4.2.3.2, the scenes of the filler items all appeared twice, but were mirror-inverted. The figure is always to the left or to the right of the object which is placed somewhere. The category 'angle' in the following table indicates the position of the Figure on the screen. The 'put-category' refers to the typical German placement verb describing the scene.

Item	Scene description	put-category (German)	angle
F1	figure puts cup on table	<i>stellen</i>	left
F2	figure puts cup on table	<i>stellen</i>	right
F3	figure puts banana on table	<i>legen</i>	left
F4	figure puts banana on table	<i>legen</i>	right

F5	figure puts teddy bear on shelf	<i>setzen</i>	left
F6	figure puts teddy bear on shelf	<i>setzen</i>	right
F7	figure puts box on shelf	<i>stellen</i>	left
F8	figure puts box on shelf	<i>stellen</i>	right
F9	figure puts crown on head	<i>setzen</i>	left
F10	figure puts crown on head	<i>setzen</i>	right
F11	figure puts newspaper on head	<i>legen</i>	left
F12	figure puts newspaper on head	<i>legen</i>	right
F13	figure puts bottle into bucket	<i>stellen</i>	left
F14	figure puts bottle into bucket	<i>stellen</i>	right
F15	figure puts flower into suitcase	<i>legen</i>	left
F16	figure puts flower into suitcase	<i>legen</i>	right
F17	figure puts torch on floor	<i>stellen</i>	left
F18	figure puts torch on floor	<i>stellen</i>	right
F19	figure puts book on floor	<i>legen</i>	left
F20	figure puts book on floor	<i>legen</i>	right
F21	figure puts doll on chair	<i>setzen</i>	left
F22	figure puts doll on chair	<i>setzen</i>	right
F23	figure puts candle on chair	<i>stellen</i>	left
F24	figure puts candle on chair	<i>stellen</i>	right
F25	figure puts toy elephant on bed	<i>setzen</i>	left
F26	figure puts toy elephant on bed	<i>setzen</i>	right
F27	figure puts painting on bed	<i>legen</i>	left
F28	figure puts painting on bed	<i>legen</i>	right
F29	figure puts last piece of puzzle into puzzle	<i>setzen</i>	left
F30	figure puts last piece of puzzle into puzzle	<i>setzen</i>	right

Appendix B

Participants and scheduling

This chapter shows figures describing the participants' profile and clarifies the scheduling for data collection via a table.

B.1 Participants' BLP score distribution

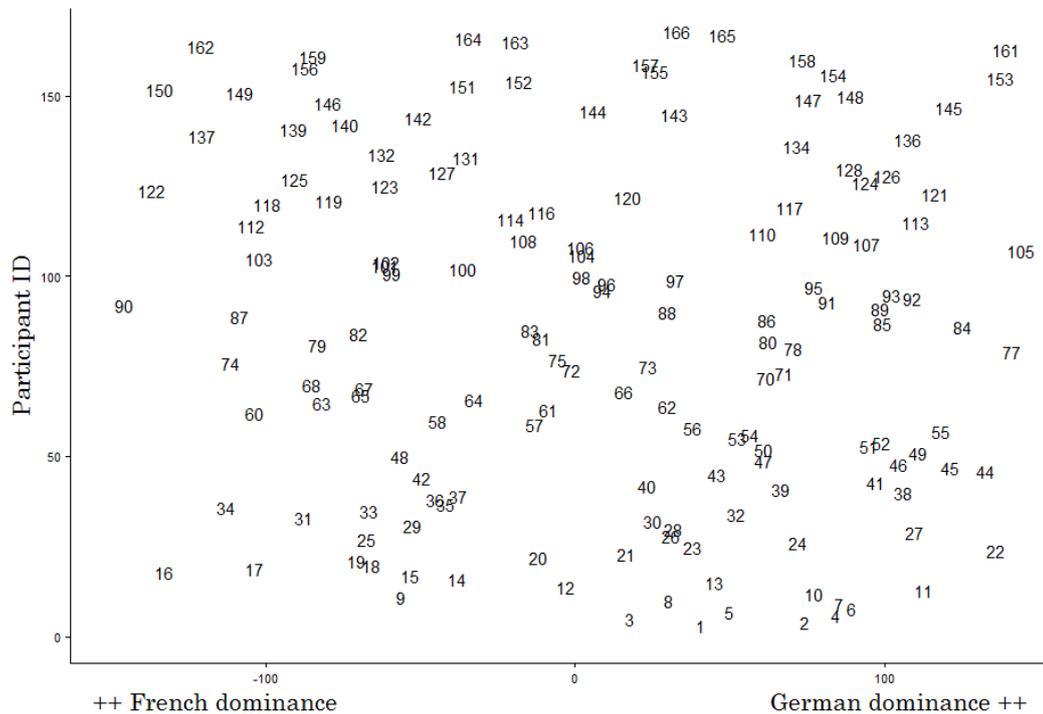


Figure B.1: BLP-score distribution across participants (identification number)

B.2 Further language competences

Table B.1: Language competences across 6 levels

Level (self-assessment according to the Common European Framework of Reference for Languages (CEFR))	Language (<i>n</i> of participants indicating to know the language on the respective level)
A1	Afrikaans (1), Catalan (1), Czech (1), Danish (1), English (1), Finnish (1), Hungarian (1), Japanese (1), Laotian (1), Lithuanian (1), Slovak (1), Swedish (1), Turkish (1), Old Hebrew (2), Latin (2), Ancient Greek (2), Portuguese (2), Rhaeto-Romance (2), Polish (4), Chinese (4), Russian (8), Spanish (18), Italian (19)
A2	Catalan (1), Modern Greek (1), Japanese (1), Macedonian (1), Polish (1), Chinese (1), English (3), Latin (3), Portuguese (3), Russian (3), Spanish (12), Italian (14)
B1	Czech (1), Estonian (1), Korean (1), Latin (1), Polish (1), Russian (1), Swedish (1), Chinese (1), Portuguese (4), Italian (11), Spanish (14), English (17)
B2	Arab (1), Ancient Greek (1), Latin (1), Polish (1), Swedish (1), Spanish (7), Italian (14), English (58)
C1	Luxembourgish (1), Portuguese (1), Latin (2), Italian (3), Spanish (6), English (45)
C2	Spanish (1), Italian (1), Albanian (2), Luxembourgish (2), English (20)

B.3 Scheduling

Table B.2 outlines the research design schedule. The abbreviation "de" refers to monolingual German mode, "bide" refers to bilingual German mode, "fr" refers to French monolingual mode, "bifr" refers to French bilingual mode, "order" refers to the order of the stimuli (subsubsection 4.2.3.3) and "text" to the text to induce the language modes (subsection 4.2.4). The *n*-column on the right shows the number of participants in the respective group.

Table B.2: Schedule for the main data collection

Group	Session I	Session II	Session III	Session IV	<i>n</i>
1a	de (order 1, text 1)	bide (order 2, text 2)	fr (order 3, text 3)	bifr (order 4, text 4)	10
1b	de (order 2, text 3)	bide (order 3, text 4)	fr (order 4, text 1)	bifr (order 1, text 2)	9
1c	de (order 3, text 2)	bide (order 4, text 3)	fr (order 1, text 4)	bifr (order 2, text 1)	9
1d	de (order 4, text 4)	bide (order 1, text 1)	fr (order 2, text 2)	bifr (order 3, text 3)	10
2a	bide (order 1, text 1)	de (order 2, text 2)	bifr (order 3, text 3)	fr (order 4, text 4)	10
2b	bide (order 2, text 3)	de (order 3, text 4)	bifr (order 4, text 1)	fr (order 1, text 2)	10
2c	bide (order 3, text 2)	de (order 4, text 3)	bifr (order 1, text 4)	fr (order 2, text 1)	10
2d	bide (order 4, text 4)	de (order 1, text 1)	bifr (order 2, text 2)	fr (order 3, text 3)	10
3a	fr (order 1, text 1)	bifr (order 2, text 2)	de (order 3, text 3)	bide (order 4, text 4)	10
3b	fr (order 2, text 3)	bifr (order 3, text 4)	de (order 4, text 1)	bide (order 1, text 2)	10
3c	fr (order 3, text 2)	bifr (order 4, text 3)	de (order 1, text 4)	bide (order 2, text 1)	9
3d	fr (order 4, text 4)	bifr (order 1, text 1)	de (order 2, text 2)	bide (order 3, text 3)	9
4a	bifr (order 1, text 1)	fr (order 2, text 2)	bide (order 3, text 3)	de (order 4, text 4)	10
4b	bifr (order 2, text 3)	fr (order 3, text 4)	bide (order 4, text 1)	de (order 1, text 2)	10
4c	bifr (order 3, text 2)	fr (order 4, text 3)	bide (order 1, text 4)	de (order 2, text 1)	10
4d	bifr (order 4, text 4)	fr (order 1, text 1)	bide (order 2, text 2)	de (order 3, text 3)	9

Appendix C

Coding Manual

This chapter describes the principles and basic steps of coding the motion event descriptions along examples drawn from the data.

The basic coding line consists of a range of elements beginning with the ascription of the clause to the audio-file, the identification number of the participant and the stimulus, the stimuli order, group and session. Subsequently, the response was segmented in motion clauses representing the coding lines which were then coded across the following categories: macro construction, micro construction, finite motion verb, verb-external manner description, verb-external path description, boundary-crossing encoding and general remarks. The basic variables were identified largely following the Berkley coding manual *Coding of Motion Events in Texts* (Slobin, 2008a) as well as preceding studies. Not all of the identified and coded categories described here were eventually used in data analyzes such as the “event type” category which served primarily the clausal segmentation and the identification of MANNER and PATH encoding in the respective clause.

C.1 Response segmentation and basic coding line

As several responses comprised super-subordinate or multiple clauses, responses had to be segmented in different clauses to form a basic coding line. Identifying different clauses was unequivocal for most examples following Berman and Slobin’s (1994, p. 660) definition of clause as a “any unit that contains a unified predicate”. Unified can refer to predicates expressing single situation including finite and non-finite verbs. Mostly, a clause consists of a single verbal element. However, verbal constructions (e.g. *faire des galipettes*), infinitives and participles functioning as complements of modal or aspectual verbs (e.g. *er tuet schnaaggä* or *il commence à traverser*) were included within a single clause (cf. Cadierno & Ruiz, 2006, p. 192) usually by ignoring the modal or aspectual verb and coding of the motion verb (cf.

section C.3.).

Several additional coding decisions are made to account for constructions where identifying clauses was not straightforward:

- Comments and scene descriptions which do not account for the current item are not coded and thus not placed on a separate line.
- If the description is ambiguous such as by the use of wrong case markers (e.g. *er springt auf dem bus*) or preposition (e.g. *er geht durch den teppich*) in boundary crossing situations, the coding is not based on the “intended” description, i.e. the coding is not oriented on the item, but on the speaker’s description and a note is added in the remark column. Note that in boundary-crossing situations, it is often not clear whether such constructions can be coded as “violation” of the BCC. Thus, a further category of “NA” is added to the boundary-crossing variable (cf. Table C.1).
- If the speaker corrects himself/herself, only the corrected response is analyzed and the erroneous utterances are not placed on separate lines.
- If the speaker provides two possibilities (e.g. *er springt oder hüpf*), the second possibility is coded and a remark is added in a separate column.
- If the whole response is given in the non-target language, the response is not coded. If only a part of the description is in the non-target language, the response is coded and a note is added in the code-switching column.
- If the response does not really match the scene, a note “inadequate scene description” is added in the remarks category.
- In the case of discontinuous or incoherent descriptions such as forms of anacoluthon, the parts most adequately conveying the stimulus information are coded and a note is added in the remarks category.

The basic coding line is explained in Table C.1 along the following example:

(58) *jemand springt seitwärts in den hauseingang hinein* (31-K2-de-IV)

Table C.1: Basic coding line

Category	Specification and coding decisions	Example
audio.file	The audio file is identified by a code starting with the identification number of the participant (020), following the group of stimuli order and condition (gr01a, cf. Table B.2), the calendar week of the recording (38), the number of the session for the participant (2) and the language mode (bide).	020.gr01a.38.2.bide
mode	The mode is either coded as bilingual German (bide), monolingual German (de), bilingual French (bifr) or monolingual French (fr).	bide
participant.id	The identification number of the 154 participants lies between 001 and 166.	020
stimulus.category	The stimulus category distinguishes between critical and filler items.	critical
stimulus.id	The 30 critical (K) and 30 filler (F) items are identified by numbers ranging from 1-30. See Appendix A for the description of the scenes for each stimuli.	K22
language	The language (or main language) in which the motion event is described, i.e. either Swiss-German/Standard German (de) or French (fr).	de
response	This coding field contains the transcription of the response	<i>jemand springt seitwärts in den hauseingang hinein</i>
macro.construction	See section C.2	simple clause

number.clauses	The number before the forward slash refers to the clause to which the coding line refers and the number following the slash refers to the number of clauses in total of the given response.	1/1
event.type	Multiple clauses or super-subordinate clauses are complex events, which can combine different event types such as a co-event and a framing-event or two framing events. The framing event incorporates the core-schema (path), the figure entity, a ground entity, the activating process (motion) and has a framing function in relation to the macro-event. The co-event is subordinate to the macro-event and refers to a clause which can express manner of motion, cause, change of state etc. See subsection 1.3.1 for more explanation.	macro event
clause.type	The clause is considered motional, only if translational aspect is expressed, i.e. self-contained motion is not regarded. The clause is coded as non-motional if there is no reference to motion, but it can still express manner which is relevant for the motion event such as in the example <i>er steit uf me snowboard</i> .	motional
manner.clause	This type of clause describing manner of motion without employing a motion verb, usually shows up in multiple-clause constructions as additional specification such as in the second clause in <i>öper wo ines huus ichi gumpet (1), wo sehr fröhlich würkt, fasch chli wie ne ballettänzer (2)</i> (40-K2-bide-1) Manner clauses are marked with 1, others with 0.	0

construction.micro	See section C.3.	finite verb
finite.v	Infinite form of the motion verb or verb construction which is further coded in section C.4.	springen
manner.v	The number of finite manner verbs, coded automatically via section C.4.	1
manner.expression	Manner adverbials, i.e. verb-external manner information in the clause.	seitwärts
nr.manner.expressions	Number of manner adverbial constructions coded automatically in section C.5.	1
path.v	The number of finite path verbs, coded automatically via section C.4.	0
deictic.v	The number of finite deictic verbs, coded automatically via section C.4.	0
path.construction	Verb-external path construction, further coded in section C.6.	in [...] hinein
path.adverbal	The number of verb-external, but verb-dependent path construction appearing only in German, automatically coded in section C.6.	1
path.adverbial	The number of verb-external and verb independent path construction, such as prepositional phrases, path-gérondif constructions etc., automatically coded in section C.6.	1

boundary.crossing	There are four categories for the coding of boundary-crossing types. Stimuli not predicating a boundary-crossing, usually showing up- and downward movement types are automatically coded as <code>bcc no vio</code> , meaning boundary crossing constraining is not “violated”. If no boundary-crossing is described, the clause is coded as <code>no bc</code> described. In cases such as in the example sentence 58, where a finite manner verb combined with a path adverbial or adverbial construction is used, the clause is categorized as <code>bcc vio</code> . In cases deviating from these typical BCC-violations, such as the examples described in subsection 5.6.2, the clause is coded as NA.	<code>bcc vio</code>
boundary.crossing.det	More detailed or additional information to the boundary-crossing construction type – usually for the NA category such as <code>implicit.bc</code> , ungrammatical case markers or awkward prepositions.	<code>bcc vio</code>
code.switch	If the clause shows lexical code-switches of any sort, a note is made in this category.	-
remarks	Notes on any unusual or salient constructions or difficulties in the coding of the clause are added to this category.	-

C.2 Macro constructions

In the category “macro constructions”, different categories are distinguished in a first step of the coding task, primarily to segment clauses and filter out answers which were discarded from analysis such as non-motional descriptions or answers in the non-target language. The macro construction categories are explained in the

following table.

Table C.2: Macro construction

Macro construction	Specification and coding decision	Example
Simple clause	The response consists of a simple motion clause with a finite verb. This response is coded in one single line.	Example 58
Super-subordinate construction	The response consists of a super-subordinate clause which can contain two motion verbs. Distribution over multiple (usually two) coding lines.	Example 39
Multiple-clause construction	The response consists of several clauses referring to the motion event. Distribution over multiple coding lines.	Example 36 or 37
No finite verb	The response describes the motion event without a verb (e.g. by means of a noun phrase only) or the motion verb is not finite. Given that the description still encodes motion, verb-external motion descriptions are coded.	<i>de nouveau des sauts pour aller dans un tunnel</i> (43-K22-bifr-IV)
No motion in response	The response consists of a simple clause without encoding motion. No coding on this line.	<i>ein athlet setzt sich hohe ziele</i> (21-K21-de-1)
Wrong language	The entire response is in the non-target language. No coding on this line.	

C.3 Micro constructions

Once the macro-construction was defined, the clause was coded at the micro-construction level which consisted of several categories described in the following table. All in all, 12 different categories are identified. The final “NA”-category comprises all the special cases which did not fit in either of the categories above.

Table C.3: Micro constructions

Micro construction	Specification	Example
Finite motion verb	The clause comprises a finite motion verb	Example 58
Modal and motion verb	The clause consists of a finite modal verb combined with a motion verb or verb construction in the infinite form. The finite modal verb is ignored and the motion verb is coded in the <i>finite.v</i> category (see Table C.1).	<i>ein oranger kleiner mensch muss in schnee treten</i> (74-K11-de-III)
Infinitif-de-but	The clause shows an infinitif-de-but construction discussed in subsection 5.6.2.3.	Example 40
Continuous motion event construction	The clause bears aspectual information combined with a motion verb usually in the infinite form. The aspectual construction is ignored and the motion verb is coded in the <i>finite.v</i> category.	<i>e person tuet spaziere z dürai</i> (23-K10-de-I)
Path-gérondif construction	The clause shows an path-gérondif construction discussed in subsection 5.6.2.2.	Example 14
Deictic verb and manner construction	A finite deictic verb is used in combination with a manner verb in the infinite form	[...] <i>dr maa chunt uf eme rollbrätt cho z fahre</i> [...] (44-K19-de-III)
Immediate future construction	The clause shows an immediate future construction composed of the finite form of the auxiliary verb <i>aller</i> and a motion verb in French or the conjugated auxiliary form of <i>werden</i> combined with a motion verb in German. The future information is ignored and only the motion verb is coded in the <i>finite.v</i> category.	<i>il va traverser les fleurs très lentement</i> (50-K29-fr-IV)
Passive construction	If the clause shows a passive construction, the motion verb is coded in the <i>finite.v</i> category and the auxiliary verb is ignored.	<i>ein teich wird vorsichtig überquert</i> (21-K23-bide-II)

Observer's interpretation and motion verb	The speaker describes what she/he sees, interprets or comments on what the item conveys. In these cases, the observer's comments are ignored and the motion verb – whether in the finite or infinite form – is coded in the finite.v category.	<i>on voit un dummy qui marche dans un bus</i> (117-K4-fr-III)
Non-translational motion	The verb or verbal construction encodes motion, but there is no path information in the clause.	<i>ein mann geht baden</i> (39-K23-bide-I)
No motion in clause	The clause does not encode motion and is usually embedded in a multiple-clause construction. It can be a manner.clause (see Table C.1) or not, such as clause (1) in the example.	<i>c'est un robot qui est dans un bac à sable (1) et qui saute dehors (2)</i> (95-K20-bifr-I)
NA	Idiosyncratic motion event constructions which do not fit in any of the categories.	<i>d person schwankt e chli bim laufe [...]</i> (56-K4-de-IV)

C.4 Verb table

The verb table consists of a list of all verbs and verbal constructions, coded according to the semantic information they bear. Note that a verb construction can encode several categories (see discussion on verbs encoding path and manner in subsection 5.3.1) such as the German verb *klettern* (see discussion in Berthele, 2006, pp. 53-58) or the French verb *grimper* (see discussion in Hickmann & Robert, 2006, p. 283). The verb table was coded independently by three raters (see subsection 4.4.3).

Most verbs showing up in the present data have been discussed in previous studies in terms of semantic categorization and there is agreement on the coding across categories by all raters. However, there are also certain verbs occurring frequently, where no general agreement in categorization is found across the literature reviewed. These verbs are briefly discussed below:

- *gehen*: Probably the paramount example of a motion verb where no unanimity in terms of coding of the semantic components exists is the German verb *gehen*. In the studies reviewed discussing and examining German motion verbs, *gehen* has been coded within different categories such as generic (Goschler et al., 2013), deictic (Carroll et al., 2012) or neutral verb (Harr, 2013). This unanimity

is due to the fact that *gehen* is polysemous, i.e. it can encode different semantic components depending on the context it is embedded in (for a discussion on this polysemy see Di Meola, 1994). In certain circumstances, *gehen* can also be coded as a manner or path verb. It needs to be pointed out that *gehen* is not a translation equivalent to the French verb *aller* or the English verb *to go*. While *kommen* and *gehen* do not “obligatorily” have to take on a deictic meaning, in French, a deictic meaning is implied (Berthele, 2004a). The English verb *to go* can also take on different semantic meanings. Analyzing the items in the present study independently, it was decided that a description of the items with *gehen* can either imply a deictic or manner meaning (in the sense of the English *to walk*). It is thus coded once as deictic verb by adding (d) in the finite.v category and once as manner verb by adding (walk) in the finite.v category. To additionally explore the effect of a different coding, the verb is coded as a manner verb in one model and as a deictic verb in another model throughout all items, discussed in subsection 6.2.2.

- *aller*: Similarly, the French verb *aller* is coded differently across the motion event literature. While Iakovleva (2012) for instance code *aller* as neutral motion verb, Treffers-Daller and Tidball (2015) ascribe a deictic meaning to the verb. In the present work, *aller* is coded as deictic verb.
- *laufen*: While the German verb *laufen* has mostly been coded as manner verb, it has lost some of the manner quality (Daller et al., 2011, p. 112) and is often used as generic verb or in non-motional contexts. To further complexity matters, there is a semantic difference between German and Swiss-German. While *laufen* takes on the meaning of *to run* in Standard German, its cognate form *laufä* in Swiss-German usually takes on the meaning of *to walk* (Berthele & Stocker, 2016, p. 18). Although the semantics of *laufen* can thus be different according to context and the language variety, *laufen* in the items of the present study always encodes manner of motion and is thus coded as a manner verb.

Table C.4: Verb table

Semantic information	Specification	Examples
MANNER	The finite verb encodes manner of movement.	<i>hüpfen, courir</i>
Path	The finite verb encodes the path information of the motion event.	<i>eintreten, sortir</i>

Deixis	The finite verb bears deictic information.	<i>kommen, venir</i>
Neutrality	The finite verb encodes motion – usually by being embedded in a construction – , but is neutral in terms of manner, path or deictic information.	<i>bremsen, freiner</i>
Non-translational motion / Non-motional	The finite verb encodes non-translational motion or does not encode motion at all.	<i>s'équilibrer in une personne qui s'équilibre sur un escalier en descendant</i> (151-K16-fr-III)

C.5 Manner table

The Manner table served primarily to list all manner adverbials and adverbial constructions such as *hüpfend* or *en marchant*. In the coded data set, there are about 1,462 different (non-lemmatized) manner adverbial types, which – for reasons of space – are not listed in this manual. Note that whole clauses describing manner are not listed in this table, but are previously coded in the micro construction (section C.3).

C.6 Path table

Path descriptions that were mapped outside the finite verb are listed in the Path table. The table served first of all to identify and code the number of path descriptions. A double count of one entry as path adverbial and as path adverbial and adverbial constructions served to identify clauses with more elaborate path descriptions as discussed in subsection 6.3.2.

As pointed out in chapter subsection 1.5.3, the notion of satellite is somewhat problematic for German (Berthele, 2006, p. 35). It was therefore distinguished between path adverbials and path adverbials. The former refers to path elements depending on the verb root, i.e. bounded affix which are frequent in German but lacking in French (as it is lexicalized in a compound verb). The latter refers to verb-external path elements independent of the verb root and possible in both French and German such as prepositions or *gérondif*-path constructions. Hence, in German, path can be encoded in a prepositional phrase (*aus dem Haus*) or in a path adverbial (*heraus*) or in a combination of both (*aus dem Haus heraus*).

Table C.5: Path table

Semantic information	Specification	Examples
Path adverbial	Path is encoded in a verb-external element which does not depend on the verb root.	<i>in, dans</i>
Path adverbial	A verb-external element which is depended on the verb root – as it cannot stand alone – encodes the path information of the motion event.	<i>herein</i>

Appendix D

GLMM output

The basic model set-up is explained in subsection 4.6.2.2. Fixed effects on the probability of the choice of the outcome variable in the clause include language mode, language of answer and language dominance. A two-way interaction between all these variables is included in the model as well as a three-way interaction. Random effects comprise participants and stimuli and are adjusted differently across the models. The parameters are expressed in log-odds. Models mv9, pv9, me9, pai9 and bcc9 comprise the same fixed-effects and same data set. Models mv9, mvm and mvd all feature the same outcome variable (i.e. the presence or absence of a manner verb), but data sets are coded differently: in the data set of mv9, the verb *gehen* is coded as either a manner or deictic verb, in the data set of mvm, *gehen* is coded as a manner verb and in mvd as deictic verb throughout all clauses. Model pa7, the model featuring path adverbials as outcome variable, only comprises German data. Hence, fewer fixed effects are included as the variable of language can be discarded. In order to take into account convergence problem warning messages, a different optimizer than the default one was chosen and the number of iterations was set to 20,000.

D.1 mv9

Model formula:

```
mv9 <- glmer (manner verb ~ language*dominance*mode + (1 + mode + language ||  
participant.id) + (1 + language + dominance || stimulus.id), family="binomial",  
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000))
```

Table D.1: Model mv9

Fixed effects	Estimate	\pm SE	p -value (LRT)
Intercept	0.64	0.20	2.891e-14 ***
language	-3.08	0.34	2.41e-10 ***
dominance	0.20	0.07	0.007143 **
mode	-0.04	0.04	0.1892
language:dominance	-0.41	0.08	2.066e-07 ***
language:mode	-0.01	0.08	0.9521
dominance:mode	-0.07	0.04	0.06903
language:dominance:mode	-0.02	0.08	0.756

Random effects	σ
Random intercept by participant	0.66
Random slope condition (participant): + mode	0.17
Random slope condition (participant): + language	0.80
Random intercept by stimulus	1.07
Random slope condition (stimulus): + dominance	0.20
Random slope condition (stimulus): + language	1.80

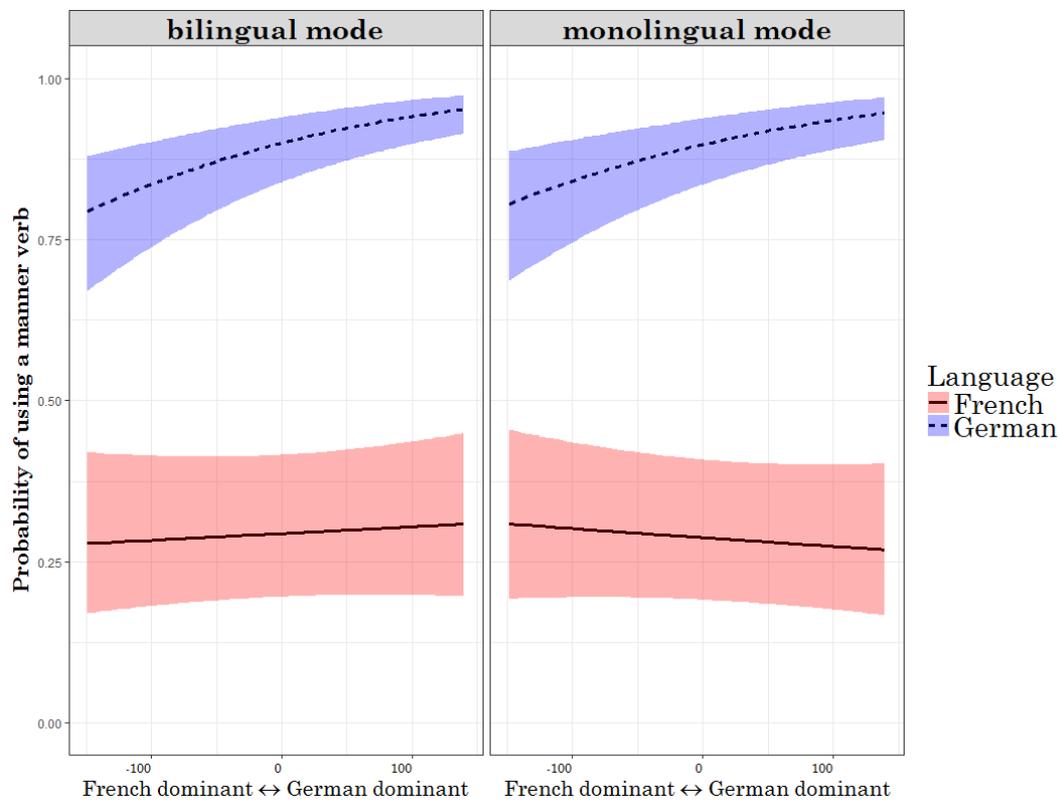


Figure D.1: Probability of using a manner verb

D.2 pv9

Model formula:

```
pv9 <- glmer (path verb ~ language*dominance*mode + (1 + mode + language |
participant.id) + (1 + language + dominance || stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000)))
```

Table D.2: Model pv9

Fixed effects	Estimate	\pm SE	<i>p</i> -value (LRT)
Intercept	-1.15	0.26	< 2.2e-16 ***
language	4.04	0.29	2.205e-15 ***
dominance	0.10	0.08	0.3216
mode	0.04	0.05	0.3123
language:dominance	-0.36	0.12	0.002903 **
language:mode	0.05	0.09	0.2732
dominance:mode	-0.04	0.05	0.8718
language:dominance:mode	0.20	0.09	3.714e-06 ***

Random effects	σ
Random intercept by participant	0.80
Random slope condition (participant): + mode	0.31
Random slope condition (participant): + language	1.27
Random intercept by stimulus	1.38
Random slope condition (stimulus): + dominance	0.16
Random slope condition (stimulus): + language	1.41

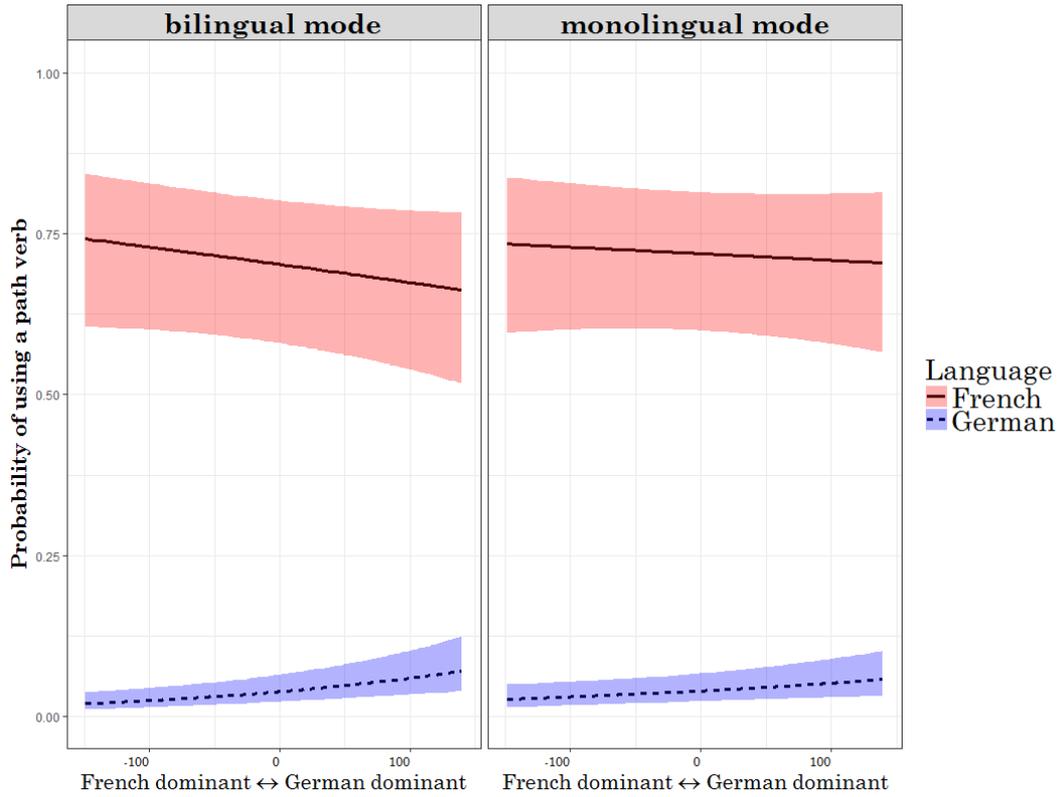


Figure D.2: Probability of using a path verb

D.3 me9

Model formula:

```
me9 <- glmer (manner adverbial ~ language*dominance*mode + (1 + mode + language |
participant.id) + (1 + language + dominance || stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000)))
```

Table D.3: Model me9

Fixed effects	Estimate	±SE	p-value (LRT)
Intercept	-0.72	0.35	8.682e-12 ***
language	0.84	0.19	8.841e-05 ***
dominance	0.04	0.07	0.9853
mode	0.03	0.05	0.5111
language:dominance	-0.60	0.07	3.821e-16 ***
language:mode	0.05	0.07	0.5356
dominance:mode	0.06	0.05	0.1476
language:dominance:mode	0.00	0.07	1

Random effects	σ
Random intercept by participant	0.76
Random slope condition (participant): + mode	0.32
Random slope condition (participant): + language	0.66
Random intercept by stimulus	1.86
Random slope condition (stimulus): + dominance	0.18
Random slope condition (stimulus): + language	0.94

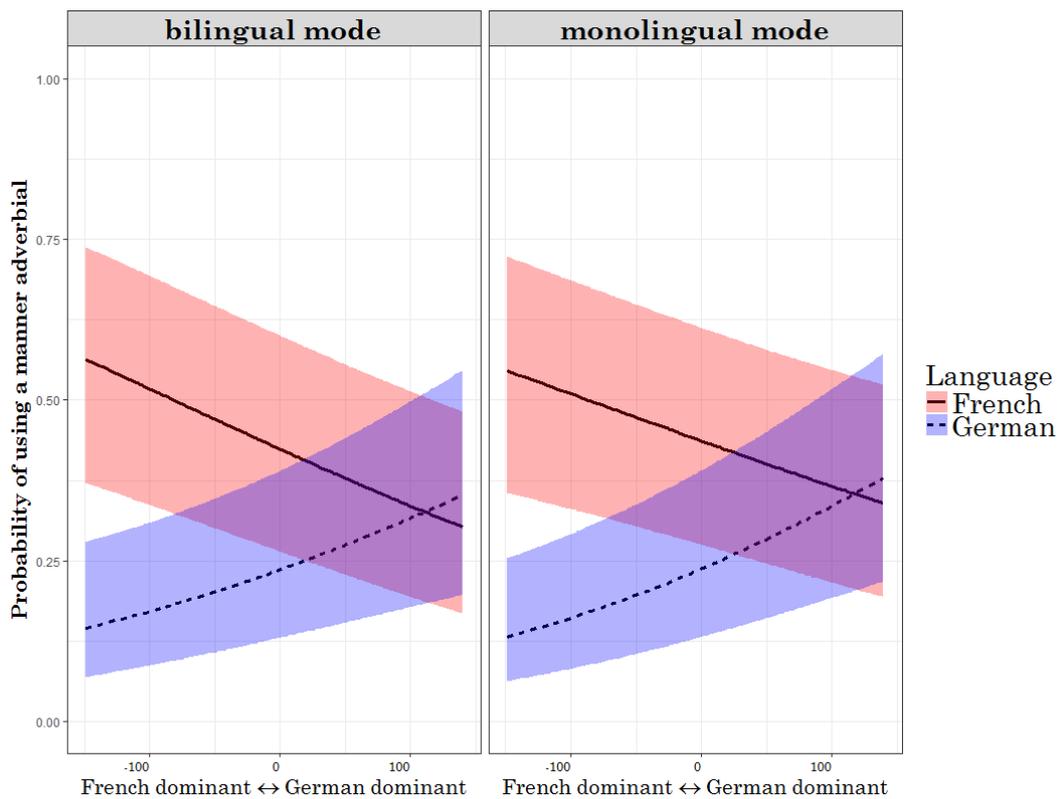


Figure D.3: Probability of using a manner adverbial

D.4 pai9

Model formula:

```

pai9 <- glmer (path adverbial ~ language*dominance*mode + (1 + mode + language ||
participant.id) + (1 + language + dominance | stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000))

```

Table D.4: Model pai9

Fixed effects	Estimate	\pm SE	p -value (LRT)
Intercept	-0.07	0.36	0.012 *
language	-0.54	0.23	0.02932 *
dominance	-0.06	0.07	0.3658
mode	-0.04	0.04	0.4416
language:dominance	-0.22	0.08	0.003718 **
language:mode	0.11	0.08	0.1398
dominance:mode	0.00	0.04	0.9853
language:dominance:mode	-0.07	0.08	0.3733

Random effects	σ
Random intercept by participant	0.65
Random slope condition (participant): + mode	0.22
Random slope condition (participant): + language	0.80
Random intercept by stimulus	1.92
Random slope condition (stimulus): + dominance	0.25
Random slope condition (stimulus): + language	1.20

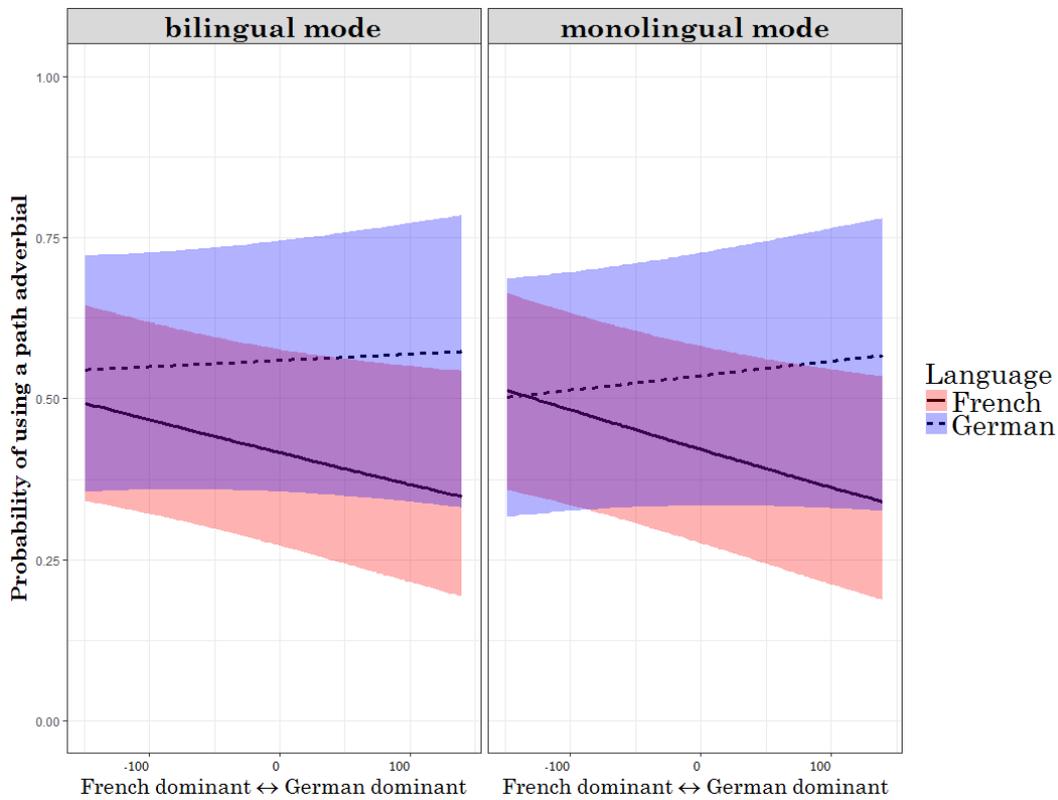


Figure D.4: Probability of using a path adverbial

D.5 pa7

Model formula:

```
pa7 <- glmer (path adverbial ~ dominance*mode + (1 + mode || participant.id) + (1 +
dominance | stimulus.id), family="binomial", dataframe, control=glmerControl
(optimizer = "bobyqa", optCtrl=list(maxfun=20000)))
```

Table D.5: Model pa7

Fixed effects	Estimate	\pm SE	<i>p</i> -value (LRT)
Intercept	-0.84	0.39	< 1.169e-12 ***
dominance	0.60	0.10	1.21e-07 ***
mode	-0.06	0.06	0.3241
dominance:mode	-0.06	0.06	0.3364

Random effects	σ
Random intercept by participant	0.95
Random slope condition (participant): + mode	0.30
Random intercept by stimulus	2.06
Random slope condition (stimulus): + dominance	0.31

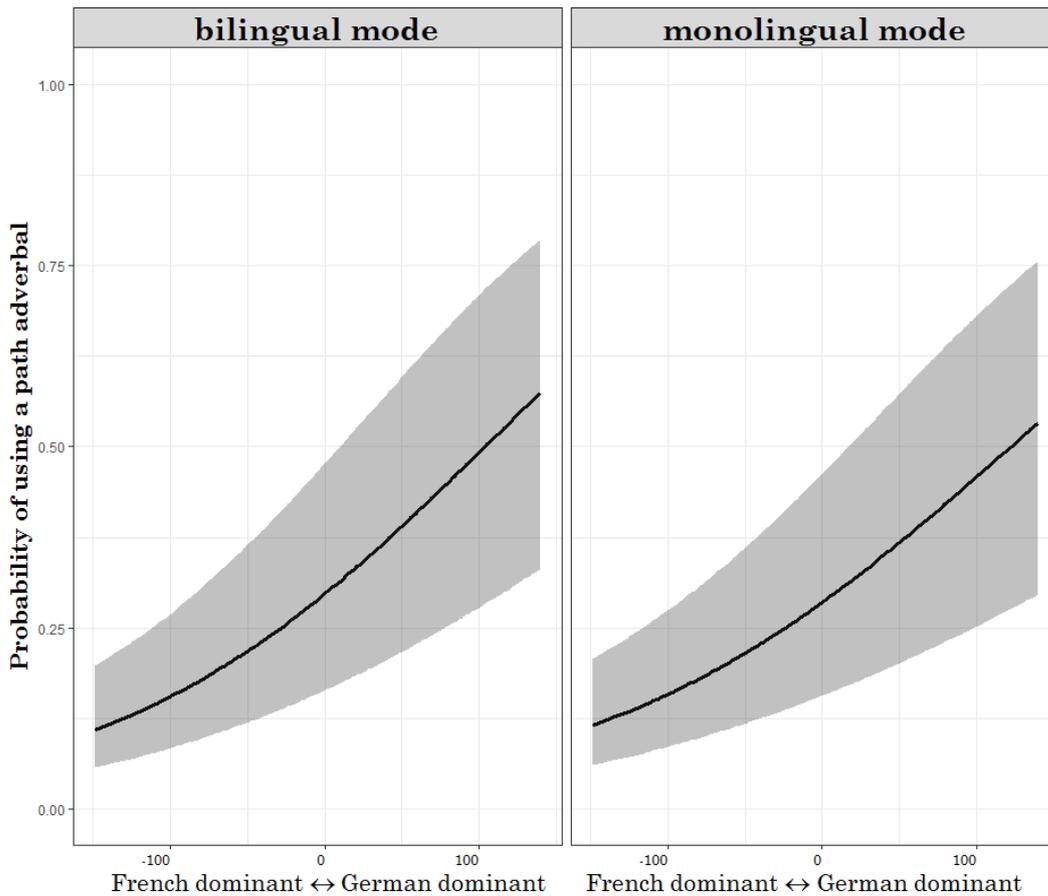


Figure D.5: Probability of using a path adverbial in German

D.6 bcc9

Model formula:

```
bcc9 <- glmer (BCC violation ~ language*dominance*mode + (1 + mode + language ||
participant.id) + (1 + language + dominance | stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000)))
```

Table D.6: Model bcc9

Fixed effects	Estimate	±SE	p-value (LRT)
Intercept	-2.50	0.64	0.0003927 ***
language	-2.04	0.27	9.254e-07 ***
dominance	0.04	0.12	0.5603
mode	-0.09	0.05	0.08992
language:dominance	-0.50	0.09	4.287e-08 ***
language:mode	-0.08	0.09	0.3985
dominance:mode	-0.02	0.05	0.6912
language:dominance:mode	0.02	0.09	0.8114

Random effects	σ
Random intercept by participant	0.85
Random slope condition (participant): + mode	0.20
Random slope condition (participant): + language	0.87
Random intercept by stimulus	3.45
Random slope condition (stimulus): + dominance	0.40
Random slope condition (stimulus): + language	1.07

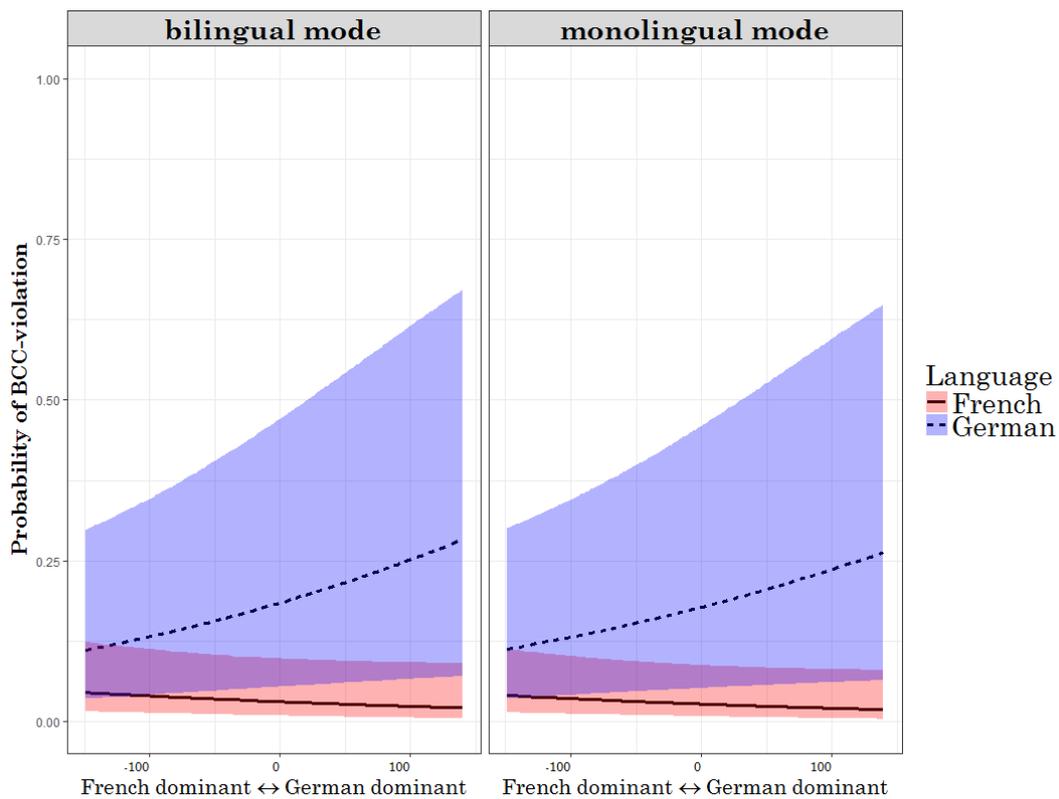


Figure D.6: Probability of BCC-violation

D.7 mvm

Model formula:

```
mvm <- glmer (manner verb ~ language*dominance*mode + (1 + mode + language |
participant.id) + (1 + language + dominance || stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000))
```

Table D.7: Model mvm

Fixed effects	Estimate	\pm SE	<i>p</i> -value (LRT)
Intercept	1.24	0.20	8.065e-10 ***
language	-4.27	0.32	1.125e-14 ***
dominance	-0.05	0.08	0.7131
mode	-0.12	0.05	0.2663
language:dominance	0.10	0.08	0.4231
language:mode	0.16	0.09	0.1168
dominance:mode	0.04	0.05	0.708
language:dominance:mode	-0.24	0.09	0.0001752 ***

Random effects	σ
Random intercept by participant	0.66
Random slope condition (participant): + mode	0.06
Random slope condition (participant): + language	1.09
Random intercept by stimulus	0.99
Random slope condition (stimulus): + dominance	0.04
Random slope condition (stimulus): + language	2.73

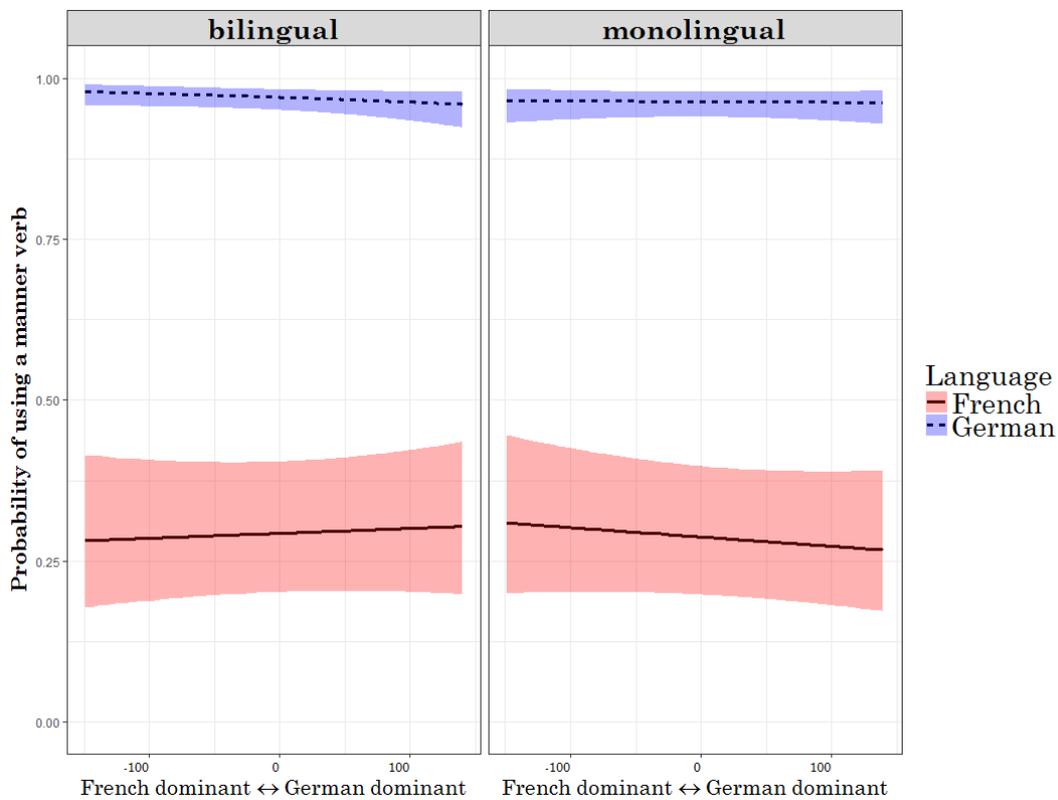


Figure D.7: Probability of using a manner verb excluding 'gehen'

D.8 mvd

Model formula:

```
mvd <- glmer (manner verb ~ language*dominance*mode + (1 + mode + language ||
participant.id) + (1 + language + dominance || stimulus.id), family="binomial",
dataframe, control=glmerControl (optimizer = "bobyqa", optCtrl=list(maxfun=20000)))
```

Table D.8: Model mvd

Fixed effects	Estimate	\pm SE	<i>p</i> -value (LRT)
Intercept	0.24	0.20	< 2.2e-16 ***
language	-2.26	0.18	
dominance	0.26	0.07	0.0001341 ***
mode	0.00	0.04	0.2275
language:dominance	-0.53	0.08	1.373e-09 ***
language:mode	-0.07	0.07	0.3211
dominance:mode	-0.05	0.04	0.1776
language:dominance:mode	-0.06	0.07	< 2.2e-16 ***

Random effects	σ
Random intercept by participant	0.48
Random slope condition (participant): + mode	0.04
Random slope condition (participant): + language	0.82
Random intercept by stimulus	1.13
Random slope condition (stimulus): + dominance	0.02
Random slope condition (stimulus): + language	0.79

D.8. MVD

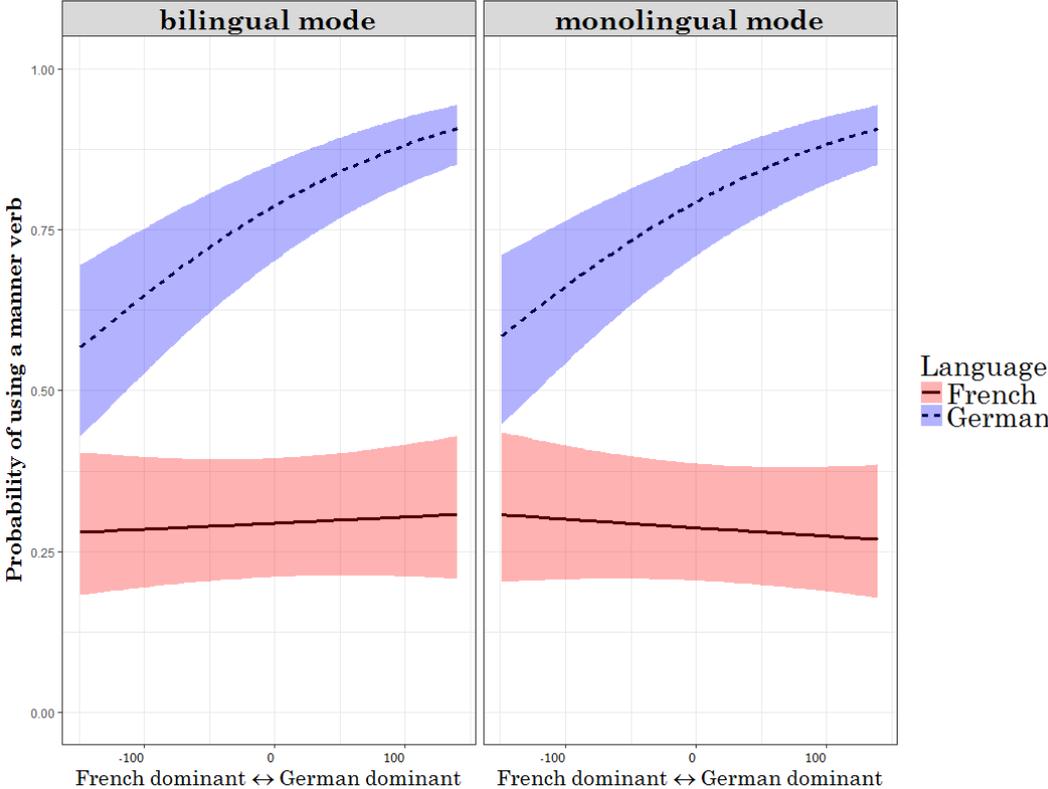


Figure D.8: Probability of using a manner verb including 'gehen'