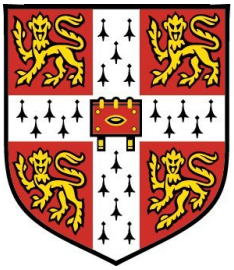
Motion Event Expression in Bilingual First Language Acquisition



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Preface

The following work was carried out at the Department of Theoretical and Applied Linguistics at the University of Cambridge under the supervision of Dr Henriëtte Hendriks.

I hereby declare that this dissertation has not been submitted, in whole or in part, for any other degree, diploma or qualification at any other University.

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated in the text.

The length of this dissertation does not exceed the 80 000 word limit set by the Degree Committee of the Faculty of Modern and Medieval Languages.

PATRI FAMILIAS BENE MERENTI

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Abstract

The thesis explores the implications of Talmy's typology of motion expression (Talmy 1985, 2000*a*,*b*) for bilingual first language acquisition of English (satellite-framing) and French (verb-framing), addressing the following question: How does the expression of motion develop in simultaneous bilingual children in comparison to monolinguals? The particular focus of this study is on the role of crosslinguistic interactions and the extent to which their occurrence and directionality are affected by language-specific properties, children's age and the factor of task complexity. The thesis pursues two goals. First, it aims to contribute to the growing understanding of the role of language-specific factors in the acquisition process (e.g. Allen *et al.* 2007, Choi and Bowerman 1991, Hickmann *et al.* 2009*a*). Secondly, by testing various proposals regarding crosslinguistic interactions (Gawlitzek-Maiwald and Tracy 1996, Müller and Hulk 2001, Toribio 2004), it endeavours to shed light on bilingual speech production processes.

Oral event descriptions elicited by means of short video clips from bilingual and monolingual children aged 4 to 10 years are analysed and compared across two production tasks of varying semantic complexity: a simpler voluntary motion task, showing agents performing spontaneous movements along various paths, and a more complex caused motion task, portraying a human agent causing the displacement of various objects in different manners along various paths. Bilinguals' event descriptions are analysed quantitatively and qualitatively in relation to monolingual English and French control groups across various aspects of verbalisation: (i) the linguistic devices used for information encoding (information packaging), (ii) the number of information components expressed (semantic density), and (iii) their syntactic complexity and compactness (utterance architecture).

The results indicate both parallels and differences to monolingual performance patterns. Although bilinguals' event descriptions generally follow the typological tendencies characterising monolinguals' English and French verbalisation tendencies, they also exhibit significant departures from the monolingual range in both languages, at all tested ages and in both production tasks. However, these differences are most prominent in children's French and in the caused motion task. In this context, bilinguals display a striking preference for

satellite-framing encoding options, resulting both in the overuse of crosslinguistically overlapping packaging strategies and in qualitatively idiosyncratic extensions of French locative satellites. Syntactically, bilinguals show a strong tendency to use compact and simple structures (lacking subordination) compared to French monolinguals. An unexpected finding concerns the occurrence of a number of divergent production phenomena that are shared by bilinguals' productions in both languages and tasks, and suggest a bilingual-specific pattern of use.

The findings are discussed in the context of recent proposals regarding cross-linguistic interactions in simultaneous bilingualism. The persistence of bilingual-specific effects even at age 10 suggests that cross-linguistic interactions characterise bilinguals' verbal behaviour throughout language development. This supports the notion that the bilingual is a unique speaker-hearer in his own right (Grosjean 1985, 2008). With regard to the impact of typological and general determinants, the findings indicate that bilinguals' verbalisation choices are guided by a complex interplay of event-specific factors and the perceived overlap of language-specific properties of both languages.

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Abbreviations

A	Agent
ANOVA	Analysis of variance
AoA	Age of onset of acquisition
C	Cause
CHILDES	Child Language Exchange System
CLI	Crosslinguistic interactions
CM	Caused Motion
E	English
F	French
EB	Bilinguals (English elicitation group)
FB	Bilinguals (French elicitation group)
Loc	Locative expression
L1	Monolingual first language acquisition
L2	Second language acquisition
M	Manner
O	Object

OTH	Other Devices
P	Path
S-language	Satellite-framing language
SPSS	Statistical Package for the Social Sciences
SD	Semantic Density
V	Verb
V-language	Verb-framing language
2L1	Bilingual first language acquisition

Chapter 1

Introduction

Few concepts permeate human activity and experience as fundamentally as the domain of space. Linguistically, its central role is reflected in the universal and culture-independent availability of linguistic expressions to talk about space. Recent discoveries of striking crosslinguistic variation in spatial semantics (Levinson 2003) have led to a reappraisal of linguistic relativity issues and a surge of various empirically tractable neo-Whorfian approaches. A new take on the issue consists in exploring the ramifications of crosslinguistic variability for the process of language acquisition (e.g. Bowerman and Choi 2001, 2003). Research in this domain addresses the question to what extent language-specific factors guide children's course of acquisition.

The present thesis proposes that the acquisition context of simultaneous bilingualism (2L1) provides a unique opportunity for investigating implications of typological diversity for acquisition, for "bilinguals are the only ones to experience directly the effects of linguistic relativity" (Pavlenko 2005: 437). This study is devoted to addressing the following question: How do children growing up with two languages from birth develop and maintain two typologically diverging spatial conceptualisation systems, and how does their development compare to that of respective monolinguals? In this endeavour, the thesis is concerned with conceptualisation in as far as it is reflected in habitual patterns of *language use*, in line with Slobin's *thinking-for-speaking* assumption (Slobin 1996*a*). The particular focus of this study lies in the dynamics of crosslinguistic interactions in bilinguals' developing production patterns of spatial expression, which we propose to analyse as an indicator of the effect of language-particulars.

1.1 Aims and contribution of the thesis

The thesis is embedded in the context of a growing body of research on the consequence of typological diversity for language acquisition. Whilst the majority of studies in this area has been conducted in the context of child L1 acquisition (e.g. Berman and Slobin 1994, Choi and Bowerman 1991, Hickmann *et al.* 2009*a*,*b*) or, more recently, in L2 acquisition (e.g. Cadierno 2004, Cadierno and Ruiz 2006, Hendriks and Hickmann 2011, Hendriks *et al.* 2008), our addition of simultaneous bilingualism from birth contributes a new dimension, that to date has only been sparsely examined in this domain (for exceptions, see Álvarez 2008, Flecken 2010, 2011, Lanza 2001). The present study thus attempts to fill a gap in the increasingly multilingual empirical research in cognitive linguistics. We contend that adding simultaneous bilingualism is a particular desideratum for this line of research since this acquisition type offers a unique natural control condition for testing the effect of typological differences in event descriptions. Moreover, given that most research on simultaneous bilinguals has been devoted to the development of children's morphosyntax in both languages (de Houwer 1994, Meisel 1990, 2001), a developmental investigation beyond the acquisition of core grammar features would contribute to a more comprehensive understanding of this learner type. In this respect, it is still not very well understood how bilingual children's discourse, such as spatial reference, develops and whether and how the two languages interact in this domain.

Thus, by adding the acquisition perspective of the simultaneous bilingual learner to the current debate, the present study pursues two related goals. First, we wish to elucidate the role of language-particulars in acquisition through the lens of bilingualism and crosslinguistic effects. In turn, a systematic analysis of such effects is intended to broaden our understanding of bilinguals from birth in general, and of crosslinguistic interactions arising in this acquisition situation specifically. As regards the latter, the nature of the typological contrast present in the combination of English and French investigated in this thesis provides us with a rich testing ground for probing predictions from various formal and psycholinguistic frameworks (e.g. Gawlitzek-Maiwald and Tracy

1996, Müller and Hulk 2001, Toribio 2004) regarding the manifestation and directionality of crosslinguistic interactions in this type of bilingualism.

Methodologically, the present study offers a novel angle on studying simultaneous bilinguals. Whilst previous developmental research on this specific learner type has mostly been conducted longitudinally with very few children (e.g. for English-French, Paradis and Genesee 1996), this study is amongst the first of its kind to provide a large-scale cross-sectional investigation, comprising a sample of 96 bilinguals.[1] Furthermore, the controlled experimental design of this study sets it apart from previous research on bilinguals from birth, which to date mostly consists of observational naturalistic studies. The size of the sample, its controlled design, and the addition of monolingual control groups allow us to perform systematic comparisons across learner types and to apply statistical procedures to identify quantitative differences in production tendencies. Consequently, the study proposed in this dissertation constitutes a first step towards constructing a more generalisable picture of speech development and performance of bilingual populations that goes beyond the scope of case studies and qualitative observations.

1.2 Perspectives of the thesis and their rationale

The following subsections outline and justify the rationale of the theoretical and methodological approaches adopted to address the research questions of this thesis.

1.2.1 A cognitive typological perspective

The present investigation is couched in a general cognitive and psycholinguistic framework with a focus on empirical ramifications of specific typological claims in cognitive semantics put forward by Talmy (1985, 2000*a*,*b*). As such, it shares the general concern of cognitive and psycholinguistic approaches with language *use* and ascribes to the fundamental assumption that language cannot be understood sufficiently as solely constrained by syntactic and semantic

[1] Plus an additional 96 monolingual controls, totalling 192 participants.

rules, but is governed by more general cognitive abilities and hence fundamentally conceptual in nature (Croft and Cruse 2004, Langacker 2008). This perspective allows us to analyse bilingual performance not just in terms of deviations versus conformity to monolingual syntactic and semantic norms, but to investigate the bilinguals' developing usage patterns when constructing a conceptual domain in discourse. What is new in this respect is the investigation of a learner type that is not usually within the research scope of cognitively-inspired acquisition approaches, since studies on simultaneous bilingualism have mainly been conducted within a generative framework (e.g. Meisel 2001). In this thesis, we propose that the maturational criterion that defines bilingualism from birth is equally valuable for research informed by cognitive approaches to language, since it provides us with an extremely useful test case for exploring claims regarding the effects of typological differences, owing to its unique natural control condition (see 1.2.4 for rationale).

1.2.2 Connecting production and conceptualisation processes: *Thinking-for-speaking*

The present investigation is concerned with verbalisations of space and as such does not touch on strictly Whorfian issues of non-linguistic forms of cognition. However, choosing spatial verbalisations as dependent variable means that crosslinguistic patterns may reflect processes whose relevance extends beyond issues of linguistic structure and may potentially provide insight into conceptual representations. This is because the task of expressing spatial events requires a number of pre-verbal speech planning processes that go beyond structural linguistic decisions (Levelt 1989, von Stutterheim and Nüse 2003). That is, when expressing spatial events, speakers must make choices not only about the linguistic surface packaging of information, but also regarding those dimensions and elements to be selected for expressions and those to be omitted, thus reflecting the dimensions they must have attended to during event perception. This specialised form of cognition taking place 'online' during the speech production process constitutes what Slobin (1996*a*) has famously labelled *thinking-for-speaking*. According to Dan Slobin, speakers of different languages typically

exhibit specific tendencies in these online choices, resulting in different rhetorical styles (Slobin 1997, 2004).

For bilingual children, who are exposed to two diverging modes of *thinking-for-speaking* and associated rhetorical styles, this raises obvious questions. Will their *thinking-for-speaking* patterns differ in accordance with tendencies of each language, depending on the language they speak? Or will they exhibit one merged conceptualisation pattern? Alternatively, do bilinguals employ language-specific differentiated construal patterns that nevertheless display interactions? Our choice of the basic domain of space thus allows us to address potential cognitive ramifications as far as they pertain to the specialised type of cognition recruited during the speech production process.

1.2.3 A developmental crosslinguistic perspective beyond L1

The question of whether language affects concept formation can be addressed by comparing child language acquisition across different L1 contexts. This comparative developmental perspective was initiated by influential work by Slobin (1985) and Bowerman (1985) and has since then inspired a great number of developmental investigations across a range of typologically diverse languages (e.g Berman and Slobin 1994, Choi and Bowerman 1991, Hickmann *et al.* 2009*a*,*b*). The rationale followed by this line of research is that if language-specific factors affect concept formation, their impact should be reflected in language-specific acquisition paths. That is, we expect to find crosslinguistic developmental variation that corresponds to the typological properties characterising children's ambient target language. Conversely, if universal factors are the predominant guiding force in this process, spatial expressions by children growing up in typologically diverse linguistic environments should closely resemble each other. In other words, what is crucial in comparisons of child acquisition across diverse L1s is whether children's expressions approximate those of corresponding adults, which would testify to the impact of language specifics, or whether they conform more closely to the output of age-matched children of other L1s, thus evidencing the effect of more general, possibly universal factors.

Studies applying the above crosslinguistic approach comparatively to L1 acquisition contexts have proven extremely fruitful and their findings have repeatedly demonstrated the early and profound influence of language-specific factors on children's course of development. This important finding has led to a fundamental reassessment of hitherto widely accepted cognitivist assumptions regarding children's spatial conceptions (e.g. Piaget and Inhelder 1956). As a result, current research on this question acknowledges that both factors, language and general cognition, play a role and interact in children's development. However, whilst the impact of language particulars in this process is no longer controversial, more refined questions regarding their role still remain unresolved. Thus, there is as yet no sufficient degree of generalisable understanding regarding the relevant properties that result in some language-specific factors affecting the acquisition process whilst others do not. Thus, which properties precisely are associated with ease and difficulty for acquisition and why?

The present thesis builds on the developmental perspective of earlier studies, but puts forward 2L1 bilingualism as a viable alternative to crosslinguistic L1 studies. In doing so, we propose that the particular conditions present in simultaneous bilingual development offer a way of addressing some of the above questions with greater precision. Thus, the unique situation of two developing language systems within one mind may allow us to pinpoint more precisely the effect of language-specifics. The rationale is explained in the following section.

1.2.4 Bilingual acquisition as window on typology

Bilingualism from birth provides us with a unique situation in which two language systems develop in parallel within the same speaker. This means that a number of social, cognitive and psychological factors are automatically controlled for, which would otherwise act as confounds. In this way, simultaneous bilingualism provides us with a natural way of isolating the factor of language that we are interested in and hence allows us to examine more directly how language-specific factors play out in acquisition. Consequently, if we find effects on development, we can more safely ascribe them to language-specific

factors than in situations of L1 or L2 acquisition, where differences in exposure, proficiency, as well as cognitive and conceptual development all have to be taken into account as potential alternatives.

What counts as evidence for typological impact in an investigation of bilingual language use? What we propose is that in a situation of balanced command of the two languages, crosslinguistic interactions can be a window on typological factors. Thus, if bilinguals display systematic preferences for using particular language-specific patterns, either by overusing them (covert influence) or by carrying them over into the other language (overt influence), such finding could be indicative of the relative difficulty associated with acquiring the property affected.

Methodologically, adopting a crosslinguistic design, which analyses and compares bilinguals' production patterns in both languages, is crucial for this type of enquiry. The rationale in doing so is that an understanding of the impact of a given language-specific property on acquisition requires us to compare the effects on both languages. In this way, we can dissociate general acquisitional challenges from those that are really due to specific linguistic features. Accordingly, if a specific difficulty occurs only in one language, but not in the other, this increases the likelihood of a language-internal source of the effect.

1.3 Organisation of the thesis

The dissertation is subdivided into two parts. The first part, subsuming chapters 2 – 4, provide the theoretical backdrop for the following empirical investigation, which is laid out and discussed in the second half of the thesis, in chapters 5 – 8.

Chapter 2 consists of two related sections. The first half provides an overview of the universal foundations of space and presents the vast typological differences in how different languages carve up this conceptual category. Particular attention is devoted to Talmy's cognitive semantic theory regarding the typological dichotomy of motion events, which constitute the centre of our investigation. This is followed by a detailed survey of the lexicalisation patterns typically exhibited by speakers of *verb-* versus *satellite*-framing languages in

general, and speakers of English and French in particular, providing a basis for an assessment of the acquisition situation of bilingual learners.

Chapter 3 is devoted to a review of empirical studies on implications of Talmy's motion typology for language acquisition in both child L1 and adult L2 contexts. This is followed by a discussion of results from the limited body of research available on motion event expression in child bilingual acquisition. We highlight what these studies suggest regarding both the impact of language-specific properties generally, and specifically for motion event verbalisation in the acquisition of English and French.

In chapter 4, we critically discuss definitions and criteria proposed for bilingualism and the notion of crosslinguistic interactions, which will recur throughout this thesis. Proposals from different frameworks regarding the underlying mechanisms and motivations of this phenomenon will be presented along with various proposed explanations for the directionality of its manifestation, some of which form the basis of our hypotheses. The chapter also makes a connection with the potential implications of these interactions for the debate regarding the separation or interdependence of bilinguals' language systems. In this context, we present a number of psycholinguistic bilingual production models that are relevant for the present investigation of lexicalisation patterns.

Chapter 5 presents the methods chosen for the present study, including a description of the design and materials used for speech elicitation, details of the data collection procedure and the coding scheme, along with a presentation of the research questions and hypotheses guiding our investigation.

The results of our study are presented in chapters 6 and 7, analysing voluntary and caused motion verbalisations respectively. Bilinguals' production patterns are analysed in each language in relation to corresponding monolinguals', taking into account quantitative and qualitative divergences from the latter and potential occurrences of crosslinguistic interactions.

The concluding chapter 8 provides a global summary and discussion of findings from both verbalisation tasks along with a presentation of implications for broader issues. Finally, the chapter points out limitations and drawbacks of the study along with suggestions of how to address them in future research.

Chapter 2

Motion Events

2.1 Space – a universal concept?

2.1.1 Why motion?

The present thesis is concerned with the linguistic expression of motion, one of the most fundamental concepts in human cognition and experience generally. For the purpose of this study, we define motion in accordance with Talmy (2000*a*: 35) as "a situation containing motion and the continuation of a stationary location alike". Motion can be either *voluntary*, that is, spontaneous and self-initiated by an agent, or *caused*, in which case an independent agent or force causes the movement of an entity. As such, motion forms part of the larger concept of space, which has been the subject of intense study by a long tradition of research in philosophy, psychology, biology, and, more recently, also in linguistics. This interdisciplinary interest is in no small part due to the universal nature of space, which is not only fundamental to humans, but is also in part shared with other species (Newcombe and Huttenlocher 2000: 1). Moreover, not only are we physically part of space as a basic dimension of physical existence, but there is reason to believe that we are cognitively hard-wired to think in spatial terms and hence cannot conceive of the world otherwise. This idea goes back to Kant, whose notion of space as an irreducible *a priori* intuition was to become one of the most influential ones in Western philosophy. Since then, the bulk of the intellectual debate has been mainly concerned with the universal character of space, which has frequently been showcased as a evidence of the unity of the human psyche that remains constant irrespectively

of all cross-cultural variation.[1] However, careful crosslinguistic research of the past 25 years has seen the discovery of far-reaching diversity in the linguistic expression of spatial concepts. The ensuing debate has raised questions about potential cognitive implications and reignited the dialogue about issues of linguistic relativity.

For the purpose of the present study, the spatial domain of motion is chosen mainly on account of the interesting typological contrast it provides for the study of bilingual language acquisition. Although embedded in a rich cognitive research tradition on motion and its conceptual correlates, the present thesis is not directly concerned with cognitive issues per se. Instead, the focus is on language-specific differences in *talking* about motion and the implications of these differences for the process of bilingual acquisition. The universality of motion and space more generally is relevant in as far as it allows crosslinguistic comparisons. Thus, given its fundamental importance, motion can be and is expressed in all languages and talked about from very early on in child language development (Mandler 1992). Thus, utterances by young children of different cultural and linguistic backgrounds reveal a preoccupation with motion that emerges in their second year (e.g. *Down. Drop!*, see Bowerman 1999: 385). Even earlier in development, studies on infant perception show that babies' attention is drawn to moving objects from birth (Haith 1980). However, as we shall see in this chapter, the way motion is expressed differs strikingly across languages, resulting in an interesting situation for the bilingual child whose cognitive understanding of space and motion develops at the same time as (s)he learns to talk about it in both languages. The implications for crosslinguistic interaction in bilingual language development form the primary focus of this thesis.

The organisation of this chapter reflects this research agenda. In 2.1.2, we provide a short introduction to the wider intellectual research context which the present study is embedded in. In 2.2, I outline the core notions on which Talmy's motion typology is based and present the characteristics of motion expression in English and French, including some recent elaborations of Talmy's classification framework. The chapter closes on a sketch of the input situation that the linguistic contrast between English and French implies for the bilingual

[1] See Levinson (2003) for a detailed discussion of the intellectual history of spatial research.

learner (2.2.6).

2.1.2 Spatial language and cognition: Universality and diversity

Space constitutes a particularly interesting domain for the investigation of universal and language-specific factors in language and cognition. First of all, space represents one of the most basic, evolutionarily earliest and all-pervasive domains of human existence (Johnson 1987, Levinson 2003). Our understanding of spatial relations is critical to our orientation and hence survival in our physical surroundings and without the shared ability to interpret spatial relations, e.g. to locate objects or to orient ourselves towards a goal, the most basic human activities pervading our daily life would be impossible. The fundamental role of space is further supported by its intimate connection with other biologically constrained cognitive systems, such as visual perception. Furthermore, neuroscientific evidence from human brain lesions suggests that our sense of space is based on a multitude of converging neurophysiological systems (see Levinson 2001:1). In more language-related terms, keeping spatial track of referents location and change of location in discourse is equally crucial to ensure successful communication. Given that spatial cognition is highly constrained by our human biological make-up, it seems natural that we would intuitively expect it to have a particularly strong claim to universality and to leave little room for cultural or linguistic variation. Therefore, it comes as no surprise that it has traditionally been assumed that the expression of space in language '[…] closely mirrors the contours of non-linguistic spatial understanding' (Bowerman 1999: 387).

Despite the universal basis of spatial cognition, a number of crosslinguistic investigations into the expression of spatial categories discovered considerable variation in how speakers of different language backgrounds carve up the domain space (Levinson 2001, 2003, Lucy 1992*a*,*b*, 1996) for the purpose of communication. Whilst the scope of linguistic variation unravelled was surprising, the more controversial aspect of the discovery concerned the robust correlations investigators detected between differences in talking about space

and behavioural differences in non-linguistic tasks, which challenged widely held universalist assumptions about spatial cognition and revived an old question concerning linguistic relativity, originally associated with the Sapir-Whorf hypothesis.[2] The debate about the possible influence of language on cognition had fallen into discredit for many years, but the above findings had brought the relativity question back to the fore. Importantly, the carefully designed experimental and anthropological field work built the basis for a more seriously scientific discussion of this question, which changed the debate from a simple "either-or" opposition between cognitive determinism (e.g. Clark and Clark 1978) and linguistic determinism (e.g. Vygotsky 1986) to a more nuanced approach that crucially allowed for an operationalisation of abstract concepts such as 'thought' and 'language' as measurable variables. Consequently, the question in the present debate is no longer whether language straightjackets thought generally, but whether specific lexical and grammatical aspects of a language exert an influence on specific aspects of cognition, such as categorisation and memory. Moreover, the simple equation of linguistic with conceptual structures that was assumed by most of the earlier work on this subject has in recent research been replaced by rigorous methodologies that are based on clear distinctions between the semantic and the conceptual level and an acknowledgement of the indirect link between the two (see Levinson 2003 for a detailed theoretical discussion). Additionally, they are guided by clearly laid out methodological agendas of how to establish and identify evidence for an influence of one on the other (Lucy 1992*a*,*b*). This refined approach to the ancient relativity question is now generally identified as 'Neo-Whorfian' and subsumes a range of slightly different conclusions regarding the depth of linguistic influence, as well as domains of reference.

In the spatial domain, one of the most influential representatives of Neo-Whorfianism is associated with research by Stephen Levinson and colleagues (Brown and Levinson 1993, Levinson 1999, 2003, Pederson *et al.* 1998) on the linguistic diversity of frame of reference systems and their cognitive conse-

[2]The hypothesis originates in influential ideas by von Humboldt (1985) and holds that different languages point speakers to different observations, leading them to arrive at different "world views" (Whorf 1956).

quences. Frames of reference are essentially coordinate systems that indicate communicative strategies employed by speakers of locating an entity in space by relating it to another point or frame of reference, a *relatum*. Locating objects in space is a universal ability that is crucial to many human activities. Levinson discovered that speakers of different languages preferentially use strikingly different spatial frameworks, which fall into three major types according to the coordinate system chosen, distinguishing intrinsic, relative and absolute frames of reference (see Levinson 1999 for a summary). The intrinsic type takes an object-centred view and determines coordination by reference to intrinsic aspects of the relatum such as its side, front etc. As an example, the spatial relationship between a man and a television could be encoded as 'The man is standing in front of the television', taking the front of the television (functionally defined here) as reference point. A relative frame of reference assumes a viewer-centred standpoint and would describe the same spatial relationship as 'The man is standing to the right of the television', with the viewer's bodily axis and the resulting viewpoint acting as reference frame. Finally, an absolute frame of reference relies on fixed cardinal bearings and would result in a description of the above relation as 'The man is standing to the north of the television'. Whilst the previously prevailing assumption was that linguistic frames of reference universally follow an egocentric conception of space and hence mainly display the relativistic frame in all languages (e.g. Miller and Johnson-Laird 1976), Levinson discovered that speakers of Tzeltal (spoken in Mexico) primarily employ the absolute frame of reference, both in their linguistic coding, and correlated with that, in a range of non-verbal cognitive tasks, such as recall and recognition memory. This correlation was interpreted by Levinson and colleagues as evidence that "particular languages seem to dictate the use of frames of reference in nonlinguistic tasks" (Levinson 1999:157). However, this rather strong relativistic claim met with a lot of criticism (see, for example Li and Gleitman 2002). Besides the difficulty of controlling for cultural variation, which could alternatively have produced the differences in non-linguistic behaviour, a major problem concerns the question of how to ensure that a task is really non-linguistic. That is to say, how do we know speakers do not re-

cruit language as a verbal strategy of solving the task at hand?[3] It is difficult to rule out this possibility in research of this kind, which means that going beyond a mere correlation to a claim for a causal link between language and cognition is hard to substantiate. Triangulating such correlations with other methodologies of getting at the same question will be crucial. In this respect, a viable alternative to approaching the question regarding the role of language is through the perspective of ontogeny, the rationale of which is outlined in the following section.

2.1.3 Linguistic and conceptual development of space

In language acquisition research, the above relativity issues are taken up in the form of an old question concerning the relationship between children's conceptual and linguistic development. In the domain of space, the moot question is whether and to what extent language plays any role in guiding children's construction of spatial concepts or whether spatial understanding and spatial language develop independently from one another. The traditional position on this issue has been the hypothesis of cognitive priority, which holds that spatial concepts develop first and that children subsequently search for the corresponding linguistic forms in their ambient language so as to be able to express these concepts. Notable proponents of this position are Jean Piaget (e.g. Piaget and Inhelder 1956, Piaget 1954) and Dan Slobin (early work, e.g. Slobin 1973) who base this claim on wide-ranging evidence that children bring a great deal of prelinguistic knowledge to the task of language learning and that language reflects and follows from these pre-established spatial concepts. In this respect, Piaget's and colleagues' work on the development of spatial cognition in children demonstrated that the emergence of spatial words in children consistently followed the acquisitional sequence posited for the development of spatial concepts. Accordingly, children were found to first express notions of containment (*in*), support (*on*) and occlusion (*under*) and later start using words expressing the concepts of proximity (*beside*) and finally express projective re-

[3]This problem has been raised by many critics. However, we wish to add that even if inner verbalisation is used as a strategy, this would nevertheless constitute an effect of language, even though of a different quality than expected (conscious rather than unconscious influence).

lations by words such as *behind*, suggesting that spatial concepts first mature non-linguistically before children search for linguistic forms to express them in their target language. This idea also found support in crosslinguistic research into the emergence of basic locative expressions by Johnston (1984) and Johnston and Slobin (1979) who similarly discovered that children with different input languages acquire spatial markers in a consistent order, which they interpreted as reflecting two types of non-linguistic factors: on the one hand, the cognitive complexity of associated concepts, and on the other one, the communicative salience (from the child's perspective) of the spatial relation encoded.

More recent research on this topic initiated by Bowerman and colleagues (Bowerman 1996, Choi and Bowerman 1991) put the assumption of conceptual primacy in ontogeny to the test by systematically comparing acquisition paths of spatial language across different languages. The rationale followed by this line of research is that if universal or generally non-linguistic determinants guide children's acquisition of spatial language, then spatial expressions by children acquiring different mother tongues should resemble each other more than those by adults of each respective language. If, on the other hand, concepts are at least partially induced by the specific language acquired, then children's verbalisations of spatial relations should look more similar to those of corresponding adults. The surprising upshot of these studies was that children's earliest linguistic productions (before their second birthday) correspond closely to language-specific categories, suggesting the possibility of language contributing to the construction of spatial concepts from the start, without going through an initial universal stage (see chapter 3.1 for summary). From the perspective of the young language learner, this finding is remarkable given that it suggests that children are sensitive to specificities of the language input very early and have the capacity of replicating them in their own utterances.

The present research debate on this issue is guided by an acknowledgement that both linguistic and non-linguistic general cognitive factors interact pervasively in children's development and that both contribute to children's construction of spatial concepts and language. Accordingly, it is hardly deniable that children's conceptual development is supported by a range of prelinguistic predispositions and biases as well as different kinds of knowledge about

space, whether innate universals ('core' knowledge, see Spelke 1994, 2003) or acquired through early interaction with the environment and universal perceptual processes (see, for example Mandler 1988). Such universal determinants account for some of the crosslinguistic uniformity found in acquisition paths. On the other hand, it is also evident that children internalise language-specific spatial distinctions from early on, mirroring the crosslinguistic semantic variation characterising adults' spatial language. Research today is less concerned with the question of *whether* language plays a role at all, but is more interested in delineating its scope of influence relative to the weight of general cognitive factors. In order to do so, much more specific questions about the role of language are pursued. How early does language-specific influence kick in and what types of linguistic properties have an impact on conceptual formation and which ones do not? The greater precision informing research questions has also resulted in a refinement of the notion of 'general determinants', which subsumes a range of general factors, such as memory and processing constraints (e.g. Clark and Clark 1978), but importantly is no longer considered in simple opposition to 'language-specific', but includes some language-related factors, such as the relative formal complexity (morphological as well as syntactic) of linguistic devices and the resulting processing load and accessibility, which can affect the rate of acquisition of the associated form-function mappings (Johnston and Slobin 1979, Slobin 1982). In the domain of motion, this interactive approach to language-specific and general cognitive constraints is pursued, amongst others, by Allen *et al.* (2007) (for discussion, see chapter 3.1.3), Hickmann (2003, 2007, 2010), Hickmann *et al.* (2009*a*) and Hickmann and Hendriks (2006) and is shared by the present thesis.

The relevant question arising for the present study is how the complex learning task that crosslinguistic variation poses to child learners plays out in the bilingual learner who has to tackle the language-specificities of two ways of structuring space simultaneously, whilst being constrained by the same general cognitive determinants as monolinguals. As proposed in chapter 1, examining bilinguals' acquisition paths constitutes one way of disentangling the relative contributions of language-specific and general factors in development.

2.2 Motion Events

2.2.1 Talmy's typology of motion events

Just like static spatial relations, motion represents a basic concept that is rooted in our immediate human experience and is of universal importance, as reflected in infants' prelinguistic intuitions about motion, such as the expectation that objects placed in midair should fall (Needham and Baillargeon 1993). Regarding the two types of motion events investigated in this thesis, studies show that children start perceptually distinguishing voluntary and caused motion as early as four months of age (Leslie 1984) once they have developed an understanding of the concept of agency (Mandler 1992). Nevertheless, motion also presents us with considerable variation in how it is habitually encoded across languages, which has been famously captured by Leonard Talmy's motion typology (Talmy 1985, 2000*a*,*b*).[4] According to Talmy (1985: 60ff), a *motion event*[5] consists of a universal set of four obligatory internal semantic components, listed and defined below (from Talmy 1985: 61):

Motion: The presence of movement *per se*

Figure: The object which is located or moves with respect to another entity

Ground: The reference entity with respect to which the Figure is located or moves

Path: The trajectory followed or location occupied by the Figure in relation to the Ground

These four components make up the internal structure of a basic motion event ('framing event'), exemplified in (1), with Path considered to be the 'core schema' (Talmy 2000*b*: 218), since it determines the distinguishing character of the fram-

[4]For precursors of Talmy, consult contrastive and comparative stylistic studies by Tesnière (1965) and Malblanc (1963).

[5]The notion of 'event' refers to the conceptual and linguistic representation of a perceived situation taking place in the external world. For a critical discussion of event theory, see Klein (1994).

ing event, that is, it defines motion.[6] Additionally, motion events may be associated with an optional external 'co-event' (Talmy 2000*b*: 26) that performs a supportive function for the basic framing event and typically contains one or both of the following 'circumstantial' semantic components:

Manner: The subsidiary activity or state exhibited by the Figure, taking place concurrently with the main event (Talmy 1985: 128)

Cause: The cause of the occurrence of the event

Examples of a framing event coordinated with a co-event specifying Cause and Manner are provided in (2) and (3).

(1) She [Figure] came [Motion] down [Path] the slope [Ground].

(2) He put [Motion + Cause] the bowl [Figure] into [Path] the cupboard [Ground].

(3) The pencil [Figure] rolled [Motion + Manner] off [Path] the table [Ground].

2.2.2 Verb-framed and satellite-framed languages

Talmy's typological work is motivated by an interest in how languages regularly associate the above semantic components with surface forms, referred to as 'lexicalisation' (Talmy 1985: 59). Accordingly, 'lexicalisation patterns' refer to characteristic ways of associating form and meaning in a language when expressing motion events and therefore have to be (i) *colloquial* in style (as opposed to literary), (ii) *frequent* in speech (rather than occasional) and (iii) pervasive, spanning a wide range of semantic notions (Talmy 1985: 62 and Talmy 2000*b*: 27).

Based on where different languages typically lexicalise the core-schema of motion, Path, Talmy proposes a basic typological dichotomy that distinguishes *verb-framed* and *satellite-framed* languages. Verb-framed languages (e.g. French and other Romance languages, Semitic, Japanese, Korean, Turkish) typically

[6] The core schema also encompasses notions such as result and aspect and thus also determines the temporal structure ("contouring") of the event (Talmy 2000*b*: 222).

conflate[7] Motion and Path in the verb root (e.g. *traverser* 'to cross'), as exemplified in (4), whilst in satellite-framed languages (English, other Germanic languages and Russian), Path typically appears in so-called *satellites* (e.g. *up*), illustrated in (5). According to Talmy, a satellite is defined as "the grammatical category of any constituent other than a noun-phrase or prepositional phrase complement that is in a sister relation to the verb root" (Talmy 2000*b*: 102). Typical examples of Talmyan satellites are English particles (*up*, *down*) or German prefixes (e.g. ***hoch****rennen* 'run **up**').[8]

(4) Elle est **entrée** dans la maison (en dansant).
She is entered in the house (by dancing).
'She danced into the house.'

(5) He ran **down** the stairs.

Whilst verb-framed languages typically express Path together with the fact of motion in the verb root, speakers of satellite-framed languages predominantly use this linguistic device to code Manner, as evident from (5) above. This means that in English, as in other satellite-framed languages, motion event descriptions typically include a co-event with Manner specification in the main verb. By contrast, in French and other verb-framed languages, Talmy notes that Cause and Manner are often omitted (as indicated by the parentheses in (4) above) or "established in the surrounding discourse" (Talmy 1985: 69). Consequently, English and French differ not only with respect to the *locus* of encoding, that is, where in the sentence information appears, but also regarding the regularity of co-expressing internal (Path) and external (Manner/Cause) semantic components, which is partly due to the language-specific grammatical and lexical means available for doing so. That is, when co-events of Manner and/or Cause are to be incorporated within the same sentence, the linguistic means available to the two types of languages are not equivalent. In these

[7]Note that in Talmy's later work (Talmy 2000*a,b*) abandons the terminology of 'conflation' (joint lexicalisation of two or more semantic components within the same morpheme) and instead refers to typical expression of components in the verb root versus satellites.

[8]Talmy's definition of satellites is problematic since it excludes certain elements such as English prepositions (see Croft *et al.* (2010) and Beavers *et al.* (2010) for detailed criticism). Most investigators today favour a more broadly defined category of satellites that includes all Path-expression outside the main verb. This is the position adopted in this thesis.

cases, speakers of verb-framed languages like French have to resort to coding the co-event in an independent constituent, that is, devices in the periphery of the main verb (henceforth *peripheral means*), typically a gerundive or adverbial, as illustrated in (6) and (7), whilst speakers of satellite-framed languages can compactly combine the expression of both the core-schema and the co-event by adding Path-satellites to Manner/Cause-verbs, as in (8).

(6) Il a traversé la rivière **en nageant** [gerund].
He has crossed the river by swimming.
'He swam across the river.'

(7) Il a traversé la rivière **à la nage** [adverbial].
He has crossed the river at the swim.
'He swam across the river.'

(8) He **swam** [main verb] **across** [satellite] the river.

Owing to the above typological contrast in the context of joint incorporation of several semantic components, a further stylistic difference arises regarding the naturalness of including or omitting Manner and/or Cause (Talmy 1985: 121ff.). That is, due to the lack of productive satellites in verb-framed languages and the subsequent need for peripheral encoding of additional elements, the inclusion of a Manner/Cause co-event in many Romance languages can be pragmatically marked since "any other component is forced into the foreground" (Talmy 1985: 123). Accordingly, languages not only differ with respect to where in the sentence semantic information is typically encoded, but also regarding "the amount and types of information that can be expressed in a backgrounded way". This implies different degrees of 'salience' associated with semantic elements, which Talmy defines as the degree of attention a semantic component attracts due to its emergence in a particular linguistic device. Certain linguistic devices, notably main verbs and satellites, can carry information in a backgrounded way. Consequently, due to the large and varied range of satellites available in English, both internal and external motion components can be systematically incorporated in English without a foregrounding effect, whilst in French and other verb-framed languages, expressing components other than Path not only often involves more formal complexity (subordination), but also

incurs the cost of a pragmatically marked effect (foregrounding).

2.2.3 Event-type variability: 'split systems'

Several explanatory remarks are in order regarding the validity of Talmy's binary classification for the description of English and French. The first point concerns the applicability of the satellite/verb-framing contrast to different types of motion events. In his more recent version of the typology, Talmy concedes that some languages may constitute "split systems" (Talmy 2000*b*: 64) in that they employ different types of lexicalisation patterns for different types of motion events. In this respect, an important distinction to draw is between motion events that imply a change of location (and hence encode a change of state) as opposed to motion events *within* a location. Talmy refers to this distinction in terms of *translational* as opposed to *self-contained* motion:[9]

> *In translational motion, an object's basic location shifts from one point to another in space. In self-contained Motion, an object keeps its same basic, or "average," location.* (Talmy 2000*b*: 35)

Talmy's basic typological contrast appears to be most consistently applicable to translational motion events. Thus, when expressing a change of location, French and other Romance languages in principle only license the verb-framing conflation pattern (although see 2.2.4), as in (9), whilst motion that does not necessarily imply a location change can also be expressed by a satellite-framing pattern, as illustrated in (10).[10] English is much more systematic in this respect, since the same conflation pattern consistently applies, irrespectively of the type of motion event to be expressed, as demonstrated by (11) and (12).

(9) Il est entré en courant.
He is entered by running.
'He ran in.'

[9]The terminology is inconsistent in the literature. The distinction is variably referred to as *directional* vs. *locative* (most authors) and sometimes as *lative* vs. *illative* (mostly for spatial case marking). Note that the distinction corresponds to the contrast drawn by Tesnière (1965) between *Mouvement* ('movement') and *Déplacement* ('Displacement').

[10]Although this does not preclude inferences of location change from the discourse context.

(10) Il a couru dans la maison.
He has run in the house.
'He was running in the house.'

(11) He ran into the house.

(12) He was running in the house.

This event-type distinction and the associated 'split' behaviour in many verb-framed languages have been widely recognised in the literature. Slobin and Hoiting (1994) observe that when a boundary is crossed by the Figure, verb-framing languages only license the expression of Path in the verb, which they refer to as the *boundary crossing constraint*.[11] Similarly, Aske (1989) contrasts the two event types in terms of telicity and observes the same split conflation behaviour for Spanish with atelic events licensing both patterns and telic Paths allowing only for the Path-conflating pattern.

A second issue concerns the degree of admissible intralinguistic variability of conflation patterns. It is worth emphasising that lexicalisation patterns should not be conceived of as an absolute contrast, but characterise predominant encoding tendencies that do not preclude the use of alternative conflation options. In this respect, note that the English motion lexicon also comprises a number of Path-conflating verbs of Latinate origin (*enter*, *exit*, *descend*, *ascend*). However, note that these verbs neither constitute pervasive strategies of expressing Path, nor do they meet Talmy's criterion of colloquial style. That is, their use is marginal, pragmatically marked and hence does not constitute a *characteristic* way of packaging information in English. The issue of intralinguistic variability is more pressing for French, which has generated some debate about the validity of the verb-framing classification. Some investigators advocate a characterisation of French as a 'mixed' or 'hybrid' system (e.g. Pourcel and Kopecka 2005). This is based on the availability of a subset of satellite-framing patterns in French, which partly consists of a number of Latinate verbal Path-prefixes (e.g. *a(d)-*, *tra-/trans-/tre-*, *é-/ex*, *ré-/re-*). These prefixes are di-

[11]According to Slobin, the reason for this different behaviour is that boundary crossing implies a change of state: "It appears to be a universal characteristic of V-languages that crossing is conceived of as a change of state, and that state changes require an independent predicate in such languages" (Slobin 1997: 441).

achronic remnants of an earlier stage of the language when satellite-framed constructions were much more widely used (Kopecka 2006). However, in modern French, they are for the most part unproductive (except for *dé-* and *re-*), as is evident from the fact that they can only combine with a very restricted range of verb roots (e.g. *accourir* 'to come running', *s'envoler* 'to fly away', *retourner* 'to return', *traverser* 'to cross'). However, the hybrid nature of French is in fact much more pervasive and extends far beyond these limited prefixes. As will be presented in the following section (2.2.4), a range of other construction types contribute to a highly variable picture in French motion descriptions. In the present context, we are less concerned with the typological implications of these constructions, that is, whether the typological classification should be revised or not, but our interest is in the consequences of this system-internal variability for the bilingual learner situation. That is, we are concerned with characterising the input situation that bilingual children face and with mapping out the scope of linguistic possibilities available for motion expression.

2.2.4 Intralinguistic variability in French

As noted above, self-contained motion events may be expressed by a satellite-framing pattern in French with Manner/Cause information appearing in the verb root. This presupposes that French provides a certain number of verbs that encode Manner and/or Cause (e.g. *marcher* 'walk', *sauter* 'jump', *pousser* 'to push', *tirer* 'pull'), which is indeed the case.[12] Thus, French differs from English not so much with respect to the lexical and grammatical possibilities of using the main verb slot for Manner, but when it comes to the combinatorial potential with peripheral Path. In this respect, note that there are only very limited means of expressing Path unambiguously in the verbal periphery in French. Although a range of locative prepositional markers (e.g. *dans* 'in', *sur* 'on') are available, their semantic status is ambiguous. In the literature, there is some disagreement about their semantic value due to the fact that they often occur in contexts that are clearly meant to convey directional motion (e.g., *Il saute dans*

[12]French also uses a set of complex causative constructions consisting of the light verb *faire* 'to do' and an infinitival motion verb (e.g. *faire rouler* 'to make roll').

l'eau. 'He jumps in the water.'), leading some investigators to attribute Path meaning to them (e.g. Croft *et al.* 2010). However, the directional interpretation in these cases cannot be directly attributed to the prepositions themselves, but arises through inference from the surrounding discourse (such as the verb meaning), that is, from pragmatic rather than semantic sources. Therefore, following Vandeloise (1986), we adopt a conservative stance on this issue, according to which the lexical semantic meaning of these markers is purely locative. Nevertheless, the frequent interpretation as translational motion relates to a phenomenon that has been pointed out by several investigators as a characteristic discourse property of French and other Romance languages and consists in a greater tendency to leave semantic information to be inferred from context (Kopecka 2009, Pourcel and Kopecka 2005, Slobin 1996*b*, 1997). Thus, Kopecka (2009) argues that French relies heavily on constructing Path meaning from a combination of sources, including the lexical verb meaning, formal and aspectual verb properties, world knowledge about the Ground entity, as well as pragmatic factors. Hence, directional meaning cannot be easily attributed to one particular constituent. Rather, French speakers construct part of spatial meaning in discourse. Similarly, crosslinguistic comparisons of motion in narrative by Slobin (1996*b*, 1997) demonstrate that speakers of verb-framed languages compensate for their omission of explicit Path information by providing more static 'stage setting' with rich information about Ground entities, from which the trajectory can be inferred. Thus, the greater reliance on pragmatic strategies may be a compensatory strategy in French for the structural constraints on joint encoding of several information types. However, note that the Talmyan framework is tailored to sentence-level meaning from lexical and structural sources, but is ill-suited to accommodating pragmatic strategies.

Besides the above pragmatic means, the French system also provides a number of linguistic strategies of satellite-framed Path-coding. Thus, a specific subset of Path-prepositions (*jusqu'à* 'up to', *de*/*depuis* 'from', *vers* 'toward') can be combined with any Manner-verb to achieve a Path interpretation (see, e.g. Beavers 2008, Beavers *et al.* 2010, Cummins 1996, Gehrke 2007*b*), independently of whether a boundary crossing is involved or not (*pace* Slobin and Hoiting 1994). These prepositions receive a directional reading by establishing refer-

ence to either the source (*de*/*depuis*), the goal (*jusqu'à*) or the direction (*vers* 'towards', *de – à* 'from – to') of the trajectory, as illustrated in (13).

(13) Il a marché **jusqu'au** sommet.
He has walked up-to-the top.
He walked **all the way up to** the top.'

However, note that these prepositions are semantically not exactly equivalent to their English counterparts in that their use implies a focus on the extent of the Path ('as far as, as much as, even') (Fortis 2007), as indicated by the English translation in (13). That is, even though the use of this subset of prepositions represents satellite-framed behaviour, the Path-marking realised by these prepositional markers is not entirely neutral, which strictly speaking restricts their validity as lexicalisation pattern according to Talmy's definition. Nevertheless, the pattern cannot easily be discounted as marginal given that its use is firmly established amongst native speakers, as demonstrated by Pourcel and Kopecka (2005) and Pourcel (2004), who refer to the above encoding strategy as 'reverse verb-framed' pattern. They include under this header any French construction where "the prototypical syntactic slots for Path and Manner information are swapped around" (Pourcel and Kopecka 2005:145), such that Manner/Cause appear in the main verb and Path in a peripheral device. Note that this includes more controversial atypical constructions, such as Path-gerunds, as in (14).

(14) ?Il court [Manner-verb] en traversant [Path-gerund] la rue.
He runs by crossing the road.
'He runs across the road.'

However, as the authors point out, Path-gerunds are not consistently judged as acceptable by native speakers, which they attribute to the atypicality of combining Path-semantics with syntactically subordinate elements in French. Although the above pattern is grammatically within the scope of possible encoding strategies in French, the construction appears to be pragmatically marked and awkward to native speakers (Pourcel and Kopecka 2005:146).

In sum, the availability of a viable subset of French satellite-framing patterns presented above demonstrates that the French motion system allows for

a high degree of variability. Although this does not imply that all of these patterns are necessarily exploited to the same extent in neutral language use, it is nevertheless important for the present purpose to point out the grammatical and lexical resources available in French. The presence of a marked but nevertheless available satellite-framing subset in French means that English-French bilinguals do not face an entirely contrasting system, but that their input provides evidence for some degree of crosslinguistic overlap between lexicalisation patterns, which may be of particular relevance for the bilingual learner's acquisition task, as we shall see in chapter 4.

2.2.5 Elaborations of Talmy's typology: Slobin's Manner cline

Talmy's typology encountered a great deal of criticism in the literature and various revisions and elaboration of the rigid binary framework have been proposed, mainly with the purpose of accommodating other types of languages that do not easily fit the Talmyan classification (see, for instance, Zlatev and Yangklang 2004 for the case of Thai and Ji 2009 for Chinese). An influential alternative to the typological dichotomy is Slobin's proposal of a discourse-based cline of Manner salience (Slobin 2004, 2006). Importantly, Slobin's proposal is based on a different perspective on motion encoding, which distinguishes languages not in terms of *where* semantic components are encoded (i.e. verb root vs. satellites), but *what* components are encoded by speakers (Path vs. Manner) and how frequently, hence giving rise to a typological continuum that allows for gradual differences between languages rather than imposing a discrete distinction. In this respect, Slobin further argues that Talmy's crosslinguistic division in terms of Path is essentially misconceived given its obligatory status for translational motion:

> *Because path is an obligatory component of motion event expression, we can't compare languages in terms of the accessibility of path as a category [...] without a path verb or satellite or other path element, there is no motion event.* (Slobin 2004: 17)

That is, languages do not differ as to whether they express Path or not, but with respect to how much scope they habitually leave for the expression of

Manner. Thus, Slobin advocates comparing languages in terms of Manner *codability*, which refers to the accessibility of both lexical and structural resources in a system for encoding this event dimension. The single most important structural criterion concerns the extent to which the obligatory main verb slot is free to encode Manner as a result of other devices carrying Path information. Crucially, in English as in other satellite-framed languages, the accessibility of a wide range of satellites for Path encoding means that the expression of Manner via the verb comes "for free" (Slobin 2003: 4). As a consequence, due to the obligatory nature of the main verb, English speakers habitually express Manner information together with Path, whilst speakers of verb-framed languages do so much less frequently due to the higher processing costs incurred by the required heavy peripheral constructions. That is, since additional Manner expression is more of a processing "luxury" for V-language speakers (Slobin 2004: 3), it will preferentially be omitted from linguistic expression and left to inference, unless it is at issue. Regarding lexical criteria, codability is further determined by the properties of the lexical inventory available in a system for expressing an event component. In this respect, Slobin (2006) observes that satellite-framed languages typically provide speakers with a rich and diverse lexical repertoire for expressing fine-grained Manner-details, whilst the Manner vocabulary characteristic of verb-framed languages is by comparison relatively limited with fewer and semantically more neutral verbs that make much less fine-grained Manner-distinctions (Slobin 2006: 71ff.). In a large crosslinguistic survey of motion expression (see chapter 3 for overview), Berman and Slobin (1994) find that in accordance with the above criteria, languages differ in how characteristically speakers make mention of Manner. Since this dimension is not captured by the Talmyan dichotomy, Slobin proposes a typological revision that places languages on 'cline of Manner salience' (Slobin 2006).

The degree of Manner codability is also correlated with a range of other discourse characteristics, giving rise to further typological differences (Slobin 1997, 2004). First of all, the habitual association of the verb slot with Manner has narrative repercussions for Path expression. Due to the availability of syntactically low-cost Path-satellites that can be compactly stacked within a single clause, speakers of English frequently deliver quite elaborate and detailed Path

descriptions that break up the trajectory into several components, as in (15) (extracted from Slobin 2004: 18).

(15) they decided to walk **outside** the house **down to** the back of the garden **out into** the bit of a forest there

Both of the above discourse factors taken together, i.e. degree of Manner mention and Path elaboration, engender what Slobin terms *rhetorical style* (e.g. Slobin 1997: 443ff.), that is, characteristic habits of encoding certain dimensions of motion events. Slobin further suggests that the rhetorical style associated with a given language has certain cognitive implications. Thus, the discourse patterns of Manner and Path elaboration imply that some dimensions of motion are attended to more than others by speakers of different languages, resulting in speakers' attention being directed more to some facets than to others in the process of formulating an event. These differences give rise to different degrees of cognitive salience associated with different event dimension of motion, which in turn engender language-specific event construals. Crucially, Slobin's cognitive claim is much more moderate than Levinson's relativistic proposal (see 2.1.2) since the purported language effect only pertains to the inherently linguistic process of *online* verbalisation, that is the cognitive process of formulating a message, which Slobin calls *thinking-for-speaking*, defined as below:

> *"[...] a special form of thought that is mobilized for communication. [...] In the evanescent time frame of constructing utterances in discourse one fits one's thoughts into available linguistic frames. "Thinking for speaking" involves picking those characteristics [...] that (a) fit some conceptualization of the event, and (b) are readily encodable in the language."* (Slobin 1996*a*: 76)

Particularly relevant for the present study, *thinking-for-speaking* is suggested to have specific implications for the process of language acquisition. Thus, Slobin claims that when learning a language, children not only acquire the language-specific form-function patterns to express motion, but along with them, language-specific forms of thinking-for-speaking (Berman and Slobin

1994, Slobin 1996*a*, 1997).[13] For the situation of bilingual language acquisition, this raises the additional question of whether bilingual children acquire two independent forms of thinking-for-speaking that are mobilised depending on the language in use at any given point ("biconceptualism", see Slobin 2006: 75), or whether they develop one merged form of construing events online, in which case we would expect children's event verbalisations to differ accordingly.

2.2.6 Implications for English-French bilingualism

The various structural and discourse-related contrasts between satellite- and verb-framed languages presented in this chapter can be summarised along the following parameters (extracted and adapted from Zlatev and Yangklang 2004: 187):

Parameter	**V-language**	**S-language**
Core schema (Path) expression	Verb	Satellite
Co-event (e.g. Manner) expression	Adjunct	Verb
Boundary-crossing constraint	Yes	No
Several Path segments per clause	No	Yes
Manner-verb use	Low	High
Scene setting	Yes	No

Table 2.1: Comparison of typological properties of verb- vs. satellite-framed languages (extracted and adapted from Zlatev and Yangklang 2004: 187)

What is the situation created for the young bilingual learner by the linguistic contrast in describing motion events in English and French outlined and illustrated above? Taking into account the implications of the above structural and discursive properties as well as the diversity of available constructions singled out by Pourcel and Kopecka (2005), a highly asymmetric acquisition situation arises, characterised by language-specific contrasts with respect to the following properties:

[13] See chapter 3.1.1 for overview of findings on the acquisition of rhetorical styles by Slobin and colleagues.

Degree of variability: Whilst French input exposes children to a multitude of patterns, rendering the target system opaque, the English input is highly consistent and may thus facilitate the learning task.

Systematicity of applicability: The English pattern can be applied systematically across the board, independently of the type of motion event expressed and can compactly accommodate multiple information components without requiring structural changes to the basic pattern. By contrast, the applicability of French patterns is subject to constraints of various kinds, such as: semantic (boundary-crossing), pragmatic (foregrounding effect of heavy peripheral structures), lexical (some verbs conflate Manner and Path), motion domain (some constructions are more acceptable in CM than in VM and vice versa). Consequently, bilinguals have to learn not only which patterns are the typical ones in each language, but also which constraints govern the use of constructions in each language and which ones are applicable crosslinguistically.

Degree of syntactic complexity: Motion verbalisations combining various semantic components are typically associated with a higher degree of formal complexity in French than the compact English construction, resulting in an obstacle for young learners who have not yet mastered subordination.

Scope for Manner expression: English facilitates the expression of Manner due to its strong association of the obligatory verb slot and a large and varied lexical repertoire for expressing fine-grained Manner distinctions. In French, expressing Manner is costly, since it requires the use of heavy peripheral structures. Only a small array of dedicated Manner markers outside the verb are readily available (adverbs). Moreover, the Manner lexicon encodes semantically less fine-grained distinctions than in English. Consequently, situations that require detailed descriptions of Manner in addition to Path may pose more difficulties in French than in English.

Moreover, in addition to the unequal tasks that the two languages present to bilingual learners separately, the combination of English and French also

confronts them with a situation of partial overlap, since the typical satellite-framing English pattern is also in some contexts available in French, generating the input situation schematically illustrated in Figure 2.1. It is important to

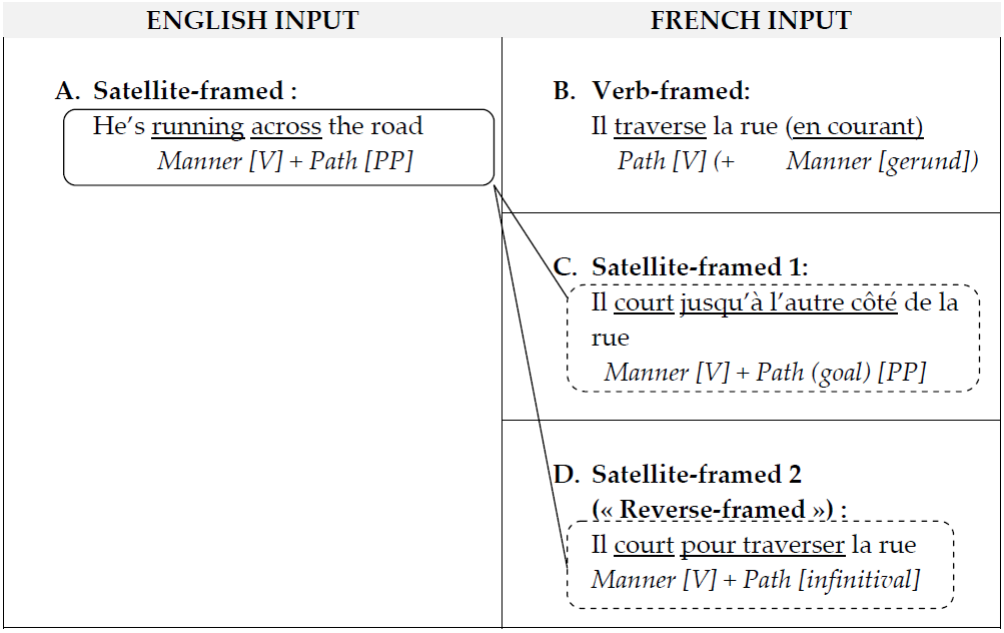

Figure 2.1: English-French bilingual learner situation

note here that the overlap of lexicalisation patterns is not complete (indicated by dashed lines). Thus, although there are ways of encoding Path outside the main verb in French, the means for doing so are not equivalent to the ones in English. Either, a formally more complex and marked construction ('reverse-framing') has to be used as in D., or a semantically restricted set of prepositional phrases (C.). In either case, the resulting satellite-framing patterns are semantically and syntactically not equivalent to English. To conclude, the above factors result in a rather intricate acquisition situation for bilingual children. Not only do they have to unravel which patterns are licensed and in which contexts. But they also face more formal difficulties in French due to the complexity of constructions. Additionally, the fact that patterns of each language are not clearly delineated, but present some degree of partial overlap, may further complicate the task of tuning in to the respective target lexicalisation patterns.

Chapter 3

Motion in Language Acquisition

In this chapter, we review studies on motion expression across a range of acquisition contexts, starting with monolingual L1 (3.1), proceeding with adult L2 (3.2) and concluding with a presentation of findings from the few available studies on motion expression in bilingual contexts (during childhood) (3.3). The scope of this review is guided by considerations of relevance for the defining characteristics of the present investigation. Thus, although we are aware of the growing body of research on motion event perception, categorisation and conceptualisation (see e.g. Brown and Gullberg 2011, Gennari *et al.* 2002, Papafragou *et al.* 2008, 2002, 2006, Soroli 2011), this chapter takes into account studies on language *production*. Secondly, even though we acknowledge that Talmy's typology is problematic when it comes to accommodating a range of languages (e.g., for 'equipollency', see Ji 2009, Ji *et al.* 2011*a*,*b*,*c*), our presentation is limited to those studies that examine the acquisition of more uncontroversially verb-framed and satellite-framed languages generally, and French and English in particular. Particularly relevant research on early bilinguals' event expression is covered in more detail to establish a basis of comparison with our findings. We conclude the chapter with a summary of what available research has revealed about the impact of language-specific properties associated with satellite/verb-framing typologies of motion expression (3.4).

3.1 Motion in L1 acquisition

L1 studies on the acquisition of motion expression pursue various research agendas. However, one central concern shared by most L1 research is to establish to what extent children's motion descriptions reflect the typological features of the adult target language and how early in acquisition the characteristics of the ambient typology begin to emerge. In this endeavour, studies differ in whether they derive developmental predictions from the Talmyan classification framework (i.e. the syntactic locus of lexicalisation, verbs versus satellites) or whether they take as their point of departure the discourse implications associated with Slobin's 'rhetorical styles' (Slobin 2004), such as the degree of attention allocation to and elaboration of certain information components.[1] Yet other studies cross-cut the criteria of both frameworks to combine the insights that can be gained from both perspectives. This is the case for studies conducted within the SALTAC project by Hickmann and Hendriks (Hickmann *et al.* 2011), on which the present investigation is based. Research on L1 child motion verbalisations also varies methodologically, in that some of them investigate spontaneous productions, whilst others work with experimentally elicited data.

3.1.1 Language-specific rhetorical styles

The most influential foundational work on the narrative consequences of typological lexicalisation patterns for L1 acquisition was conducted by Berman and Slobin (1994), who compared motion event descriptions across a total of 21 typologically diverse languages, elicited from children between the ages of 3 and 11 by means of a wordless picture book (the *'Frog Story'* by Mayer 1969). The results of this study, which are presented and discussed extensively in Slobin (1996*b*, 1997, 2000, 2003, 2004), indicated that children's event descriptions follow language-specific typological tendencies by age three and accordingly exhibit the characteristics of 'rhetorical style' which Slobin predicted to correlate with Talmy's distinct typological framing tendencies. Thus, children's oral nar-

[1] See chapter 2.2.5.

ratives differed systematically in line with their target typology along several discourse-specific dimensions, which all relate to the degree of linguistic attention speakers allocate to specific aspects of motion events (Manner and Path) 'online'. Attention allocation is reflected in and measured by several related sub-aspects of discourse: the overall frequency of mention of a specific aspect, the variety of verb types used, but also the degree of elaboration (amount of fine-grained detail provided, semantic differentiation, richness of description). Thus, narratives by children acquiring satellite-framing languages displayed both a strikingly greater number of Manner-verb types and a Manner lexicon of more differentiated meanings than children growing up with V-languages. Moreover, they also tended to provide more details regarding different sequences of the trajectory (Source, Goal) by means of stacked satellites. By contrast, children growing up with various types of V-languages used fewer Manner-verbs and with fairly basic neutral meanings, thus exhibiting a low degree of elaboration of this domain. Moreover, narratives in these languages provided less rich detail regarding the trajectory, but instead frequently left information regarding the Path-dimension to be inferred from static scene-settings.

These robust discourse differences across child narratives are interpreted by Slobin as evidence for the early impact of language, which trains speakers in the course of acquisition to direct their attention to those event dimensions that are salient in their target language, a process he refers to as "typological bootstrapping" (Slobin 2001: 441). Slobin and colleagues' findings thus demonstrate that from a young age, children's motion even descriptions do not only follow the typical lexicalisation patterns of their target language, but also adhere closely to a whole range of associated discourse characteristics that are gradient in nature. Consequently, fine-tuning to tendencies of target speech requires children to attend to subtle stylistic features of the input. It appears that children are sensitive to these stylistic dimensions and their conceptual implications (*thinking-for-speaking*) from their earliest produced event descriptions, testifying to the early and wide-ranging impact of language.

3.1.2 Language-specific spatial categories

Support for both the depth and the early influence of language-specificity on spontaneous child speech came from a further influential line of research by Bowerman and colleagues (Bowerman and Choi 2001, 2003, Choi and Bowerman 1991), whose work compared spontaneous L1 child motion descriptions in English (satellite-framing) with productions in Korean (verb-framing). Their results are not only consistent with Slobin's finding, but also provide evidence for an even earlier onset of language-specificity with potentially deeper conceptual implications for children's construction of semantic categories. Thus, Choi and Bowerman (1991) demonstrated Korean and English children's sensitivity to language-specific lexicalisation patterns as early as 14 months of age, that is, from their earliest productive use of spatial expressions. By that age, Korean children's spontaneous utterances made lexical distinctions between caused and voluntary motion event types as well as between types of fitting relationships (loose versus tight), in accordance with the distinction present in their input language, whilst English children generalise their earliest spatial expressions (Path particles) over both caused and voluntary motion event types, indicating that they categorise both as the same and are hence already tuned to language-specific principles. Thus, Korean and English children's earliest productions were shown to reflect language-specific semantic distinctions without evidence of going through an initial universal categorisation stage driven by non-linguistic concepts. This finding proved challenging for the previously widely held assumption of cognitive priority (see chapter 2.1.3) in the acquisition of spatial language (Clark 1980, Slobin 1978). Accordingly, the authors argue that the way language organises a given domain guides children's construction of categories from the outset.

In sum, Bowerman and colleagues' findings not only corroborate Slobin and colleagues' evidence regarding the early impact of the input language, but are interpreted by the authors as indicative of more fundamental language effects on children's concept formation, going beyond Slobin's proposed *online* thought process of *thinking-for-speaking*. Thus, based on the evidence of Korean children's category distinctions that simply do not arise in English, they

ascribe a more deterministic role to language, which accords more closely with Levinson's relativistic view that "language *constructs* concepts that otherwise might not have been" (Levinson 2001: 584).

3.1.3 Language-specific syntactic packaging

Based on the above findings of early language-specificity of children's spatial language, another line of inquiry on motion in L1 concentrated on how universal tendencies interacted with language-specific factors in the acquisition process. Thus, Allen *et al.* (2007) tested how typologically determined preferences in syntactic packaging affected video-elicited motion narrations by 3-year-old children acquiring English compared to two verb-framing languages, Turkish and Japanese. The investigation hinged on the observation that Manner in V-languages is not only mentioned less frequently (Slobin 2006) than in S-languages, but its joint expression with Path is also more costly, since it usually involves heavier constructions requiring children to have attained relatively advanced syntactic skills (subordination). The data showed that, although 3-year-olds' narrations were largely already attuned to the respective adults' language-specific patterns, they also displayed evidence for some language-independent syntactic preferences. Amongst these, children of all three languages showed a preference for compact packaging (one clause) of semantic components that were portrayed to occur simultaneously in the event, which the authors interpret as indication of either universal tendencies of lexicalisation in child language or as arising from principles of iconicity.[2] Moreover, all children in the study used complex structures involving Manner subordination less frequently than adults, likely reflecting the syntactic difficulty involved in their production. However, the detected child-specific syntactic tendencies interacted with language-specific factors. Accordingly, English children manifested an earlier and more prominent tendency for compact packaging than either Japanese and Turkish children. Conversely, syntactically loose structures, scattering semantic elements across several independent clauses,

[2]Children may have "mapping preferences between conceptual and linguistic representation" (Allen *et al.* 2007: 45).

occurred more frequently in Japanese and Turkish children's narrations.

3.1.4 Motion in English and French L1

A series of studies conducted within the SALTAC project (Hickmann 2007, 2010, Hickmann and Hendriks 2006, 2010, Hickmann *et al.* 2009*a*,*b*, Ji 2009, Ochsenbauer 2010) are devoted to the development of spatial language in first language acquisition by English and French children between the ages of 3 and 10, analysing both spontaneous verbalisations and experimentally elicited productions. These studies use variables that are based on, but go beyond Talmy's and Slobin's established categories of motion expression. In addition to the generally examined typological variables of typical encoding tendencies (verb or satellites) and linguistic attention to event components, the investigators are interested in the impact of language-specific structural factors (e.g. the availability of compact structures) and their interaction with general cognitive factors in shaping children's event descriptions. Their results indicate that both typological and general cognitive factors guide the acquisition process.

Reflecting the impact of language-specific factors, results showed that English and French children's verbal behaviour differed in accordance with the adult target language tendencies from as early as age 3. Thus, French children relied more on verbs to convey motion information, whilst English children frequently used verbs in combination with satellites from early on. Moreover, French children's productions focussed on Path alone more often, frequently omitting the Manner component, whilst English children systematically combined both event aspects in their expressions from early on, resulting in higher utterance density (number of components expressed) at an earlier age than in French. This effect was partly due to language-specific structural differences. The availability of low-cost compact structures in English allowed children to encode multiple elements systematically from early on with relative ease. In contrast, joint encoding of several semantic elements in French is partly dependent on the acquisition of syntactically complex constructions (gerunds), which were not fully productive in French children even at age 10. These structural differences thus gave rise to language differences both in the density and

complexity of children's descriptions. As regards the latter, French children showed a tendency to scatter information across several independent utterances in contrast to English children's strong preference for tightly packaged information within the same clause, consistent with findings by Allen *et al.* (2007). Taken together, the problems associated with expressing multiple information types jointly in V-languages clearly illustrate the asymmetric challenges faced by children acquiring typologically different languages.

Findings also reflected the influence of general cognitive factors. Thus, with increasing age, children's event descriptions became denser, regardless of the language acquired. This result was interpreted as reflecting two types of factors: on the one hand, children's increased representational skills and memory capacity, allowing them to process multiple relevant aspects and select them for linguistic expression; on the other hand, the development of linguistic skills, particularly syntactic abilities, which allow children to express more information jointly. However, the general effect of age was also modified by language-specific factors. Thus, developmental curves showed striking differences in the two language groups. The syntactic complexity associated with joint information encoding in French resulted in a protracted course of development, which was characterised by striking density progressions, especially after age 6, whilst English children reach ceiling levels of density very early. Moreover, independently of age, semantic density of expressions was generally higher in English than in French (even at adult age).

In sum, findings by the SALTAC project are consistent with the other available L1 research reviewed in this section and point to the early and pervasive impact of typological constraints on children's event expressions. The striking differences in verbalisation behaviour between children acquiring English and French clearly illustrate the developmental consequences of language-specific properties whilst also highlighting their close interplay with general cognitive factors.

3.2 Motion in L2 acquisition

3.2.1 Perspectives and objectives of L2 motion research

Slobin's assumption that the linguistic training received in childhood L1 "may be exceptionally resistant to restructuring in adult second-language acquisition" (Slobin 1996*a*: 89) generated numerous studies devoted to the question of how adults learn to express motion events in a second language. Researchers in this domain are frequently guided by an interest in cognitive implications relating to Slobin's notion of *thinking-for-speaking*. L2 acquisition is taken as a way of addressing conceptual issues, following the rationale (implicitly or explicitly) that the degree to which learners can adapt to L2 patterns sheds light on the conceptual status of characteristic patterns of lexicalising motion. Accordingly, if the process merely involves mapping new surface forms onto semantic elements familiar from the L1, it should be possible for learners to adapt to L2 patterns of motion expression relatively easily. Conversely, if the process also entails acquiring a new way of *thinking-for-speaking* about events, we expect learners to experience difficulties, even at very proficient stages of the acquisition processes. Independently of underlying cognitive implications, the overarching question that L2 research on motion addresses is whether and to what extent L2 motion lexicalisation patterns are learnable in adult L2 acquisition, especially in cases when the learners' source language is typologically different from those of the target language. To measure the degree of native-like attainment, investigations share a focus on the role of L1 transfer in the acquisition process and how it is affected by the following variables:

(i) Learners' proficiency

(ii) Degree of typological relatedness between L1 and L2

(iii) L1/L2-specific properties

Given the focus of the present thesis is on role of language-specific properties in the acquisition of typologically contrasting languages, our review will concentrate mainly on L2 findings regarding (iii). Of particular interest are, on the one

hand, typological properties pertaining to V/S-languages generally (addressed in 3.2.2), and, on the other hand, language-specific characteristics of English and French (in 3.2.3) that have been shown to pose persistent problems in the L2 acquisition process.

3.2.2 Acquiring L2-specific framing properties

The great majority of L2 studies on motion acquisition has been devoted to typologically contrasting language pairs, that is, L1 speakers of a satellite-framing language acquiring a verb-framing language, such as Danish and Spanish by Cadierno (2004) and Cadierno and Ruiz (2006); English speakers acquiring Spanish (Larrañaga *et al.* 2012, Navarro and Nicoladis 2005) or Japanese (Brown and Gullberg 2011). The reverse direction of V-language L1 speakers acquiring a satellite-framing L2 has been less frequently under investigation, although Stam (2010) analyses Spanish learners of English, and a subset of the above studies is bidirectional (Brown and Gullberg 2011, Inagaki 2001).

Independently of the language pair examined, a general observation shared by all of the studies is that learners' motion expressions become more native-like with increasing proficiency and show less influence from the L1. However, authors of the various studies are divided regarding the possibility of learners' attainment of full mastery of target patterns. On the one hand, Cadierno and colleagues state that the impact of L1 transfer is most prominent during initial and intermediate stages of the acquisition process, but only plays a limited role in advanced learners' event descriptions (e.g. Cadierno 2008: 265). They conclude that "learners at this stage of language acquisition appear to have been able to acquire the L2 characteristic form-function mappings" (Cadierno 2008: 263). This positive stance on learnability is shared by Navarro and Nicoladis, who similarly emphasise learners' successful attainment of characteristic L2 patterns and minimise L1 impact to negligible traces (Navarro and Nicoladis 2005: 106).

By contrast, Stam's as well as Larrañaga and colleagues' investigation of L2 Spanish and English, and Inagaki's study of Japanese and English L2 arrive at a different conclusion. These authors report on the pervasive influence of

learners' source language, which manifests itself persistently even at advanced stages of the acquisition process and even in contexts of substantial exposure to the L2 in naturalistic settings (Larrañaga *et al.* 2012), suggesting incomplete acquisition of target patterns.

Although a thorough presentation of L2 findings is beyond the scope of this thesis, what is interesting for the present context is that despite the diverging conclusions that authors draw from their results, their data indicate substantial agreement regarding the types of verb/satellite-framing properties acquired successfully by learners and the ones that represent challenges. Taken together, these findings paint a rather complex picture of L1 transfer, suggesting that some aspects of event expression can be acquired successfully by adults, whilst others are only incompletely mastered and continue to be subject to L1 influence even at advanced proficiency levels.

As regards successfully acquired typological properties, it emerges from several of the studies (Cadierno 2004, Cadierno and Ruiz 2006, Larrañaga *et al.* 2012, Navarro and Nicoladis 2005) that L2 speakers soon learn what semantic components are typically encoded in the main verb. Thus, the Danish learners of Spanish in Cadierno (2004) showed no evidence of transferred Manner and motion conflation in their verb usage, which was predicted on the basis of L1, but instead followed target L2 tendencies of expressing Path. The same result was obtained by Navarro and Nicoladis' and Larrañaga *et al.*'s studies of English learners of Spanish. Thus, native speakers of satellite-framing languages appear to catch on to the fact that their verb-framing L2 typically conflates motion with Path rather than Manner, and follow this pattern in their own productions irrespectively of proficiency level. Verbal encoding appears to be equally unproblematic in the other direction: Inagaki's Japanese learners of English, even at an intermediate level, showed no difficulty accepting English Manner-verbs (with Goal prepositions) as grammatical, despite the fact that their L1 does not license the equivalent encoding.[3]

On the other hand, other aspects of L2 event expression proved to be highly problematic for learners at all stages and in both directions of acquisition (L1

[3]Although it has to be said that Inagaki's results are based on a grammaticality judgement test, not production data.

V to S-language L2 and *vice versa*). Interestingly, difficulties were mainly encountered with characteristics pertaining to Slobin's rhetorical style (e.g. Slobin 1996*b*), that is, the degree of elaboration of event components and speakers' reliance on bare-verb clauses (without satellites).

With respect to Path elaboration, Cadierno (2004) reports that Danish natives transfer the Path complexity characteristic of their L1 to their L2 Spanish productions, as evidenced by their production of redundant and anomalous Path particles and numerous Ground adjuncts. Conversely, whilst S-language native speakers experience difficulties shedding their L1's prominent Path elaboration in their L2 verbalisations, Spanish learners of English (Stam 2010) similarly struggle to acquire added Path complexity when describing events in their L2. Thus, neither intermediate nor advanced learners of English were found to successfully replicate English speakers' characteristic accumulation of Path aspects via stacked satellites. Instead, learners continue to produce significantly more bare Path verb clauses without post-verbal adjuncts than native speakers (Stam 2010:156), thus retaining some of the rhetorical style typical of their source language. The use of bare verbs, common in V-languages[4] is also acknowledged by Navarro and Nicoladis (2005) to constitute a challenge in the other direction of acquisition: English L2 learners of Spanish in their study continue to prefer the L1 pattern of providing spatial information post-verbally, as demonstrated by their persistent addition of prepositional phrases to Path verbs in Spanish.

Whilst some gradient aspects of rhetorical style are difficult to adapt to in both typological directions of L2 acquisition, categorical properties appear to be more problematic in one direction (from S to V-language) than the other. This concerns the acquisition of the boundary-crossing constraint[5] governing V-languages, but not applicable in S-languages. The available studies show that for native speakers of S-languages the acquisition of this constraint frequently fails or remains incomplete even in highly proficient learners (Cadierno 2004, Inagaki 2001, Larrañaga *et al.* 2012). Accordingly, learners' descriptions

[4]Berman and Slobin (1994) attribute the bare-verb style of many V-languages to the cognitive cost associated with adding information peripherally to the main verb, which frequently requires formally complex constructions (see chapter 2).

[5]See Slobin and Hoiting (1994) and chapter 2 for definition.

were frequently found to violate the constraint, even at advanced stages of development. In the case of Danish speakers' acquisition of Spanish (Cadierno and Ruiz 2006), learners inaccurately mapped Manner onto verbs in combination with anomalous Path satellites (e.g. *saltar (a)fuera de la ventana* 'jump out of the window', from Cadierno 2008: 263). This accords with findings by Larrañaga *et al.* who observe similar anomalies in English learners of Spanish suggesting transfer from the L1. Thus, learners produce Manner verbs in combination with either a locative satellite that fails to adequately convey the change of location entailed in the boundary-crossing (e.g. *en/al* 'at'), or directional prepositions (e.g. *hacia* 'towards') that are target-appropriate, but fairly infrequent in L1 Spanish. The authors report that even when Path-verbs are used by the more advanced learner group, the addition of the Manner component poses enormous difficulties and is only mastered by a few very advanced learners who successfully employ Manner-gerunds. The authors conclude that even at advanced stages of proficiency, learners of V-languages "do not appear to be aware of the boundary crossing constraint" (Larrañaga *et al.* 2012: 134).

Further empirical support for this learner difficulty comes from the perspective of acceptability judgements in Inagaki's study on Japanese and English L2 acquisition. Inagaki's bidirectional design demonstrates the asymmetry of the learner problem: Whilst Japanese adults accurately judged the typical English pattern as acceptable from early on, the reverse case was less successful. Thus, English learners of Japanese had difficulty recognising the ungrammaticality of the satellite-framing pattern in Japanese, even after years of exposure.

In sum, available research on adults' acquisition of motion expression in a typologically contrasting L2 indicates that some aspects of motion typology can be acquired successfully, whilst others prove difficult even for highly proficient L2 learners. Mapping the appropriate semantic content onto the main verb appears to be acquired relatively easily, whilst more subtle gradient features of rhetorical style are difficult to adapt to. The ease and difficulty of these aspects affected both learners of V -and of S-languages. By contrast, research also suggests that some properties specific to V-languages give rise to asymmetric learner problems. In this context, the boundary-crossing constraint appears difficult to acquire for native speakers of S-languages, where the restric-

tion does not apply.

3.2.3 English L2 learners of French

Compared to the research conducted in L2 Spanish, only few studies are concerned with how adults of a satellite-framing L1 learn to express motion in French (Hendriks and Hickmann 2011, Hendriks *et al.* 2008, Treffers-Daller and Tidball in press). Hendriks *et al.* (2008) investigated how English speakers of two proficiency levels learn to express complex caused motion events in French. The primary focus of Hendriks and colleagues is how source -and target-specific properties affect learners' acquisition process. Their findings partly accord with the other L2 research reviewed above, but also show important differences. In line with other studies, learners' event descriptions become more target-like as their proficiency increases. This concerns both semantic density (increasing number of semantic components expressed), resulting in more informative event descriptions, and syntactic abilities, which demonstrated learners' gradual command of syntactically complex constructions. However, with respect to encoding strategies, learners' productions remained target-deviant even in the highest proficiency group, showing persistent transfer from learners' English pattern: Unlike French native speakers, learners continue to mainly conflate Cause and Manner in the main verb (e.g. *pousser* 'to push'), thereby following the prototypical pattern of their source language. Thus, contrary to the above L2 findings, learners' verbs do not suggest successful adaptation to the typical encoding tendencies of the target language.

With respect to satellite usage, Hendriks *et al.*'s findings parallel the anomalous productions reported by Larrañaga *et al.* (2012) and Cadierno and Ruiz (2006), suggesting similar difficulties relating to the expression of Path in the verbal periphery, which remains anomalous despite increasing proficiency. Learners either resort to existing French locative prepositions that do not unambiguously convey the change of location portrayed (e.g. *dans* 'in'), or create idiosyncratic satellite-like devices that appear to be modelled on frequent particles of their L1 (e.g. *à travers* 'across' or *entre* 'between/into'). Such target-deviant satellization of prepositions frequently violated the boundary-crossing

constraint and thus points to the same learner difficulty experienced by English and Danish learners of Spanish (Cadierno and Ruiz 2006, Larrañaga *et al.* 2012).

Furthermore, target-appropriate syntactic strategies of integrating information (subordination) proved problematic for learners, and were only mastered by a subset of learners in the advanced group, in line with L2 Spanish findings by Larrañaga *et al.* (2012) and preliminary findings on L2 French by Treffers-Daller and Tidball (in press). Even when constructions were grammatically well-formed (formally correct gerunds), they continued to show the influence of source-language tendencies in that the subordinated element was frequently Path (e.g. *en traversant* 'by crossing'), which is not common in native French speakers.

In their analysis, the authors explore the impact of a language-specific aspect of motion expression that is insufficiently taken into account by other L2 research in this domain. This concerns the variability of patterns available in the target language input and its implications for the learner task. The authors propose that the challenge in acquiring French caused motion reference for English speakers may partly lie in the highly variable input (French allows a variety of patterns, see chapter 2 for overview), which results in a rather opaque system for the learner, especially as compared to their highly systematic L1 system (using mainly one pattern). This variability may partly explain learners' prolonged reliance on L1 transfer.

A follow-up study by Hendriks and Hickmann (2011) on the L2 acquisition of voluntary motion expressions suggested that situation-specific factors and the type of motion domain expressed may play a further decisive role in the occurrence of L1 transfer. In this task, although L2 productions showed some of the same anomalies and L1 traces as their caused motion descriptions (idiosyncratic satellites and anomalous gerundive structures), learners were much more successful at matching the typical encoding strategies of the target language. Thus, in line with native French speakers' encoding tendencies, learners mainly mapped Path onto the main verb. Interestingly, this encoding tendency was even more systematic in adult second language learners than in French native speakers, who displayed a more varied pattern of information organi-

sation.[6] Thus, when expressing simple voluntary motion events, learners' performance was significantly more target-like. The findings for this task thus conform more closely with results by Cadierno and Ruiz (2006) and Navarro and Nicoladis (2005) who report similarly successful L2 mastery.

Hendriks *et al.*'s two L2 studies thus draw attention to the potential importance of task -and event-specific properties, which interact with language-specific factors in the L2 acquisition process. The different outcomes of the two tasks are attributed by the authors to the complexity of the caused motion task. They speculate that the presence of multiple event components may result in learners' greater reliance on the compact patterns of their source language as "the most efficient way of presenting information" (Hendriks and Hickmann 2011: 335).

3.3 Motion in bilingualism

Compared to the wealth of studies recently emerging in L2 contexts, not much is known about the development of motion expression in early bilingualism. Only a handful of studies have investigated this learner type to date. In addition to the scarcity of available research, comparing the results of these studies is somewhat complicated by the fact that investigators adopt different criteria and definitions of 'bilingualism' (for discussion of definitions, see chapter 4), resulting in analyses of slightly different learner populations. The present review only takes into consideration studies that deal with bilinguals exposed to both languages from early childhood and are highly proficient in both (Álvarez 2008, Daller *et al.* 2011, Filipović 2011, Flecken 2010, 2011, Hohenstein *et al.* 2006), as these are the most relevant to our sample of simultaneous bilinguals. Note that Álvarez (2008)'s case study constitutes the only one to analyse a simultaneous bilingual subject raised by the one-parent one-language principle and is thus the one most closely comparable to the participants of our study.

Moreover, it should also be said that most of the above studies are con-

[6] Path as well as Manner information occur in different parts of speech in L1 French (Hendriks and Hickmann 2011: 334), displaying a more variable picture as would be expected on the basis of the Talmyan categorisation of French.

cerned less with the acquisition process per se and more with bilingual competence once both languages are fully in place, either in bilingual adults (Daller *et al.* 2011, Filipović 2011, Hohenstein *et al.* 2006) or adolescents (Daller *et al.* 2011, Flecken 2010). The developmental perspective of the present thesis is only shared by Álvarez (2008)'s longitudinal study (between age 6;11 and 10;11).

In terms of the typological status of the language pairs analysed, most of the studies are interested in the consequences of typologically contrasting V/S-language combinations, notably English-Spanish, examined by Álvarez (2008), Filipović (2011), as well as Hohenstein *et al.* (2006), and Turkish-German (Daller *et al.* 2011). In contrast, Flecken (2010, 2011) analyses the typologically closely related pair of German and Dutch, which present considerable lexicalisation overlap amidst subtle language-specific differences. This allows Flecken to address the question of whether bilinguals' performance patterns replicate the fine-grained differences in conceptualisation of monolinguals. Although the studies are heterogeneous in various respects, they overlap in some of the central issues they address. These concern the following:

(i) The degree of (non-)conformity to monolingual production patterns

(ii) Occurrence of crosslinguistic influence and its directionality

(iii) Independent versus interdependent processing

(iv) Factors influencing (i), (ii) and (iii) (e.g. age of acquisition, dominance)

With respect to (iv), whilst all of the studies take into account the role of the typological relationship obtaining between the languages examined (i.e. typological contrast and/or overlapping patterns), some of them are additionally concerned with the role of certain language-specific factors (such as the availability of grammaticalised aspectual markers, see Flecken 2010, 2011). Others focus more on factors relating to participants' acquisition history and exposure patterns, such as Daller *et al.* (2011), who test the effect of the dominant societal language, by comparing bilinguals across two sociolinguistic contexts, or Hohenstein *et al.* (2006), who examine the effects of varying age of acquisition onset and compare production patterns in early (at or before age 5) and late (after age 12) bilinguals of both languages. In addition to production processes,

some of the studies aim to provide insight beyond language use and correlate their evidence on production with non-verbal tasks such as eye-tracking (Flecken 2011) and memory tasks (Filipović 2011). Despite the evident disparities in acquisition background, language combinations and focus of interest, the studies converge on a number of findings regarding the above questions, addressed separately below.

3.3.1 Language differentiation

The findings of all studies suggest that bilinguals of all types analysed show sensitivity to language-specific differences and clearly differentiate lexicalisation patterns of their two languages. Accordingly, their event descriptions follow the language-specific tendencies manifested by monolinguals in each language, even when it comes to fine-grained differences. For instance, Hohenstein *et al.* (2006) find that in English, bilinguals use more Manner-verbs, whereas their Spanish displays a greater proportion of Path-encoding verbs (Hohenstein *et al.* 2006: 255), in line with typical tendencies of monolinguals of each language. Likewise, in her analysis of bilinguals' use of aspectual markers, Flecken observes that subjects select aspectual forms in their Dutch in accordance with the specific event criteria that guide monolingual Dutch speakers' selection. In the same vein, Álvarez reports that from the earliest tested age (6;11), her simultaneous bilingual subject's narrations of the *Frog Story* adhere to language-specific patterns of spatial reference management, as manifested in the child's preferential encoding of Path in verbs when speaking Spanish and in particles in his English (Álvarez 2008: 172). Daller *et al.*'s findings on boundary crossing event verbalisations similarly testify to children's sensitivity to typological characteristics of both languages: In this context, bilinguals generally avoid Manner-verbs in their Turkish descriptions, in accordance with the boundary-crossing constraint (also mentioned in L2 context, see 3.2.2) applicable to V-languages.

The interpretation of language-specificity of motion verbalisations depends somewhat on the framework and question addressed by the various studies. Although there is general agreement that adherence to typological tendencies

suggests sensitivity to and differentiation of bilinguals' languages, some authors go further in their interpretation in favour of a separation of language systems. From the developmental perspective adopted by Álvarez, the author concludes that her bilingual subject's referential systems develop separately. Similarly, Hohenstein *et al.* conclude from their comparison of late and early onset of acquisition that early bilinguals "develop relatively independent mechanisms for processing their two languages" (Hohenstein *et al.* 2006: 260). Based on both production and eye-tracking data, Flecken concludes that early bilinguals manage to keep their systems of event conceptualisation separate, despite the typological closeness (Flecken 2010: 359).

3.3.2 Bilingual-specific patterns

Notwithstanding the evidently differentiated use of both languages, it clearly emerges from all of the reviewed studies that bilinguals' production patterns are different from corresponding monolinguals' in both of their languages. However, as several authors emphasise (e.g. Daller *et al.* 2011, Flecken 2010), the detected differences do not consist in 'errors' in the sense of ungrammatical productions, but are nevertheless unconventional on account of the following characteristics, which we address in turn:

- 'In-between' strategies (3.3.2.1)
- Reduced variation and over-extension (3.3.2.2)
- Convergence (3.3.2.3)

3.3.2.1 In-between strategies

One recurrent finding concerns bilinguals' quantitative departure from monolingual tendencies when it comes to using given options. Thus, when frequency analyses are performed in relation to monolinguals, the studies concur in their finding of a bilingual usage style that authors qualify as 'in-between'. Thus, bilinguals are frequently found to pattern neither like monolinguals of

language A or B, but instead occupy a middle position between the respective monolinguals' tendencies. Accordingly, Filipović and Hohenstein *et al.*'s studies both find that English-Spanish bilinguals use more Manner verbs in their Spanish than monolinguals, but significantly fewer than native speakers in their English descriptions. Similar results are obtained by Daller *et al.*, who report that "bilinguals as a group fall between the two monolingual extremes" (Daller *et al.* 2011:108) with respect to all of the variables of event expression analysed. For instance, when it comes to Path satellites, bilinguals produce more than Turkish monolinguals, but fewer than German monolinguals (Daller *et al.* 2011:110).

3.3.2.2 Reduced variation and over-extension

Another recurrent observation is linked to the above quantitative discrepancies in usage preferences, which often entail bilinguals' overuse of certain options in relation to monolinguals. As a consequence, other available options are underused as compared to monolinguals or never employed, resulting in reduced variation. Álvarez describes a reduction in lexical diversity which surfaces in the child's rather limited range of types of movement verbs and particles. Instead, the simultaneous bilingual is shown to rely more frequently on 'all-purpose' expressions of movement, such as deictic verbs (e.g. *to come*) (Álvarez 2008:170). In Hohenstein *et al.*'s study, such reduction is evident structurally in subjects' greater reliance on bare-verb utterances without modifying elements.[7] Evidence for reduced diversity in range of grammatical forms comes from Flecken, who reports on bilinguals' heavy reliance on one specific Dutch progressive form to express an aspectual perspective in ongoing motion. By comparison, other forms are significantly underused by bilinguals, which Flecken interprets as indication of bilinguals' less diversified aspectual system (Flecken 2010:241). In the same study, bilinguals' reduced pattern variety also entails an extension of the Dutch progressive to contexts which in monolin-

[7]Although the authors consider that this bilingual effect may be due to differences in testing situation. Whilst bilinguals were tested orally, data for monolingual controls was obtained in the written modality (from study by Naigles *et al.* 1998), which may have resulted in more elaborated event descriptions.

gual usage are more semantically restricted and hence gives rise to idiosyncratic productions that are not ungrammatical, but unconventional for native speakers (Flecken 2011: 73).

3.3.2.3 Convergence

Related to bilinguals' overuse of certain options described above, another finding emerging from three of the reviewed studies (Filipović 2011, Flecken 2011, Hohenstein *et al.* 2006) concerns *convergence* (see chapter 4.3.3.3 for this concept). Results in these studies indicate a bilingual preference for linguistic strategies that are acceptable in both languages, but more typical in one of them. As a consequence, bilinguals' overuse of the converging option in the less typical language results in departures from monolingual usage that are more prominent in one of bilinguals' languages than in the other. Regarding its motivation, the occurrence of convergence preferences under time pressure conditions in Flecken and Filipović suggests that the phenomenon may be a processing strategy that helps bilinguals to reduce the cognitive load involved in dealing with two language systems (see Flecken 2010: 360). In Flecken's study, the time constraint condition[8] results in German-Dutch participants' opting for the simple verb form (neutral event construal), which is an option reliably available in both Dutch and German. However, a drawback of the study is that Flecken only reports on participants' productions in Dutch, but not on their German. This somewhat weakens a convergence analysis, which would require an illustration of preferential usage in *both* languages.

An analysis of both languages is provided in the two studies on English-Spanish bilingualism by Hohenstein *et al.* and Filipović. Both investigations report evidence for their participants' preferential adherence to a crosslinguistically converging option, resulting in divergences from monolingual tendencies in the language where the pattern is less typical. However, despite the close parallels in acquisition history and sociolinguistic context, the two studies arrive at diverging results regarding the converging pattern preferentially

[8] In this condition, the time interval for verbalisation between the videos was reduced (Flecken 2010: 46).

selected.

Hohenstein *et al.*'s early bilinguals' English verbalisations resemble monolingual tendencies in their propensity to use Manner-verbs, whilst their Spanish diverges significantly from corresponding monolinguals, displaying fewer Path and more Manner verbs (see Hohenstein *et al.* 2006: 255). By contrast, Filipović's participants are reported to conform with the Spanish pattern independently of the elicitation language (Filipović 2011: 480). However, note that Filipović's analysis is problematic for two reasons. First, her convergence results do not apply to verbal production data, but recognition performance (memory task), where bilinguals are reported to perform worse than either monolingual group, but more similarly to Spanish monolinguals.[9] Although the author attributes the error rates to bilinguals' adherence to the Spanish lexicalisation pattern (which omits Manner mention), no correlating verbal production data is provided that would support this claim. In fact, the few examples of bilingual event descriptions provided (Filipović 2011: 479) all illustrate the use of the typical English (Manner in and Path outside the verb) rather than the Spanish pattern.

A second problem concerns the author's proposed analysis of the data as reflecting a bilingual 'whatever-works-in-both' strategy (Filipović 2011: 481). On that basis, the availability of the verb-framing pattern in Spanish and in English (e.g. *He crossed the road running*) is argued to drive bilinguals' converging performance. We disagree with the analysis for the following reasons. First, the English verb-framing pattern, although acceptable, does not represent an equivalent option in terms of register[10] to the Spanish strategy, and is hence unlikely to be accessed in situations of verbalisation (and memorisation) under time pressure.[11] By contrast, stylistically equivalent satellite-framing patterns are available in Spanish (see Slobin 1996*b*), so based on the structural overlap considerations adopted by Filipović, convergence should be predicted to occur with the English rather than the Spanish pattern.

[9] That is, bilinguals' display similar error rates in recognising presented differences in Manner as Spanish monolinguals.

[10] The structure is pragmatically marked and of formal register, see chapter 2.

[11] Participants were given 10 seconds to write down their event descriptions (Filipović 2011: 476).

This is exactly the finding obtained by Hohenstein *et al.*, who, however, propose a different explanation for their result. The detected bilingual proclivity for Manner-verbs in both languages is attributed by the authors not to language-internal structural factors, but to the influence of the culturally English-dominant environment of participants (Hohenstein *et al.* 2006: 259).

3.3.3 Dominance effects

The culturally dominant ambient language is considered as a potential factor in bilingual motion expression by several of the studies, either as an alternative interpretation of divergent bilingual data patterns (Álvarez 2008, Flecken 2011, Hohenstein *et al.* 2006) or as a variable investigated in its own right (Daller *et al.* 2011).

In the latter case, Daller *et al.*'s study compares event descriptions across two sociolinguistic environments (Turkey and Germany) and shows how bilinguals' preferred patterns of event verbalisation shift as a function of the dominant ambient language. In each case, typical verb/satellite-framing tendencies of the ambient language exert a measurable influence on bilinguals' event verbalisations, which the authors interpret as a result of transfer from highly entrenched patterns of the dominant environment language. Such transfer can result in qualitatively idiosyncratic productions, when the predominant encoding strategy of one language is transferred to the other one. Thus, Daller *et al.* report on bilinguals residing in Turkey who produce verb-framing constructions in German, where Manner appears syntactically subordinate to the Path component, reflecting the preferred Turkish pattern (Daller *et al.* 2011: 112).

In the other reviewed studies, language dominance is acknowledged as potentially playing at least a partial role in production patterns that show more prominent anomalies in one of the bilingual's languages than in the other. Thus, the simultaneous bilingual child in Álvarez' study shows difficulties in expressing movement generally and change of location specifically. The prominence of these difficulties in the subject's English are considered by Álvarez to stem from the dominant Spanish-speaking environment and the limited sources of English input (Álvarez 2008: 175). Similarly, Flecken and Hohenstein *et al.*

also adduce the increased exposure to the language of the environment as potential factors determining bilinguals' performance patterns. All of the available bilingual research concurs that the factor of exposure must be taken into account, even though it may be difficult to control for.

3.4 Summary: Determinants of motion acquisition

Several aspects that have emerged from this review on motion expression across various acquisition contexts are relevant for the purpose of the present investigation. L1 studies across various languages have demonstrated children's early sensitivity to typological patterns of motion expression. It was shown that children's earliest productions follow the typological tendencies of their target language. Given early bilinguals' exposure to two languages, children will be receptive to language-specific patterns of both languages. As regards L2 acquisition, the lasting and pervasive impact of language-specific properties was evidenced by the persistent difficulties adult learners experienced when adapting to new patterns of construing motion events. Finally, studies on motion in bilingualism suggested that contexts in which both languages are in contact within the same speaker from early childhood may give rise to specific processing strategies that can be seen as a consequence of bilinguals routinely managing and accommodating the demands of two language systems.

An important finding that emerged from all three acquisition contexts reviewed is that learners of satellite- and verb-framing languages face acquisition tasks that are in many respects not equivalent. Thus, different typological properties imply different challenges for the learner and the way these challenges are met by learners depends to some degree on the context in which the language is acquired, whether it is as the first and only language in childhood (L1), or in a context of contact, either with a previously established language (L2) or of two languages simultaneously (2L1). Across these various acquisition scenarios reviewed, certain typological properties associated with V-languages were repeatedly found to be linked with difficulties in the acquisition process, leading to a protracted course of development in both L1 and L2 contexts and

to persistent anomalies and transfer in L2 learning. These are:

- The *syntactic complexity* required for systematic joint encoding of multiple event aspects (e.g. Manner and Path)
- The degree of *pattern variation*, particularly prominent in French (difficult to discern one typical pattern)
- The presence of *event-specific semantic constraints*: change of location, e.g. *boundary-crossing*, only licenses a subset of patterns

Importantly for the present investigation, this means that children exposed to the contrasting typological properties of English and French are faced with an asymmetric learner situation in which properties of one of the languages may present greater challenges than the other one, in line with the acquisition situation outlined in chapter 2. In light of this situation, what verbalisation behaviours should we expect from simultaneous bilinguals and what interactions to occur in development?

Chapter 4

Bilingualism and Crosslinguistic Interactions

In this chapter, we define and explain some of the key notions relating to simultaneous bilingualism that are going to recur through this thesis. Furthermore, we present the theoretical concepts and empirical research findings that form part of the basis of our own research predictions. A thorough review of the vast field of research undertaken in the domain of simultaneous bilingualism is beyond the scope of this dissertation. Our presentation is therefore limited to the issues and findings directly relevant to the questions addressed in this thesis, concerning the type of bilingual speaker under investigation (defined in 4.1), the research controversy relating to the degree of separation or interdependence of bilinguals' language systems (4.2), and the notion of crosslinguistic interactions, its various manifestations and proposed determinants of their occurrence (4.3). Finally, we clarify some psycholinguistic concepts that are of relevance in a study of bilingual production processes, relating to the activation of language systems and language 'modes' (4.3.4).

4.1 Who is 'bilingual'?

This study is concerned with a very specific type of bilingual who acquires both languages simultaneously from birth, which we will refer to accordingly as *simultaneous bilingualism* or, interchangeably, as *bilingual first language acqui-*

sition. The latter term follows a denomination initiated by Swain (1976) and consequently adopted by Meisel (1989) and de Houwer (1990) and emphasises the notion that this specific type of bilingualism is assumed to be qualitatively equivalent to monolingual first language acquisition (see e.g. Meisel 2004).[1] Before I justify the selection of this type of bilingual for my study, this section gives a brief overview of the various dimensions along which bilingualism has commonly been defined to provide a context in which to place the notion of bilingualism adopted in this thesis.

4.1.1 Criteria and definitions

The question of who counts as 'bilingual' has generated a range of proposed definitions and criteria in the research community, resulting in a vast array of fairly heterogeneous investigations. The main criteria adopted can be roughly divided into those that distinguish bilinguals according to the linguistic measure of proficiency/competence achieved (balanced vs. dominant) and language-external criteria. The latter subsume distinctions according to bilinguals' context of acquisition, either maturational, relating to the age of acquisition, or social, regarding the status of the two languages in the bilinguals' cultural environment.[2] Evidently, these definitional criteria are in fact not independent, but closely interrelated concepts, since a given context of bilingual acquisition will affect the competence attained, reflecting the "multidimensional" nature of bilingualism (Hamers and Blanc 2000: 25).

As regards competence-based criteria, definitions advocated vary starkly, ranging from Bloomfield's idealised definition of "native-like control of two languages" (Bloomfield 1935: 56) at one extreme of the spectrum to the modest requirement of "the ability to use more than one language" adopted by Mackey (1962: 52). The notion of balanced bilingual competence, that often underlies competence-based criteria, faces methodological as well as theoretical problems. Theoretically, complete balance, that is, equivalent competence in

[1] This view refers to the development of grammatical competence in children, but does not necessarily extend to other aspects of language development.

[2] These categorisations are by no means exhaustive, but the most relevant for our purpose. See Hamers and Blanc (2000) and Butler and Hakuta (2004) for other criteria.

both languages, is an idealised construct rather than a state that is ever truly present. Given that bilinguals' uses of their two languages hardly ever cover exactly the same contexts of communication and domains of life, competencies are likely domain-specific (see 'Complementarity Principle', Grosjean 2008).[3] A second short-coming is that measuring language competence presupposes an operational definition of native-like competence, which is problematic in itself given the vast variation in native speakers' competence and the multidimensional nature of proficiency (Hamers and Blanc 2000: 35). A related criticism that is increasingly being voiced in the bilingualism literature is that monolingual native-like competence may not be an appropriate yardstick against which to measure bilingual competence, since such comparison distorts an understanding of bilingual-specific performance patterns that are not found in monolinguals (e.g. code-switching) and cannot easily be accommodated by monolingual norms (see e.g., de Houwer 2009, Grosjean 2008). The increasing awareness that bilinguals perform differently from monolinguals has led many researchers to advocate a new approach to bilingualism that does not use native L1 speakers as a standard, but instead considers bilinguals 'holistically' as specific speakers in their own right (e.g. Cook 1992, Grosjean 1985, 1989).[4]

Regarding social criteria, a distinction is made between 'additive' and 'subtractive' bilingualism (Lambert 1974, 1977), according to the value attributed to a language by the sociocultural environment in which a bilingual child grows up. The distinction originates in the observation that the value attached to a language by a given culture and society frequently correlates with linguistic competence and the cognitive benefits that can be gained from bilingualism. Thus, in contexts in which both languages are valued, bilinguals are considered to benefit from their exposure to two languages as an enriching experience from which the child can derive certain cognitive benefits, whilst subtractive bilingualism is associated with circumstances in which one of the languages

[3]Note that imbalances in communicative contexts covered will mostly affect lexical, rather than grammatical competencies.

[4]Although this view is generally endorsed in this thesis, we emphasise that it does not invalidate the method of comparisons with monolinguals. When monolinguals are understood as control condition rather than as 'norm', such comparisons are in fact methodologically important for an understanding of how bilinguals are actually different.

is devalued and its usage stigmatised or generally discouraged, with negative 'subtractive' effects for competence in that language, resulting in delay, incomplete acquisition or even language loss (Cummins 1976, Lambert 1977). Given that the present thesis deals with two languages whose command is highly valued and associated with prestige in both sociocultural environments (France and England), we can assume that bilinguals' linguistic competence in our sample will not be negatively affected by social attitudes. That is, we assume that we are dealing with an additive form of bilingualism.

An important distinction from a developmental perspective is drawn on the basis of age of acquisition, although the theoretical motivation of definitions and distinctions made depends on the framework adopted. Maturational criteria have frequently been adopted by generative frameworks of language acquisition that see the age of onset of acquisition (henceforth AoA) as a crucial predictor of competence in as far as the 'Language Acquisition Device' (see, e.g. Chomsky 2007) is assumed to be exclusively or maximally available during a given 'critical period' (proposed originally by Lenneberg 1967, Penfield and Roberts 1959), meaning that access to Universal Grammar is either impossible or severely limited after this period (see, e.g. Chomsky 2001). Therefore, after a given age (cut-off points adopted by different authors vary substantially), the acquisition process and attainment are assumed to be qualitatively different from native language development ('Fundamental Difference Hypothesis', see Bley-Vroman 1990). However, no generative theoretical commitment needs to be made to consider the AoA a decisive factor. Thus, given that AoA also affects length of exposure and hence the amount of input, other non-nativist frameworks, such as usage-based models (e.g. Tomasello 2003) also regard age as an important variable in the developmental process. That is, a correlation between decline of linguistic performance and increasing age is uncontroversial. However, there is disagreement about whether such decline should be attributed to maturational factors and the time-critical availability of a domain-specific faculty (nativist approach), or rather to general cognitive changes linked to brain plasticity and/or age-related differences in socialisation that affect learning[5], as

[5]Identification with a peer group differs as a function of age, given that children are still developing their socio-cultural identity (see e.g. Hamers and Blanc 2000).

would be assumed by cognitive and functionalist theories.

Independently of theoretical affiliation, a rough distinction along the age dimension is generally made between bilingualism acquired during childhood (*child bilingualism*) and in adulthood or adolescence (*adult bilingualism*), with the latter type constituting second language learning (L2 acquisition), that is, when the L1 is already fully in place. More relevant to our case, a further distinction typically made within child bilingualism is between *simultaneous* and *successive* bilingualism (also referred to as *sequential* or *consecutive* bilingualism or *child L2* acquisition), where the latter refers to cases of children's exposure to a second language some time after acquisition of the first has begun. However, where to draw the line between these two types of acquisition is a matter of controversy and definitions are often arbitrary rather than empirically based. Most researchers addressing this issue suggest a cut-off point between the ages of 3 and 4. Thus, McLaughlin (1978) sets the boundary at age 3, but concedes that this stipulation is largely arbitrary. Despite the lacking justification, exposure before the fourth birthday is accepted as the general cut-off point by a number of other researchers (e.g. Flecken 2010, Unsworth 2005) on the basis that by this age the core phonological and grammatical properties of the L1 have been established and are difficult to acquire at levels equivalent to a first language. Meisel (2004, 2010) also favours a cut-off point between age 3 and 4, but backs up this division by adducing linguistic as well as neuropsychological evidence of substantive differences between simultaneous and successive learners. Linguistically, grammatical knowledge acquired after age 3 differs from that acquired by (2)L1 children, especially in the domain of morphology. Thus, if exposure to the L2 starts after age 3, Meisel observes that aspects of children's inflectional morphology resemble anomalies typical of adult L2 learners: French-German successive bilingual children use French subject clitic pronouns with non-finite verbs, which does not occur in (2)L1 children, but is characteristic of adult L2 learners' French (see Meisel 2010: 239). Meisel further supports the cut-off point at age 4 by reference to a number of neuroimaging studies that suggest correlations with localisation patterns of brain activity. If exposure to the L2 starts after age 4;0, Weber-Fox and Neville (1996) find that the spatial cortical distribution of brain activation is more distributed

and relies on right hemisphere processing to an increasing degree, whilst (2)L1 processing of syntactic cues[6] is mostly limited to the left hemisphere and hence more specialised.

However, other researchers reject the boundary of age 4 in favour of the more stringent criterion of exposure from birth onwards (Padilla and Lindholm 1984). Acknowledging the effects of input, de Houwer (1995, 2006) adopts a combined criterion of exposure to both languages after birth within no more than a week's interval and regular, almost everyday input to both languages (de Houwer 2006: 3). The basis for this strict criterion is, first, that anything that is learnt can be assumed, due to psychological principles (e.g. Kagan 1984), to affect subsequent learning in children. Accordingly, de Houwer argues that until empirical evidence to the contrary is available, the more cautionary default assumption must be that monolingual and bilingual exposure starting after birth entail different processes. Secondly, exposure from birth is required to ensure valid comparisons with monolingual acquisition, since otherwise we cannot disentangle the factors of AoA and the presence of two languages (de Houwer 2006: 3).

4.1.2 The present sample: Why simultaneous bilinguals?

In this thesis, I adopt an age-based criterion of bilingualism, which I consider methodologically advantageous for the purpose of operationalisation. Unlike proficiency-based or socio-cultural criteria, which defy consistent and meaningful measurement, AoA provides us with a criterion that is amenable to operationalisation and allows for clear-cut subject selection principles. Given the vast degree of variation in language performance that is typically reported even within bilingual groups receiving dual exposure before 4;0, all possible measures should be taken to homogenise samples as much as possible to allow for maximal isolation of the various variables affecting language production.

Accordingly, the sample under investigation in this thesis consists of simultaneous bilinguals from birth who conform to the strict criterion advocated by

[6]Note that no such differences between learner types could be detected with semantic stimuli, suggesting that AoA may mainly affect morphosyntactic aspects of language (Meisel 2010).

de Houwer (1995, 2006) combining exposure to both languages from birth onwards with regular everyday input (for details on participants, see chapter 5.3). Thus, in the adoption of this stringent cut-off point, our sample contrasts with other recent studies on early bilinguals' event expression (see e.g. Flecken 2010) that use a more lenient age-based criterion of exposure before age 4. This has several methodological and theoretical advantages.

Methodologically, adopting de Houwer's combined criterion provides control for a number of variables that likely affect children's language use. Thus, the early onset boundary homogenises the sample on the social dimension, given that the requirement of exposure from birth typically entails acquisition within the same family context. Moreover, as shown above, some aspects of language skill are optimally acquired before age 4 due to increased cue sensitivity in the first years. Whilst not guaranteeing native-like proficiency, adopting a cut-off point at birth at least ensures that bilinguals have the possibility of tuning in to each language during the maximally sensitive time window. Given that we are interested in bilingual effects that result from language-specific properties, we have to control as much as possible for confounds, such as imbalanced competence/dominance that could alternatively account for any obtained effects. The empirical research evidence suggests that onset from birth in combination with regular exposure is the most reliable predictor of balanced proficiency and processing.

Most importantly, recall that acquisition of the linguistic variable at the heart of this study, i.e. lexicalisation patterns, not only draws on lexical and grammatical competencies, but also relies on speakers' command of rather subtle features of discourse organisation, such as the frequency with which certain event aspects are mentioned or omitted (see chapter 2). We assume that the acquisition of such subtle gradient properties is crucially affected by the factor of length of exposure. Moreover, Slobin's assumption that patterns of event verbalisation acquired during childhood are particularly hard to shed in later language learning (Slobin 1996*a*: 89) points to the importance of early exposure for successful acquisition of features of rhetorical style.[7] By adopting the crite-

[7]This is supported by the difficulty L2 learners experience in adapting to new lexicalisation patterns (see review in chapter 3).

rion of everyday bilingual exposure from birth, we hold constant both of these potentially decisive factors, length and onset of exposure.

4.2 Separation versus interdependence

One of the central issues that research into simultaneous bilingualism has been concerned with is the relationship between bilinguals' language systems in development, and whether and to what degree bilinguals treat their two input languages as one system or whether they differentiate them. The question originated in the observation that simultaneous bilingual children exhibit some types of linguistic behaviour that are unfamiliar in monolingual children's usage and that appear to be indicative of interactions between children's two languages. Thus, in the course of development, bilingual children are sometimes found to engage in code-mixing, that is, they draw on elements from both of their languages within the same utterance or sometimes even within the same constituent.[8] Evidence of mixing in young bilinguals was reported even in the earliest diary studies (e.g. Leopold 1949) and were frequently interpreted as indicative of children's failure to differentiate between the two languages and, more generally as a sign of linguistic confusion. The further observation that code-mixing frequently diminishes substantially in the course of development appeared to substantiate the notion that code-mixing indicated a deviant, but transitory developmental phase of confusion. These and other bilingual-specific language behaviours inspired a number of researchers to hypothesise a fused or unitary language system during early developmental phases. The most influential version of the fusion hypothesis was put forward by Volterra and Taeschner (1978), who propose a three-phase model of bilingual development, which assumes two initial stages of lexical and syntactic fusion. Based on purported evidence that bilinguals' earliest productions do not make

[8]For instance, Köppe and Meisel (1995) provide an example by a 2-year-old French-German bilingual who combines a French nominal stem with a German plural ending: *die poussetten* 'the pushchairs'.

use of translation equivalents[9] the authors claim that bilinguals' first developmental phase consists of a single undifferentiated lexical system. The second phase of development is characterised by lexical language separation, but a fused syntactic system, manifesting children's application of "the same syntactic rules to both languages" (Volterra and Taeschner 1978: 312). It is only during a third developmental stage that children are assumed to differentiate their languages both lexically and syntactically. Although the three-stage model has been severely criticised both on theoretical and methodological grounds (for detailed critiques, see de Houwer 1990, 1995, Genesee 1989) and is generally rejected today, the ensuing debate it inspired led to the acknowledgement of some important methodological and analytical points for bilingual research. One important issue concerns the validity of arguing for fusion on the basis of mixed language use and the related problem of identifying evidence for or against fusion. Thus, it is not clear what types of language use would count as characteristic of a 'fused' language system. Secondly, mixed language use in itself does not necessarily conflict with children's ability to differentiate both languages. On the contrary, mixed language use in fact presupposes two differentiated systems from which the child selects elements and hence does not warrant arguments for fusion, as pointed out, amongst others, by Meisel (2001).

Since the proposal of the fusion hypothesis, a wealth of research projects have been devoted to the issue of differentiation in bilingual children's early language development. Overwhelmingly, the evidence obtained suggests that children differentiate their two languages from early on in development, at least by age two or earlier (see Paradis 2000 for an overview), which motivated the now dominant position in the research community of the 'Separate Development Hypothesis' (de Houwer 1990, 2009) or 'Differentiation Hypothesis' (Meisel 1989, 2001). The evidence for language differentiation spans all levels of linguistic analysis (from phonetic to pragmatic differentiation of linguistic cues), but has gained especially strong support from a number of projects investigating early morphosyntactic development across a range of language

[9]The general consensus today is that this analysis is flawed in several respects. See Köppe (1997*b*), Pearson *et al.* (1995), Quay (1995) for empirical evidence of bilinguals' early use of translation equivalents.

pairs, including English and French (Genesee *et al.* 1995, Paradis and Genesee 1996), French and German (Meisel 1990, Meisel and Müller 1992, Parodi 1990), as well as the closely typologically related pair of English and Dutch studied by de Houwer (1990, 1994). These studies investigate bilingual children's development of a range of grammatical properties in both languages and find evidence that, first, children's earliest productions adhere to the language-specific grammatical principles of each of their languages, and secondly, that children's development follows the same acquisitional sequences as monolinguals and falls within the same rate of development.

To take an example from English-French bilingualism, Paradis and Genesee (1996) investigated the development of finiteness in children's English and French between age 2 to 3 and found that children's verb forms in English and French reflect the same asynchrony as respective monolinguals: Thus, finite verbs emerged productively earlier in children's French than in their English and at about the same age as they become productive in respective monolinguals. Equally in accordance with monolingual development, the authors report that in French, bilinguals used subject pronouns only with finite verbs, in accordance with their function as clitics (agreement markers) in this language, whereas in English, subject pronouns occur both with finite and non-finite verbs, clearly demonstrating children's language-specific application of grammatical principles. The authors conclude that acquisition of bilinguals' grammatical development proceeds "separately and autonomously" (Paradis and Genesee 1996:19), without signs of transfer or other discrepancies (acceleration or delay) from the acquisitional patterns characteristic of monolinguals.

Regarding other linguistic domains, some studies on bilinguals' phonetic and phonological development similarly suggest a strikingly early ability for infants in the pre-verbal period (aged 4 months) to perceptually differentiate the sound systems of the two languages, even in cases of rhythmically very similar language pairs, such as Catalan and Spanish (Bosch and Sebastián-Gallés 1997, 2001). Findings regarding sound production, such as language-specific babbling, are somewhat more mixed. Some studies report evidence for differentiated babbling in line with the language-specific prosodic properties of monolingual children (for English-Spanish bilinguals, see Maneva and Gene-

see 2002). On the other hand, other studies (Kehoe *et al.* 2004) report on transfer of phonetic features such as voicing (as measured by voice onset time) in early bilinguals, suggesting an interactive development of both phonetic systems during early stages.

Turning to pragmatic competencies, the evidence for language differentiation in bilinguals, operationalised as the felicitous use of each language according to context (such as the interlocutor's language knowledge), the evidence conclusively indicates children's very early ability to make situation-appropriate language choices and to differentiate their languages according to the interlocutor's linguistic abilities (see Köppe 1997*a*,*b*, Lanza 1997). For instance, Genesee *et al.* (1995) showed that English-French bilinguals' language choice and mixing patterns changed in accordance with their interlocutor, even before the two-word stage (between age 1 and 2). Thus, children in their study were shown to use their languages selectively in accordance with each parent's predominant language preferences.

Thus, whereas the evidence for early language-differentiation on the level of phonetic and phonemic development is not entirely conclusive, the linguistic domains that are relevant to the present investigation of lexicalisation patterns, that is, lexical, grammatical as well as pragmatic/contextual skills, appear to be differentiated by bilinguals early on and follow language-specific patterns of development.

Although bilinguals' ability to differentiate their two languages is no longer contested in the research debate and is now assumed to be the rule rather than an exception, note that this leaves open the question as to whether both languages develop completely autonomously, impervious to any interconnectivity, or whether the two language systems allow for some degree of interplay in acquisition. The first position is associated with the 'Autonomy Hypothesis', advocated amongst others by Meisel (2001) and de Houwer (1990, 1994), the latter with the 'Interdependent Development Hypothesis', maintained by a range of researchers (e.g. Döpke 2000, Gawlitzek-Maiwald 2003, Müller 1998, Tracy 2000). The recent controversy about this issue reflects the fact that the initial debate regarding the relationship between children's developing languages has moved on from a simple 'one system or two?' dichotomy (Paradis 2000: 176) to a

more nuanced one that allows a serious exploration of ways in which bilingual acquisition differs from monolinguals' without running the risk of stigmatising bilingual acquisition as qualitatively abnormal. Researchers in this field share an interest in the various manifestations of interdependence phenomena and their underlying mechanisms. According to an influential proposal by Paradis and Genesee (1996), interdependence may manifest itself in three ways: (i) acceleration, (ii) delay (in the acquisition of a particular language property), and (iii) transfer/crosslinguistic influence. Given the focus of the present investigation on crosslinguistic interactions, we limit our presentation in the following section to (iii).[10]

4.3 Crosslinguistic interactions (CLI)

4.3.1 Definitions and terminology

One interdependence phenomenon that has received a great deal of attention in the recent bilingualism literature is the notion of *crosslinguistic influence*, defined by Jarvis and Pavlenko (2008:1) as "the influence of a person's knowledge of one language on that person's knowledge or use of another language". However, given the slightly different applications of this notion across various frameworks, one encounters a fair amount of terminological variability, with investigators sometimes referring to *crosslinguistic influence*, a term originally introduced by Sharwood Smith and Kellerman (1986) and now used in the majority of studies, *crosslinguistic transfer* (used, for instance, by Müller 1998), but also more marginally, some authors adopt deliberately neutral and broad terms, such as *interlanguage influence* (e.g. Gawlitzek-Maiwald 2003), or *crosslinguistic interactions* (e.g. Paradis 2000:196).

A related problem is that the terms used are frequently not clearly defined or used interchangeably even within the same study.[11] This terminological in-

[10]For transfer/acceleration effects, see Paradis and Genesee (1996), who find that the rate of grammatical development in bilingualism is within the same range of variation as in monolinguals'.

[11]This problem has been pointed out repeatedly. For more detailed terminological

consistency is even more obscured by the fact that many of these terms originate in second language learning (especially 'transfer', initiated by Selinker 1969), where they have a more specialised meaning and hence carry with them certain implications or connotations that are not suitable in the context of simultaneous bilingualism.[12] However, the variable terminology partly reflects intended differences in meaning, with some studies adopting clearly delineated and theory-specific definitions, and others intentionally keeping the notion relatively broad to include a greater range of phenomena. In the first category, we find the definition adopted by Paradis and Genesee (1996: 3) as "the systemic influence of the grammar of one language on the grammar of the other language during acquisition", where 'systemic' applies to the theory-specific notion of grammatical representations at the level of competence (as opposed to performance). In the latter category, we find the deliberately broad and theory-neutral definitions by Jarvis (2007, 2011) and Odlin (2003, 2005), both of which apply the notion of 'crosslinguistic transfer/influence' to all linguistic subsystems, including the level of linguistically mediated conceptualisation patterns.[13] Thus, according to the 'Conceptual Transfer Hypothesis' by Jarvis (2007), bilinguals' habitual language use, such as their lexicalisation patterns, can be affected by the types of online conceptualisation patterns associated with the language use of their other language.

For the purpose of the present investigation, bilinguals' dual acquisition of two sets of lexicalisation patterns requires mastery of lexical, grammatical as well as associated appropriate ways of *thinking-for-speaking* (see chapter 2). Therefore, adopting a broad definition is crucial, since all levels of linguistic analyses may be affected by the presence of another language. As for terminology, the term *crosslinguistic interactions* (henceforth *CLI*) shall be used in this thesis, which has the advantage of being theory-neutral and avoiding L2 connotations. Importantly, the term emphasises the underlying process of interplay

overviews and definitions, see Jarvis (2000) and Odlin (2003, 2005).

[12] In second language acquisition, the issue of directionality carries a different weight given the notion of 'source' and 'target' language, which cannot be meaningfully applied in the case of 2L1 acquisition.

[13] Consult chapter 2 for the link between lexicalisation patterns and conceptualisation/*thinking-for-speaking*.

between two languages rather than implying a specific outcome, unlike the terms 'transfer'/'influence'. Moreover, the terminological choice encompasses a wider spectrum of phenomena, without limiting itself to the grammatical domain.

4.3.2 Manifestations and identification of CLI

A major methodological issue concerns the question of how to identify manifestations of CLI. That is, what types of deviations can be attributed to children's bilingualism? Given that monolingual children also exhibit discrepancies from adult target norms, clear criteria are required to distinguish developmental phenomena, on the one hand, and effects of bilingualism on the other one (see also de Houwer 1995: 234 and Paradis 2000: 176 for this argument). For this purpose, systematic comparisons with monolingual first language acquisition are required. Thus, if a given deviation does not occur in monolingual L1 acquisition and is traceable to a property of the other language, we may ascribe it to CLI. However, this does not rule out other less perceptible effects of bilingualism which are not directly traceable to any specific feature of either language, but nevertheless constitute departures from monolingual usage, often of a quantitative kind (overuse or underproduction). This form of CLI has been referred to in the literature as 'covert' (e.g. Mougeon *et al.* 2005, Romaine 1995: 177) or 'indirect' (e.g. Müller and Hulk 2001), as opposed to 'overt' or 'direct' forms, manifested as qualitative divergences, which may result in ungrammatical constructions or semantically infelicitous usage. Covert CLI necessitate other criteria of identification, given that monolingual acquisition may exhibit the same features. As regards covert CLI, I propose that systematic quantitative comparisons between monolingual and bilingual learners are required to identify whether a given structure or feature is used with a frequency that is within the same range of variation as in monolingual usage or whether it diverges significantly. Given that monolingual L1 acquisition also displays substantial variation, I propose that only statistically significant divergences from monolingual degrees of frequencies warrant a qualification as indirect/covert CLI.

In this thesis, I use the term *CLI* to refer to the following two sets of phenomena in simultaneous bilingualism that arise either directly, (i), or indirectly, (ii), from the presence of two languages (note that both notions rely on comparisons with monolingual baselines):

(i) The *direct* influence of a specific property of language A on language B, as manifested in *qualitative* deviations from monolinguals usage, that are unattested in monolingual acquisition

(ii) The *indirect* influence of the other language, as manifested in *quantitative* differences from monolinguals in statistically significant overuse or underproduction of a given pattern or feature as compared to monolinguals.

In the literature, abundant evidence for both quantitative and qualitative manifestations of CLI can be found. With respect to quantitative manifestations, a further distinction can be drawn between frequency differences in relation to target-like features and structures that are in accordance with adult norms, and, on the other hand, deviant developmental features which also occur in monolingual acquisition, but are overused by bilinguals. As part of the first category, quantitative CLI was detected in a study on English-Spanish bilinguals' processing of word order cues conducted by Hernandez *et al.* (1994), whose findings suggested bidirectional quantitative influence on speakers' use of various cues in sentence comprehension: In Spanish, speakers relied more on word order cues than monolinguals, which is characteristic of English, whilst their English syntactic processing used agreement cues (noun-verb) to a much greater extent, reflecting CLI from their Spanish. Turning to language production studies, a sample of English-Spanish bilinguals investigated by Hohenstein *et al.* (2006) were found to use substantially more Manner-verbs in motion descriptions in their Spanish than monolingual Spanish speakers and more Path-verbs in English than corresponding monolinguals (see chapter 3 for details). To mention an example from English-French bilinguals' production of possessive constructions, Nicoladis (2012) observes a significantly higher rate of typically French periphrastic constructions in children's English (e.g. *the hat of the dog* instead of *the dog's hat*). Again, this construction type is also used by

monolinguals, but at a lower rate than by bilinguals. Evidently, such quantitative departures in the use of target-like properties are not easily perceptible on the basis of individual observations, as they do not give rise to non-native like phenomena.

For the latter category, several studies provide evidence of bilingual frequency differences in deviant developmental features. For instance, Yip and Matthews (2000) report on a Cantonese-English bilingual subject's production of non-target null objects[14] in English (e.g. *I don't want* from Yip and Matthews 2000: 201), which also occur in monolingual English children's development, but with a substantially lower frequency. In a study of noun-noun compound orders by Nicoladis (2002*b*), English-French bilingual children reversed twice as many compounds in their English in relation to monolingual children (e.g. *bowl cherry* instead of *cherry bowl*), which was attributed to indirect influence of the typical left-headed French compound order (e.g. *chapeau melon* 'bowler hat' from Nicoladis 2002*b*: 848).

Evidence for qualitative instances of CLI in simultaneous bilingualism are more sparse and controversial in the literature, since they pose a problem for theories of bilingualism that strongly emphasise qualitative equivalence of 2L1 and L1 (e.g. Hulk and Müller 2000, Meisel 2001). For this reason, potential instances of ungrammaticality are frequently discounted as performance phenomena and as insufficiently systematic or numerous in their occurrence to be representative of bilinguals' competence (e.g. de Houwer 2009). Irrespective of the interpretation or importance attached to qualitatively deviant CLI, such instances have been reported to occur in simultaneous balanced bilinguals. For example, findings by Nicoladis (2006) regarding the production of adjective-noun strings by English-French bilinguals demonstrate cases of ungrammatically post-nominal adjectives in children's English (e.g. *a monkey purple* from Nicoladis 2006: 25) that would typically occur in this position in French. These instances can hardly be discounted as untypical on quantitative grounds, given that their occurrence is statistically significant. In this thesis, we assume, in accordance with the above definition and identification criteria, that CLI may give

[14]These are licensed in Cantonese, but have to be realised with transitive verbs in English (see Yip and Matthews 2000: 195).

rise to ungrammaticality, even though our focus on discourse patterns rather than the acquisition of grammatical properties, allows us to be agnostic about its implications.

4.3.3 Causal factors

Research on CLI in simultaneous bilingual development has addressed the causal factors underlying its occurrence and directionality, such as the linguistic domains that attract such interactions 'vulnerable' to it (Müller 1998, Serratrice *et al.* 2004), as well as language-internal structural factors, such as the degree of overlap and variability of patterns (see below for details) and language-external factors relating to imbalances in proficiency and input. As regards the latter factors, it is well known that even simultaneous bilingual children can be dominant in one of their languages, depending on various socio-cultural and input-related factors (see 4.1 for details).[15] A number of studies have investigated cases of unbalanced bilingualism more closely and have reported an influence of children's dominant language on their weaker one (e.g. Argyri and Sorace 2007, Bernardini 2003, Bernardini and Schlyter 2004, Granfeldt 2003, Schlyter 1993, Yip and Matthews 2000). In some cases, CLI has been claimed to result from children's use of their dominant language as a gap-filler to overcome temporary weakness in the less developed language, (see 'Ivy Hypothesis' by Bernardini and Schlyter 2004). Moreover, some of the crosslinguistic phenomena that occur in the children's weaker language have been observed to bear similarities with transfer in L2 acquisition, which raised questions about whether the weak language in simultaneous exposure contexts is acquired qualitatively like a second language (Schlyter 1993). However, this is contested by others (e.g. Bonnesen 2009, Meisel 2007), given that the evidence regarding dominance as a predictor of CLI is far from conclusive. Thus, other studies have found that the language-external factor of dominance does not always correlate with patterns of CLI (Kupisch 2008, Müller 1998, Müller and

[15]Note that a methodological problem concerns the definition and operationalisation of the notion of 'dominance'. Investigators are divided as to what criteria to adopt (see Cantone *et al.* 2008, Müller and Kupisch 2003).

Kupisch 2003, Nicoladis 2002*b*, 2006)[16] and have consequently argued that language dominance is "completely unrelated to the occurrence of cross-linguistic influence" (Müller and Pillunat 2008: 290). Instead, language-internal properties are proposed as the crucial determinants of CLI.

Given the uncertain predictive value of the dominance factor and our interest in the effects of language-specific properties, the present thesis does not pursue dominance-related theories of CLI. Instead, dominance is the variable controlled for (as much as possible) by our selection of simultaneous balanced bilinguals, in order to isolate the factor of interest in our investigation, namely the language-specific properties of motion verbalisation described in chapter 2 and how they guide CLI. I am aware that the possibility of dominance in the bilingual sample cannot be completely discounted and is in fact difficult to control for. The working assumption for the present study is that the bilingual samples studied are fairly balanced owing to the strict selection criteria (see chapter 5.3).

In the following, I present a number of influential explanatory proposals put forth in the literature that consider language-internal structural factors as predictors of CLI. Given that our CLI-related predictions are partly based on these proposals (see chapter 5.8), I point out the relevant applications and hypotheses generated in each case for English-French motion lexicalisation. My selection of these specific predictive theories of CLI is motivated by several factors. First, I consider them most relevant and applicable to cases of simultaneous bilingualism and developmental investigations, since they have either been conceived to account for CLI in this specific acquisition context (e.g. *Structural Ambiguity* and *Bilingual Bootstrapping*), or lend themselves well to this acquisition context due to their more general applicability and inherent implications for simultaneous bilingualism (e.g. *Convergence*).

[16] In fact, Kupisch (2006) demonstrates that the weak language may also influence the strong one, hence suggesting bidirectionality of influence, even in unbalanced bilingualism.

4.3.3.1 Bilingual Bootstrapping

In an influential paper, Gawlitzek-Maiwald and Tracy (1996) propose that CLI is used by bilingual children as a relief strategy to facilitate, i.e. "bootstrap", the acquisition of particular properties in cases of asynchronous development of the two languages. So, when one of the languages develops at a faster pace with respect to a given property than the other one, the more developed language "fulfils a booster function" (Gawlitzek-Maiwald and Tracy 1996: 903) for the slower one. Thus, in what the authors describe as a strategy of *pooling resources*, children's knowledge of a particular linguistic domain or property in one of their languages can be used to help them fill temporary gaps they have in their other language. Importantly, this strategic type of CLI is assumed to work domain-specifically rather than affecting the entire language system. Thus, it is only with respect to the given domain or property in which one language is more advanced than the other that children exploit their knowledge of their language to boost this particular domain in the other language. This implies that CLI may be bidirectional, depending on the domain investigated, because one language may lag behind regarding a certain domain, but be more advanced in another one. Accordingly, the phenomenon is assumed to be temporary and to disappear when the child has acquired the target-appropriate devices in the slower language. The evidence adduced by the authors is based on mixed utterances by an English-German bilingual child who is observed to use finite verbal elements from her more advanced German to help her construct verb phrases in English at a time when she did not use English agreement markers productively yet (e.g. *kannst du move a bit* 'can you move a bit', see Gawlitzek-Maiwald 2003: 140).

A slight interpretative problem concerning the bootstrapping hypothesis is the lack of clarity regarding the assumed notion of asynchronous bilingual development. It is not clear whether this refers to an assumption about language dominance, in which case the concept may not apply equally well to balanced bilinguals, or whether the lag the authors refer to arises from the language-specific developmental schedules of each language. In either case, it is not entirely clear whether CLI is dependent on such asynchrony or merely correlates

with it, which compromises the predictive value of the proposal. A second issue concerns the underlying reason for this behaviour, which the authors rather speculatively refer to as "the observable effect of [...] two [...] language systems being activated simultaneously" (Gawlitzek-Maiwald 2003:141), but the details of how this results in CLI are not fleshed out.

In relation to our own case of the English-French bilingual learner situation spelled out in detail in chapter 2, the Bilingual Bootstrapping Hypothesis is applicable to the asynchrony regarding the development of complex subordinate constructions required for information-rich motion expressions in French. As mentioned in chapter 3, French L1 learners take longer to express the same quantity of information than English monolinguals due to the formal complexity involved (gerunds). Applied to our case of English-French bilingualism, Bilingual Bootstrapping would predict children's drawing on English resources to help them boost their French constructions. Thus, we would expect the typical English structure to affect French directly or indirectly as a means of expressing multiple motion information types, but we would also expect this influence to cease once children have acquired the appropriate French constructions.

4.3.3.2 Ambiguity and overlap

Another explanatory proposal advanced by Müller (1998), Hulk and Müller (2000), Müller and Hulk (2001) as well as Döpke (1998) is based on the notion of ambiguity and overlap. Ambiguity is said to be present when there is evidence for more than one possible pattern or structure in a language. According to Müller and Hulk, this ambiguity concerns the level of underlying grammatical analysis of a surface structure (Müller 1998:153), whilst Döpke's proposal refers to the surface level. In either case, ambiguity, or variability of input, is assumed to lead to CLI when one of the available options in language A overlaps with the (ubiquitous) corresponding pattern of language B.[17] In such cases, CLI is predicted to occur unidirectionally from the non-ambiguous language

[17]The concept of 'ambiguity' is misleading in the present context, where the availability of several choices of patterns does not entail ambiguity of analysis. I therefore prefer the term 'variability' to refer to the existence of more than one pattern.

to the language exhibiting variability in input. Importantly, this type of influence is assumed to be exclusively quantitative and to manifest itself indirectly as children's overuse of the structure shared between the two languages. As such, this type of influence does not give rise to qualitative differences in relation to monolingual development, but amplifies and prolongs developmental deviations that also occur in L1 acquisition.

The evidence for the ambiguity/overlap proposal is based on observations on bilinguals' development of various syntactic properties. Müller and Hulk (2001) examine the target-deviant omission of obligatory objects in Romance (e.g. *il met dans le bain* 'he puts [HER] in the bath', see Hulk and Müller 2000: 230) during a stage of development in a number of Romance-Germanic bilinguals' productions.[18] Such target-deviation is qualitatively equivalent to occurrences in monolingual Romance acquisition, but differs quantitatively both in its much higher rate of production and protracted developmental persistence. This difference is attributed by the authors to the indirect influence of the children's Germanic language, which in some contexts licenses object drop (e.g. Dutch *Heeft mevrouw de Wachter gemaakt* '[THAT] has Mrs. de W made', see Hulk and Müller 2000: 230), hence providing positive evidence for such constructions and ambiguity of input. Döpke (1998, 2000) investigates word order patterns in English-German bilinguals' productions and reports on bilinguals' overextension of the crosslinguistically shared word order (verb-object) in children's German in relation to monolinguals, as a result of reinforcement of the word order option available in both languages.[19]

Note that the underlying explanation provided for this type of CLI differs. Döpke (1998) bases her theory on the Competition Model by Bates and MacWhinney (1989) and accordingly considers quantitative CLI to arise from crosslinguistically effective cue strengthening of superficially overlapping structures in children's input. On the other hand, Müller and Hulk (2001) ascribe the overproduction to crosslinguistically ambiguous and conflicting evidence

[18]The data comes from three bilingual children of various language combinations: German-French, Dutch-French and German-Italian, see Müller and Hulk (2001: 10).

[19]Subject-verb-object word order is pervasively available in both German and English, although object-verb is the typical order for most German dependent clauses (ambiguity in German).

in the input for a given construction. In terms of developmental persistence, CLI is conceived of as a temporary phenomenon that will fade out once children have arrived at the appropriate language-specific analyses. This process is assumed to take longer in bilingual children due to their confrontation with a wider range of possible analyses (Hulk and Müller 2000: 228). As a consequence, bilingual children take longer to "figure out the language-specific analysis for the phenomenon in question" (Hulk and Müller 2000: 228). According to Döpke (1998, 2000), such delay is the result of a greater degree of "interlanguage cue competition" (Döpke 1998: 582) arising from the exposure to dual input. Thus, it is assumed in both versions of the overlap proposal that bilinguals do not process their two languages in isolation (despite assumed early differentiation) and actively engage in comparing and contrasting options of both languages during development (e.g. Hulk and Müller 2000: 228).

Although the proposal accounts well for a number of cases of indirect CLI observed in simultaneous bilingualism, it has been increasingly criticised on account of its insufficiently predictive value. Thus, several studies shed doubt on ambiguity/overlap as a necessary factor for CLI, given its observed occurrence in the absence of either ambiguity or overlap. For instance, in the study by Nicoladis (2002*b*) (see 4.3.2 above), English-French bilinguals reversed the typical noun-noun compound order in both of their languages (e.g. *chair flower* instead of *flower chair*) as a result of CLI, even though the order of the construction in each language is unambiguous and the two languages do not overlap. Likewise, a Cantonese-English bilingual studied by Yip and Matthews (2000) showed evidence of target-deviant transfer of prenominal relative clauses, typical of Cantonese, into his English, even though this structure is not available in English, where relatives are consistently postnominal. In other cases, CLI did not occur despite the presence of both conditions (ambiguity and overlap), as reported by Zwanziger *et al.* (2005) and Nicoladis *et al.* (2010). These findings suggest that the proposed criteria for the emergence of CLI may not be universally applicable, or may depend on additional criteria. However, note that these findings do not discount the proposal entirely, given that in most of the cases, ambiguity/overlap was assumed to have at least a reinforcing effect on the CLI that occurred.

The present investigation of lexicalisation patterns, which are inherently variable, and in the case of English and French also display substantial overlap (see chapter 2) provides a good test case for the ambiguity proposal. Although the authors apply the notion of ambiguity/overlap to the acquisition of syntactic properties, the predictions generated have since been applied to other domains, including typical patterns of motion verbalisation (Hohenstein *et al.* 2006, see review chapter 3) or the labelling of moving figures (Nicoladis *et al.* 2010).

For the present context, the proposal is quite attractive since not only does it allow us to derive testable predictions regarding the directionality of CLI based on language-internal properties, but it also takes into account the variability of input patterns ('ambiguity') and their possible effect on CLI. Given the highly variable patterns observed in French adult usage (see chapter 2 and 3 for L1 French findings), especially in the domain of caused motion contrasting with the very systematically applicable English pattern, the ambiguity proposal would predict unidirectional influence from English to French, manifested as the quantitative reinforcement of those patterns that are shared between the two languages. Consequently, we should expect an overproduction of the restricted satellite-framing options acceptable in French (expression of Path via Goal-denoting prepositional phrases, as illustrated in chapter 2). In terms of development, if ambiguity is the driving force, the prediction is that CLI should diminish with age once children have resolved the situation of ambiguous input and converge with target-specific tendencies.

4.3.3.3 Convergence

Similarly to the causal factors proposed above, the notion of *convergence* is also based on the concept of structural parallels between languages. However, unlike the two previous proposals, it has not been worked out explicitly as a predictive theory of CLI in bilingualism, nor has it been applied to developmental situations so far. Moreover, the origin of this concept lies in diachronic linguistic research where it is used to refer to the phenomenon of contact-induced language change, defined by Weinreich (1959: 395) as "partial similarities in-

creasing at the expense of differences". As a process, convergence involves both a maximisation of already existing crosslinguistic similarities and a reduction of differences (Mougeon and Béniak 1990) and can occur at any level, including the phonological and typological (see Silva-Corvalán 1994: 4-5).[20]

More recent research on CLI has sought to apply the societal concept of convergence to the level of individual bilingualism. In this context, Jarvis and Pavlenko (2008) redefined *convergence* as both a process and an outcome in adult second language learners, where it is used to refer to a form of conceptual change (arising from transfer) characterised by the formation of a new unitary concept that is "distinct from both L1- and L2-based concepts" (Jarvis and Pavlenko 2008:155). Bidirectional CLI are seen as a typical manifestation of convergence processes. Evidence for convergence in this sense comes from a series of semantic studies on categorisation patterns (as measured by naming patterns and similarity judgement tasks) in French-Dutch bilinguals' labelling of household container objects (Ameel *et al.* 2009, 2005, Malt and Ameel 2011), which indicated a convergent naming pattern, characterised by influence from typically encoded categories of both languages. As a result of this bidirectional CLI, bilingual categorisations in each language were found to be more similar to one another (close correlations) than those exhibited by corresponding Dutch and French monolinguals. Relevant to our case, Ameel *et al.* (2005) hypothesise that such convergence towards a common categorisation pattern may affect simultaneous bilinguals more than mature second language learners since for the former, learning takes place within the same context, resulting in simultaneous activation and negotiation between the two patterns.

The convergence proposal we focus on in this thesis is based on influential research by Toribio and associates (Bullock and Toribio 2004, Toribio 2004), who redefine the concept as "the enhancement of inherent structural similarities found between two linguistic systems" in individual bilinguals' speech performance patterns (Bullock and Toribio 2004: 91). Convergence is conceived of as a process in bilingual speech rather than a fixed outcome and its manifestations in bilinguals' language representations can therefore be variable. The

[20]For in-depth discussions of convergence in language contact, see Clyne (2003) and Thomason and Kaufman (1988).

underlying cause for this phenomenon is attributed by Toribio (2004) to economy of speech processing (Muysken 2000). Accordingly, to reduce the cognitive cost associated with the processing of two languages, bilinguals preferentially settle on those options that serve both systems due to their similarity. For instance, in her study on English-Spanish bilingual heritage speakers, Toribio (2004) observes that speakers' production choices frequently suggest an active searching for parallels between the two languages. This can give rise both to quantitative effects, due to the favouring of congruent options over divergent language-specific ones, but also to "discourse-pragmatically non-target-like" usage (Toribio 2004:170) when speakers extend certain syntactic options to options that are semantically restricted in the target language.

To date, no study has tested Bullock and Toribio's convergence proposal in an acquisition context of bilingualism. One of the claims that makes the proposal particularly relevant to the present condition is the prediction that convergence processes are favoured by conditions in which both language systems are activated in parallel, such as code-switching activities, general situations in which subjects are in a 'bilingual mode' (Grosjean 2001, see 4.3.4 below for explanation), and crucially, in children exposed to both languages simultaneously "who are called on regularly to produce and process information in two languages (e.g., within the one-parent/one-language paradigm)" (Toribio 2004:172).

Applied to the case presently investigated, a convergence strategy would predict the occurrence of bidirectional CLI that show evidence of a preference for congruent lexicalisation strategies. To some extent, such outcome would overlap quantitatively with predictions based on ambiguity/overlap (see above), as the overuse of patterns available in both English and French. On the other hand, convergence allows the emergence of qualitative differences resulting from efforts of enhancing structural similarities by overextending felicitous patterns to new contexts.

4.3.4 Psycholinguistic determinants of CLI

Although space restrictions do not allow us to expound current psycholinguistic speech production models, this section clarifies a few important psycholinguistic factors that have been found to affect CLI.

One important determinant of CLI is what is called in neurological terms the activation levels of each language. In psycholinguistic research, the state of activation of each language is often referred to as the 'language mode', a notion introduced by Grosjean (1982, 2001, 2008). The language mode is conceived of as a continuum ranging from maximally monolingual (when the other language is maximally deactivated) to maximally bilingual (when both languages are called upon), such as situations of code-switching. Depending on the nature of the communicative situation, a bilingual speaker is assumed to be located at any given time somewhere along this continuum in a highly dynamic fashion. Accordingly, activation levels can vary all the time as a function of relevant changes in the situation.[21] Various aspects of a situation can influence language mode, notably how the speaker's language knowledge relates to the competences of the interlocutor(s) (e.g. their own bilingualism vs. monolingualism), the topic of conversation, or the degree of formality. In turn, language mode appears to affect language processing and production patterns, such as the degree and type of mixing in speech. As an example, a study by Treffers-Daller (1998) on German-Turkish bilinguals' use of code-switching in situations with different interlocutors showed that code-switching patterns (both frequency and type) changed in accordance with 'language mode' as determined by the interlocutors' language competence: When with monolingual German family members with little knowledge of Turkish, speakers used mainly German with few Turkish borrowings, whereas in situations with bilingual friends who were comfortable in both languages, a much higher rate of mixing occurred.

Two issues emerging from Grosjean's research, theoretical and methodological, are of particular importance for the present investigation. The first concerns the claim that even in a maximally monolingual mode, the other lan-

[21] Changes in 'language mode' are considered to take effect unconsciously in most cases (Grosjean 2008: 40).

guage is never completely deactivated, hence allowing involuntary influences to affect performance in the activated language. This claim has been substantiated in recent years by the increasing empirical evidence that points to constant parallel activation of both languages in bilinguals even when the situation only calls on one of them (e.g. Costa 2008, de Groot *et al.* 2000, Dijkstra *et al.* 1999, Kroll *et al.* 2006, Merian *et al.* 2003). To mention an example from speech processing, a series of experiments conducted by Dijkstra and colleagues (Dijkstra 2005, Dijkstra *et al.* 1999, 2000, 1998) tested bilinguals' word recognition by measuring response rates to visually presented Dutch-English homographs.[22] The results showed that interlingual homographs affected response time to stimuli in the activated language, suggesting a parallel processing of both languages across a range of related tasks. Crucially, participants could not deactivate processing of the non-target language even when it slowed down performance. The second important finding emerging from these experiments is the highly flexible nature of bilingual performance patterns: Comparisons across tasks showed that the degree of relative language activation was affected by task-specific requirements (see in particular, Dijkstra *et al.* 2000) and contextual factors, such as the participants' expectations about the task (in line with Grosjean's claims). Turning to production, recent research by Costa and associates (Costa 2005, 2008, Costa *et al.* 2000) is devoted to examining the role of the language that is not in use (hence deactivated) on the language currently in use on bilingual production patterns. One of the experiments conducted (Costa *et al.* 2000) tested the effect of interlanguage cognates[23] on the speed of picture naming performed in the target-language by Spanish-Catalan bilinguals. Results demonstrated that even though the experiment was designed to induce a monolingual mode (naming in only one language), the deactivated non-target language nevertheless affected performance, as evidenced by the faster naming of cognates.

Thus, bilingual production and processing findings converge in their evidence in support of Grosjean's language mode theory that neither of bilinguals'

[22] An interlanguage homograph is a lexical item that shared the spelling of a word in another language, but has a different meaning.

[23] Cognates were defined by this research group as translation equivalents with shared phonological features.

two language systems can be completely deactivated and may hence exert an influence on the processing and production in the other language. Moreover, psycholinguistic research also suggests that the relative degree of activation and the interaction between systems in processing and production is highly dynamic and depends on the demands and variables of the task at hand.

This brings us to the second methodological point, which concerns the concept of language mode as a potential confounding variable in experimental research on bilinguals and the need to carefully control for it. Thus, as Grosjean repeatedly points out, the possible mechanisms underlying CLI phenomena, such as interdependent versus independent processing (see discussion on 'separation' in 4.2), cannot be investigated if language mode is not taken into account and controlled for, since otherwise "it becomes difficult to disentangle what is due to bilingual representation and processing, and what is due to the bilingual mode the participants are in." (Grosjean 2001:15). Even the knowledge of being tested as a bilingual individual in experimental situations is claimed by Grosjean to potentially activate both languages to a greater extent and hence induce a bilingual mode. This is an important factor to bear in mind for our experimental procedure of data collection and points to the necessity of inducing a maximally monolingual mode when carrying out experimental tasks. This and other methodological points are addressed in the following chapter.

Chapter 5

Methodology

This chapter presents the three interrelated research questions pursued by this study (5.1) and the choice of methods, experimental design and analysis (5.2–5.7). General predictions are formulated at the end of the chapter (5.8)

5.1 Research Questions

Research Question 1: How do typological properties of motion expression affect the simultaneous acquisition of English and French and what is the role of crosslinguistic interactions?

This question aims to elucidate the impact of language-specific properties on the simultaneous bilingual acquisition of English and French, specifically with respect to the role these properties play in guiding CLI.[1] The scope of this question is twofold. As a first step, it aims to investigate whether the simultaneous acquisition of typologically different systems diverges from that of monolingual first language acquisition, or whether, conversely, bilingual development in each language follows the same course as in respective English and French monolingual children. Comparisons with monolingual control groups allow us to identify quantitative and qualitative discrepancies. As a second step, I focus on those discrepancies that are the result of CLI between children's developing spatial systems. CLI and their directionality will be examined as a

[1]See chapter 4.3 for definition and 4.3.2 for identification criteria adopted.

means of understanding their underlying motivation. Both language-internal (language-specific structural factors) and language-external (e.g. task-specific requirements) causal factors are considered. The following aspects of CLI are examined:

A. *Is CLI unidirectional or bidirectional?*
   Do CLI affect productions in both languages or is influence restricted either exclusively or mainly to one language? If CLI are unidirectional, what are the factors motivating this directionality?

B. *Is CLI task-dependent?*
   How do task-specific requirements affect the occurrence of CLI? Production patterns are compared across two tasks that differ in their degree of semantic complexity, i.e. the number of semantic information components to be verbalised. The caused motion task (see 5.2.2) involves a greater number of event components than the voluntary motion condition (5.2.1) and may hence constitute a greater representational and communicative challenge. Such increased task-complexity may affect bilinguals' verbalisation strategies and give rise to more pronounced CLI.[2]

C. *Is CLI age-dependent?*
   The extent to which CLI vary as a function of age can provide insight into the status and motivation of this phenomenon. Developmental disappearance, decline or, alternatively, persistence, or even increase of CLI[3] with age each suggest different explanations. If CLI are found to be age-restricted, this raises the question of whether their decline is linked to the acquisition of particular linguistic devices, which may in turn suggest the function of a temporary relief strategy (see chapter 4.3.3.1).

[2]See chapter 4.3.4 for evidence of task-specificity of crosslinguistic effects.

[3]Some research on second language acquisition suggests that transfer from L1 increases with proficiency, as learners acquire more linguistic material available for transfer (e.g. Hyltenstam 1984, Klein and Purdue 1993). This may be relevant for situations of 2L1 development, too, as age progressions also result in the mastery of a greater range of linguistic devices, thus providing more scope for language-specific influences.

Research Question 2: What do bilinguals' motion expressions reveal about general bilingual production strategies?

The study aims to address more general questions regarding production strategies in bilingualism that are not necessarily restricted to the domain of motion expression. In this respect, the way bilinguals deal with the requirements of two typologically diverging, but also partially overlapping systems provides a good test case for various proposals in the literature concerning bilingual speech production. In this context, the thesis focuses on predictions based on a number of influential theories developed in the fields of bilingual acquisition and psycholinguistics: *Bilingual Bootstrapping*, *Structural Ambiguity*, and *Convergence* (see chapter 4.3.3).

Research Question 3: What is the relative weight of language-specific and general cognitive factors in language acquisition?

The particular situation of simultaneous bilingualism has a number of methodological advantages that allow us to address the question as to the role language-specific and general cognitive factors play in the acquisition process more generally. Although previous research on motion in L1 and L2 acquisition (for a review see chapter 3) has identified a number of potentially relevant language-specific properties affecting acquisition, the confounds of cognitive maturity and age of onset of exposure make it hard to pinpoint what effects should be attributed to general and language-specific factors. To disentangle the various factors at play and isolate those that are due to typology, we either need a comparison of different source and target languages, or, alternatively, an acquisition scenario where both maturity and age of exposure are held constant, which is the case for 2L1 acquisition.[4]

[4]See also 1.2.4 for 2L1 as window on effects of typology.

5.2 Experimental design

It follows from the developmental and typological perspective of this study that a test design addressing the above questions has to allow for comparisons across learner types (monolinguals versus bilinguals), ages (cross-sectional design) and languages (crosslinguistic analysis). Two sets of short animated cartoons were used as elicitation tool. The first set presented speakers with a series of voluntary motion events, the second set showed caused motion events.[5] All stimuli were designed in the context of a larger research project, SALTAC[6], and had been used to elicit motion descriptions in other languages (such as German, Russian, Chinese and Greek) and by different learner types (L1 and adult L2). Using the same experimental task ensures comparability of findings across learner types and languages.

5.2.1 Voluntary motion stimuli

This task was designed to elicit descriptions of voluntary motion events and comprised 12 animated motion cartoons.[7] To avoid order effects, stimuli were presented in six different orders to which subjects were assigned randomly. The presentation of each item lasted about 15 seconds on average. All target items consisted of three relevant event scenes: an entry part characterised by the agent's appearance on the scene, the core part, marking the target voluntary motion scene, and finally, the agent's disappearance from the scene. Items were subdivided into two sets of 6 videos each, corresponding to two event types. The first subset involved events carried out along a vertical axis, in relation to vertical ground referents (e.g. trees, table legs, lamp posts). These 6 items involved animal agents performing a spontaneous movement in various Manners (e.g. climbing) along an upward and subsequently a downward tra-

[5] See chapter 2 for definitions of event types.

[6] I am grateful to Maya Hickmann and Henriëtte Hendriks for allowing me to use their design and letting me have access to the corpus for English and French speakers.

[7] The task also included a second series of 12 control items designed to maximise Manner salience to test children's (especially L1 French) ability to verbalise this component. The analysis of these items was excluded from the thesis due to space limitations, but is covered in Engemann (in prep).

jectory. For example, one target stimulus showed a mouse entering the picture from the right hand side, crawling up a table leg, grabbing a piece of cheese positioned on the table, and sliding back down with the cheese on its back, and walking out of the room (for a full description of all target items and visual examples, see Appendix A). These items also involved an additional action, usually consisting in the animal protagonist getting hold of and eating some food item (e.g. a bear climbing up a tree to get honey from a beehive and eating it once back on the ground). Although irrelevant for the task purpose, these elements were introduced to make stimuli more appealing and natural to child participants. The second target subset showed boundary crossing events (involving boundary referents such as a road or a river), carried out by a human agent. For instance, a boy was shown to walk into the scene, swim across a river and walk out of the scene. Target stimuli of both sets were designed to make both Path and Manner salient to subjects.

5.2.2 Caused motion stimuli

This task was designed to elicit verbalisations of complex caused motion events. It comprised 32 target stimuli that showed a human agent (introduced as 'Popi' in French and as 'Hoppy' in English) in motion who performed an action causing the displacement of various objects (e.g. a suitcase, a wheelbarrow) along various Paths and in different Manners. For instance, one of the items portrayed Hoppy at a beach with a rolling floating tyre which he pushes up a sand dune. Hoppy stops once he and the tyre reach the top of the dune (for a full description of all stimuli and examples, see Appendix A). To avoid order effects, subjects were randomly assigned to one of four test orders. The task presented participants with a multitude of semantic components (five in total), which made their joint expression in descriptions communicatively challenging. Two of these information components were held constant across all target items:

- **Cause:** the causal relation between the Agent (henceforth A) and the Object (henceforth O) was always the same, such that A caused O's displacement.

– **A's Manner of motion:** A was shown to *walk* in all items.

The remaining three components were systematically varied across items:

– **Manner of causing action:** The action A performed in order to achieve O's displacement varied between *pushing* and *pulling*.

– **Object's Manner of motion:** The Manner in which the displaced O moved varied between *sliding* and *rolling*.

– **Path:** A and O followed the same Path across all items. The trajectory was systematically varied: A and O either moved along a vertical trajectory (*up* or *down*) or crossed a boundary on the horizontal axis (*across* and *into*).

The combination of the available variants for each information component produced 16 scenarios (2 Manner of causing action x 2 Manner of O's Motion x 4 Path = 16). Each scenario was presented twice, hence resulting in a total of 32 test items. Sceneries presented (e.g. beach, forest, mountains) as well as ground referents (e.g. roof, sand dune, street, cave etc.) varied within each specific combination from one exemplar to the other. Additionally, subjects were presented with eight distractor items, which occurred at regular intervals after a set of four test items.[8] Distractors showed a variety of motion situations involving inanimate objects causing other objects to move (e.g. a ball causes a book to slide into a wall) and/or change their state (e.g. a ball rolls into a bottle, causing it to fall and break). Their inclusion was meant to mask the real purpose of the task as well as to prevent subjects' habituation to recurrent semantic components and from consequently settling on a particular verbalisation strategy.

In summary, the caused motion task was constructed to confront participants with multiple information types and to test the effect of the resulting communicative challenge on participants' linguistic choices. As shown in chapter 2, English and French differ in their availability of low-cost means of integrating multiple information types, which makes this information-rich task particularly suited for testing the effect of this typological contrast on CLI.

[8]Distractor descriptions are excluded from the analysis.

5.3 Participants

5.3.1 Between-subject design

Participants comprised 96 simultaneous English-French bilingual children and a control group of the same number of monolingual English and French children (N = 48/language). For the bilinguals, an independent subject design was adopted whereby half of the children (N = 48) performed the tasks in English and half of them in French. This design was preferred to testing both languages within the same speaker for several reasons. From a methodological standpoint, the experimental tasks were demanding for children since they required sustained attention for 30 to 45 minutes for caused motion descriptions and an additional 15 to 25 minutes for the voluntary motion task. Even imposing a prolonged temporal break between tasks would not eliminate the danger of priming that a task repetition in the other language would have entailed. Given the relatively large number of items in each task, participants were likely to be sensitised to the relevant event components, which could hence affect their performance in the other language.

The second reason was that part of the bilingual dataset had already been collected by a former SALTAC project member between 2001 and 2004 and was available for transcription and analysis.[9] However, this dataset had been collected only in French and a data collection from the same sample of children in English was neither possible nor desirable, since the time elapsed had introduced an age difference. I therefore set out to complement the existing dataset for French and to collect corresponding data from the same category of 2L1 bilinguals in English.

5.3.2 Age groups

For the developmental analysis, both bilinguals and monolingual controls were divided into four age groups, each comprising 12 subjects. Ages tested were approximately 4, 6, 8 and 10 years (see Appendix B for an overview of age

[9] I thank Maya Hickmann for letting me use the bilingual audio recordings.

ranges and means). Taking bilinguals and monolingual controls together, this amounted to a total subject number of 192. With each of the 4 age groups represented 4 times (i.e. in 2 languages and 2 learner types), this produced 16 subject groups (4 ages $\times$ 2 languages $\times$ 2 learner types).

5.3.3 Gender

For each group, I aimed to obtain roughly equal numbers of male and female participants, although a perfect gender balance (6 males/6 females) was not always possible, especially in the bilingual groups, due to the difficulties in finding sufficient numbers of participants that met the selection criteria.[10] As a result, not all participant groups feature equal numbers of males and females (see Appendix B for an overview).[11]

5.3.4 Selection criteria

Subject recruitment was limited to those bilinguals who were most balanced.[12] As such, controlling for the extraneous factor of language dominance as much as possible was crucial. Research suggests that two major determinants of dominance are age of onset of acquisition (AoA) and input (quantity and quality) the child is exposed to (see chapter 4.1.2). In practice, these two factors are confounded, since AoA will also affect quantity of exposure. However, keeping AoA constant by selecting only bilinguals from birth provides a convenient means of controlling fully for the first and to some extent for the latter. Participant selection was guided by the following criteria (see 4.1.2 for detailed rationale):

[10] A considerable number of participants had to be discarded due to clearly unbalanced proficiency.

[11] Our ANOVAs did not reveal any significant effect of gender ($p < 0.05$) on any of the dependent variables tested, so the imbalance was considered acceptable.

[12] I am aware that in practice, perfectly balanced bilingualism is hardly ever achieved and that even simultaneous bilinguals are likely to develop linguistic preferences due to a variety of factors. See chapter 4.1.2 for determinants of 2L1 imbalances and 3.3.3 for dominance effects on bilingual motion expression.

(i) Exposure to both English and French from birth on a regular everyday basis, both at home and school

(ii) Main source of input (parents) is provided by native speakers of English and French

In accordance with criteria (i) and (ii), all selected participants were raised by a native French-speaking and a native English-speaking parent, following the 'one-parent – one-language' principle.[13] Additionally, to ensure sustained exposure to both languages once children's social network widened beyond their immediate family, all participants were recruited at bilingual institutions with a dual-language immersion programme.[14] So, both at home and in their school environment, children received exposure from both languages by native speakers on a daily basis.

5.4 Procedure

5.4.1 Data collection

Children were tested in their nurseries and schools in England and France. Monolingual English controls were recruited in Cambridge, whilst the monolingual French participants were tested in Vanves, a suburb of Paris.[15] All the bilingual data was collected in France (in Paris and Aix-en-Provence). This was to ensure comparability with the first bilingual dataset already available, which had been collected in France. Moreover, it held constant the factor of the dominant ambient language, which can affect children's language balance and preferences (see chapter 3.3.3).

[13]The approach goes back to Grammont's advocated principle of 'une personne; une langue' (Grammont 1902).

[14]Both English and French were regular languages of instruction.

[15]The data collection for monolingual children was carried out by other members of SALTAC. I thank Maya Hickmann and Henriëtte Hendriks for letting me use these data.

5.4.2 Questionnaires

To ensure that participants met the above selection criteria, a questionnaire was issued to schools and completed by children's parents prior to the data collection, which gathered information about children's language background and everyday linguistic exposure. The questionnaire was circulated to parents via the school administration and was delivered in both languages (see Appendix C for the English version). Parents were questioned about their own native language, the languages regularly spoken with the child by family members (including siblings), childminders, relatives, friends and teachers. Furthermore, to gain better insight into other sources of input, other questions concerned the frequency and lengths of visits to English-speaking or other countries, as well as linguistic exposure through different media (books, radio, TV). Finally, parents were asked to evaluate their own and their child's level of fluency in each language on a scale from 1 (= poor) to 10 (= native-like).[16]

Access to the questionnaire information helped control roughly for children's regular linguistic exposure. Subjects who were clear outliers, e.g. due to extensive exposure to a third language, were discarded from the study. Additionally, in order to avoid unbalanced bilingualism, only those subjects were included whose fluency assessment by their parents did not diverge by more than two points between the two languages on the questionnaire scale.

5.4.3 Task procedure

The task was conducted with each child individually in their nursery or school setting in a quiet room. Participants were seated at a table with a computer screen in front of them, on which they were shown the video clips. They were invited by the experimenter to verbalise what had happened in each of them after the end of each clip. All descriptions were audio-recorded by means of a small digital voice recorder, which was placed discreetly next to the com-

[16] I am aware that this subjective self-evaluation is no substitute for a standardised proficiency test. However, both because of time restrictions and comparability concerns with the first French dataset (for which no such test was performed), no independent standardised proficiency assessment was carried out.

puter.[17] Each child participated in both tasks (VM and CM). To make allowances for younger children's shorter attention span, a short break was introduced between the two tasks. At the end of the task, children were rewarded for their participation with a small present.

With bilingual participants, the experimenter negotiated a maximally monolingual mode (see chapter 4.3.4). At the beginning of the task, the experimenter introduced herself either in English or in French, indicating that she could only speak and understand one of these languages, and proceeded to conduct the entire session in the language of the introductory interaction. When children attempted to describe events in the other language (very rare), the investigator demonstrated incomprehension and encouraged the child to proceed in the language of the experiment.[18]

5.4.4 Elicitation

To elicit descriptions that relied maximally on verbal means (rather than gestures) and to express as much relevant information as possible, children were asked to tell what they had seen in the videos to an imaginary listener who himself had no visual access to the cartoons. For the younger children (aged 4), this fictitious listener was represented by a doll they were introduced to at the beginning of the task and that they were asked to blindfold as part of a secret-telling game. Subjects were to imagine that the listener would have to reproduce the stories themselves on the basis of their audio-recorded descriptions. Whenever necessary, subjects were reminded to be as complete as possible in their responses.

In order to familiarise children with the requirements of the task, each session started with a training item, similar to the target stimuli, which was designed to sensitise participants to the relevant types of information (see Appendix A for item descriptions). If the response given was incomplete, i.e. did not include the information components systematically varied, the exper-

[17] In the earlier data collections carried out by other project members, an analogue voice recorder with microphone was used.

[18] To illustrate such linguistic negotiation: *EXP: Qu'est ce qui s'est passé? 'What happened?' *SUJ: He jumps. *EXP: Comment? 'Pardon?' *SUJ: Il court. 'He runs.'.

imenter would replay the training video and, if necessary, direct children's attention towards the relevant entities by questions until all key components were elicited.[19]

After the training phase, target stimuli were presented to children with an introductory commentary by the experimenter that provided them with suitable lexical items for the Figures (e.g. 'Here we can see a wheelbarrow') and Grounds (e.g. 'Look, there's a very steep sand dune') portrayed. This was to ensure that participants could focus their attention on verbalisation rather than on lexical retrieval.[20]

During the presentation of target items, all questions were avoided in order to minimise any influence on children's spontaneous verbalisations. In cases where children gave no response or omitted critical information (i.e. no reference to either (i) the fact of motion per se or (ii) the Figure), the experimenter followed a standardised procedure of elicitation, using general questions whenever possible ('What happened?'). As an example, the child's spontaneous response in (2) only expresses a static location, but makes no mention of motion, which in turn licenses the experimenter's general question in (3), which usually suffices to elicit at least reference to the core motion event, as seen in (4). If repeated general questions, as in (5), did not succeed in eliciting a basic component, as is the case for (6) (Figure omitted), the experimenter resorted to more specific questions, as illustrated in (7) and (9).

(1) *EXP: There is a cave and a wheel.

(2) *SUJ: Hoppy is in the forest.

(3) *EXP: And what happened?

(4) *SUJ: Hoppy went into the cave.

(5) *EXP: And what else happened?

(6) *SUJ: He just went in and it was very dark.

[19]For CM, these components were Cause, Path, Manner of causing action and the Object's Manner of motion. For VM, these were Path and Manner.

[20]Especially for bilingual populations, where studies have repeatedly shown slower lexical retrieval (Costa 2005, Gollan *et al.* 2007) as well as smaller vocabulary sizes (see Bialystok 2001 for reviews) than in monolinguals, this procedure helped to avoid time-consuming and cognitively costly lexical searches.

(7) *EXP: And what about that wheel?

(8) *SUJ: It was rolling.

(9) *EXP: How come it rolled?

(10) *SUJ: He pushed it.

Responses elicited by specific questions, such as (8) and (10), were later excluded from the analysis.

5.5 Transcription

All sessions were audio-taped and transcribed in their entirety in CHAT-format, one of the tools provided by CHILDES[21] (MacWhinney 2000), following the transcription conventions laid down in the current CHAT manual.[22] Accordingly, all utterances produced by the subject and the experimenter were shown on a main line starting with an asterisk followed by the three-letter codes 'SUJ' and 'EXP' respectively. Target responses were segmented into clauses that were indicated by the symbol **[c]** appearing at the end of a clause, each of which contained one verb, as illustrated in (11).

(11) *SUJ: He has like this plastic chair **[c]** and he's pulling it **[c]** and he's walking **[c]** to go in the cave **[c]**.

Modal verbs (e.g. *The mouse **wants** to get the cheese [c].*) and temporal-aspectual constructions (e.g. *He **keeps** pushing it [c].*) that involved an infinitival verb element were considered as one verbal complex and hence counted as one clause only. On the other hand, gerunds (e.g. *Il a traversé la rue [c] **en tirant** le cheval [c].* 'He crossed the road [c] **pulling** the horse [c].') as well as infinitival constructions (e.g. *He went up **to get** the banana*) were treated as a separate clause. In examples of transcriptions given throughout the thesis, the following symbols will recur:

[21]The acronym stands for 'Child Language Exchange System'

[22]See `http://childes.psy.cmu.edu` for the current CHAT manual

[/]	verbatim repetition (without correction)
[//]	retracing (repetition with correction)
[///]	reformulation
< >	repeated or retraced material (followed by one of the above symbols)
( )	omitted part of incompletely produced word
xx	unintelligible speech, treated as a word
xxx	unintelligible speech, not treated as a word
#	single pause between words
##	long pause between words
+...	incomplete utterance due to speaker's trailing off
+/.	Interruption (by other speaker)
+//.	self-interruption

Idiosyncrasies in utterances were always transcribed exactly as produced by the child. To mark idiosyncratic speech phenomena specific to bilingual and child speakers, the following symbols were used:

@e	code-switching into English (from French matrix)
@f	code-switching into French (from English matrix)
@c	child-invented word coinage of unidentifiable origin

If the standard word or matrix language equivalent could be identified, the transcriber added it in square brackets (**[:]**), as shown in (12) and (13):

(12) *SUJ: là il push**@e** [:pousse] la table [...] dans la ferme [c].
*SUJ: there he pushes the table [...] in the farm [c].
'There he pushes the table in the farm.'

(13) *SUJ: he's pushing down <the box of apples> [//] well # the panier**@f** [:basket].

5.6 Coding

The coding of the transcribed data followed an elaborate scheme created specifically for the research purposes of SALTAC.[23] Each transcribed clause was aligned with two types of coding lines using the CLAN[24] tool made available by CHILDES. The coding served to extract all elements of the transcribed motion verbalisations that were of interest for the analysis. The component of participants' descriptions that corresponded to the motion event tested was identified as the target response. Whilst the majority of items in both tasks contained one target motion event, note that 6 of the voluntary motion items contained two target scenes (upwards and downwards). For these items, the coding produced two corresponding coding lines each. If a target scene was not verbalised by the child, this was coded as a non-response ('NR') and its absence taken into account statistically. Two types of data coding were carried out, producing two types of coding lines: *Basic coding lines* (5.6.1) took into account speakers' target response (one response per item). *Synthetic coding lines* (5.6.2) served to provide a more global understanding of the overall architecture of responses, taking all of participants' productions into account.

5.6.1 Basic coding lines

Basic coding lines identified one single target response per item for statistical analysis. Note that the target response could comprise several clauses (embedded clauses) and hence correspond to several coding lines.[25] In cases where children produced more than one response for the same item, a systematic heuristics was applied to identify one target response per item. The identification procedure was guided by a range of hierarchically applied criteria. Whenever possible, the semantically richest response (containing the highest number

[23]For the complete coding manual, see Hickmann *et al.* (2011).

[24]See `http://childes.psy.cmu.edu` for the CLAN manual.

[25]The coding scheme provided separate coding lines for descriptions of entry and departure scenes (e.g. *A mouse appears* or *The bear goes away*), which are not taken into account in the present analysis.

of information types) was identified as target.[26] So for instance, in the case of (14), the richness criterion would identify the second utterance as the target, as its expression of both Path and Manner makes it semantically richer than the first, which only verbalises Path.

(14) La souris elle monte **[P = 1]** la table. Elle grimpe **[P + M = 2]**.
The mouse it ascends the table. It climbs.
'The mouse is going up the table. It's climbing.'

In cases of equally rich utterances, as in (15) below, the second criterion of 'relevance' applied, which prioritised responses containing the most relevant information type, depending on the task and item type. Generally, Path (first utterance in (15)) took precedence over other information types, as it was considered the defining property of motion.[27]

(15) Il traverse **[P]** la rivière et il glisse **[M]**.
He crosses the river and he slides.
'He's crossing the river and he's sliding.'

The resulting basic lines consisted of 16 fields that coded for a range of elements essentially based on Talmy's conceptual taxonomy (information in verb vs. satellites, Figures, Grounds), but also captured dimensions of motion expression beyond Talmy's categorisation. Thus, basic lines took account of the semantic information expressed by speakers' target responses, both in verbs and it satellites. Depending on the task coded, the main information types distinguished were: **C**(ause) (for CM only), **P**(ath)[28] and **M**(anner).[29] Separate coding fields were reserved for information content supplied by the verb and by satellites. Thus, the scheme not only allowed to determine the types of information expressed, but also a distinction in terms of the linguistic devices that carried this information. Note that in our coding scheme, a much broader

[26]Subtypes of the same information component, such as the source and goal of Path (e.g., ***from*** *the river bank* ***to*** *the other side*) only counted once.

[27]For a detailed presentation of the remaining criteria and examples, see the coding manual (Hickmann *et al.* 2011:18–22).

[28]Within the P(ath) component, the coding made further distinctions between various aspects (e.g., boundary-crossing, source, goal, deixis etc.).

[29]The CM task distinguished 3 types of Manner information, corresponding to the event components presented in 5.2.2.

definition of 'satellite' was adopted than in the traditional Talmyan framework. It took into account all information expressed outside the verb and hence included motion components that appeared in prepositional phrases, nominal phrases (e.g. *the runner*) and adverbial expressions (e.g. *fast*, *avec le vélo* 'with the bike'). A full description of all coding fields along with coding examples can be found in Appendix D.

5.6.2 Synthetic coding lines

Basic lines were followed by synthetic coding lines, introduced by '%sum'. The aim of these lines was to provide a more global insight into the *Utterance Architecture* of participants' responses and their degree of syntactic complexity. *Utterance Architecture* refers to the structural relationship obtaining between the various response elements that make up the child's utterance. Thus, %sum-lines took into account not only the component identified as target response (at the centre of %cod-lines), but also all other utterance elements produced to describe an item.[30] %sum-lines comprised 11 fields (for a description of all fields and coding examples, see Appendix D). The following description is restricted to field 3, which specified global architecture as a function of two dimensions, *compactness* and *syntactic complexity*, each of which could take on one of two values. *Compactness* distinguished between the values 'tight' and 'loose': If information was packaged within a single main clause, the response was coded as 'tight'. Conversely, responses spreading information across separate main clauses were coded as 'loose'. The dimension of *complexity* distinguished between 'simple' and 'complex'. Responses without dependent subordinate clauses were coded as 'simple'; those comprising subordinate clauses as 'complex'. Combining the values of the two dimensions produced four possible architecture types defined and illustrated below:

[30]This included entry and departure scenes, which are however not taken into account in the present analysis.

1. **TS (tight simple):** All information is expressed in one single clause (no subordination):

   (16) He's pushing the table into the cave.

2. **TC (tight complex):** All information is expressed in one sentence, containing at least one subordinate component (frequently gerunds or relative clauses):

   (17) (C'est un garçon qui) traverse la rivière en nageant.
   (It's a boy who) crosses the river by swimming.
   '(It's a boy who) crosses the river swimming.'

3. **LS (loose simple):** Information is spread across several coordinated or juxtaposed clauses:

   (18) Il tire la voiture **et** il monte jusqu'en haut du toit.
   He pulls the car and he ascends to-the top of-the roof.
   'He pulls the car and he goes up all the way to the top of the roof.'

4. **LC (loose complex):** Information is spread as in LS responses, except that at least one of the clauses contains a subordinate element (occurs very rarely):

   (19) Popi fait tourner la roue **et** il traverse la rue # en la
   Popi makes turn the wheel and he crosses the road # by it
   poussant toujours.
   pushing still.
   'Hoppy rolls the wheel and he goes across the street pushing it.'

5.7 Analysis

5.7.1 Variables

5.7.1.1 Independent variables

The present study tests the effect of the following **between-subject** factors:

Age:	4 levels (*4, 6, 8 and 10 years*)
Language:	2 levels (*English and French*)
Learner Type:	2 levels (*bilingual and monolingual*)

It also tests the effect of the following **within-subject** factor:

Event Type:	3 levels in VM task (*up, down, across*) 4 levels in CM task (*up, down, across, into*)

5.7.1.2 Dependent variables

The dependent variable, motion expression, was measured as a function of the following three aspects of verbalisation:

Information Packaging:	the linguistic devices used to encode information (*main verb* vs. *other devices*)
Semantic Density:	the number of semantic components expressed (*SD1, SD2, SD3/+*)
Utterance Architecture:	syntactic complexity and compactness (*TS, TC, LS, LC*)

5.7.2 Statistical analysis

In order to test the effect and interaction of Age, Language and Learner Type on the above variables of event verbalisation, analyses of variance (factorial ANOVAs) were performed using SPSS Version 19. Parametric tests were preferred whenever possible. When the criterion of homogeneity of variance, assessed by the Levene's test, could not be satisfied, non-parametric equivalents were used instead (Kruskal-Wallis and Mann-Whitney tests).[31] Normality violations, assessed by the Shapiro-Wilk's test, on the other hand, were considered acceptable for parametric procedures, given that ANOVAs are generally deemed robust against this type of departure.[32] To determine the locus of significant differences, ANOVAs were followed up by post-hoc tests to break down any significant main and interaction effects detected.[33]

5.8 General predictions[34]

The following general predictions were made regarding the occurrence of CLI in bilinguals' event verbalisations:

A. **Unidirectionality**
   In accordance with the language-specific properties of English and French (see chapter 2), unidirectionality of CLI was expected, with bilinguals' French productions showing influence from English, but not vice versa.

B. **Task-dependency**
   Given its greater complexity, the CM task was expected to give rise to most or more CLI than VM verbalisations.

C. **Age-dependency**
   Given the formal complexity required for information-dense packaging

[31] The procedure used is always indicated in the analysis as applicable.

[32] According to Donaldson (1968), Glass *et al.* (1972) and Schmider *et al.* (2010), non-normality does not affect the reliability of the F-statistics as long as group sizes are equal, which was the case for our design.

[33] The specific post-hoc procedures carried out are reported in the relevant sections.

[34] Specific predictions for each task are presented in the relevant chapters (6 and 7).

in French (see chapter 2), CLI was predicted to occur predominantly in verbalisations by younger children (age 4 and 6), when influence from the formally simpler English pattern could serve as a convenient syntactic relief strategy. Conversely, the acquisition of complex structures with age was expected to result in a decline of CLI.

With respect to the three dimensions of motion expression outlined above (5.7), CLI was expected to manifest itself as follows:

- **Information Packaging:**
  Bilinguals were predicted to overuse the satellite-framing lexicalisation patterns in their French verbalisations. Thus, a higher frequency of C/M encoded in the verb and P in other devices was expected than in French monolinguals.

- **Semantic Density:**
  As a result of the more information-dense packaging afforded by the anticipated overuse of English-style Information Packaging (see above), a boost in Semantic Density was predicted for bilinguals' French. In accordance with age-dependency predictions, this density boost was expected to decline with increasing age, such that significant density differences should occur mainly in the younger age groups.

- **Utterance Architecture:**
  In accordance with the two above predictions, bilinguals' Utterance Architecture in French was expected to display structurally more compact and simple constructions, hence resulting in a higher frequency of 'tight simple' responses than in French monolinguals.

Chapter 6

Results I: Bilingual Development of Voluntary Motion Expression

This chapter presents findings for the VM task with respect to the three variables of event verbalisation defined in 5.7, starting with *Information Packaging* in 6.2, proceeding with *Semantic Density* in 6.3 and finishing with an analysis of *Utterance Architecture* presented in 6.4. Results for each variable are preceded by specific predictions relating to the factors of Language, Learner Type and Age. Analyses of bilinguals' productions are both quantitative and qualitative and are always presented in direct relation to corresponding monolingual control groups to allow for an assessment of divergences and identification of CLI.

6.1 Task-specific coding conventions and predictions

VM target items were designed to make two event dimensions salient to participants: **P**(ath) and **M**(anner) (see chapter 5.2.1). The coding scheme counted as P a range of semantic aspects relating to the trajectory, including information about directionality (e.g. vertical movement, as in *monter/descendre* 'to ascend/descend'), deixis (e.g. *to come*), source (e.g. ***from*** *the bottom of the hill*), goal (e.g. ***to*** *the top of tree*) and boundaries (e.g. ***across*** *the river*). As for the M-component, the coding took into account all semantic information relating to motor patterns of motion (e.g. *jump*), its pace (e.g. *slowly*), position (e.g. *debout* 'standing'), and sometimes the instrument involved in the event (e.g. *en vélo* 'by bicycle', *patins* 'ice-skates').

Given the typological properties of French and English (see chapter 2) and the expectation of task-dependency (see 5.8), no significant departures from monolingual English and French tendencies of motion expression were predicted for the VM task.

6.2 Information Packaging

Information Packaging referred to the linguistic devices chosen to express information types. Recall that the basic coding procedure (see 5.6.1) distinguished between semantic content located in the main verb (henceforth V) and in other linguistic devices outside the verb (henceforth OTH). The OTH-category included both satellites in the traditional Talmyan sense (e.g. particles such as *up*), but was much broader in that it also took into account prepositional phrases (e.g. *to the top of the house*), noun phrases (e.g. *the jogger*), adverbials (e.g. *slowly*) as well as verbs in subordinate constructions, such as relatives and gerunds (e.g. *en courant* 'running').

6.2.1 Predictions for Information Packaging

In accordance with the task-dependency hypothesis, bilinguals' verbalisations in the VM task were predicted to follow the information packaging patterns characteristic of corresponding monolinguals without significant departures. Thus, following previous L1 findings for English and French VM expression (see chapter 3.1.4), the prediction was that bilinguals' English responses would predominantly encode M in V and P in OTH, in accordance with the typical satellite-framing pattern. In French, bilinguals were expected to follow the predominant verb-framing strategies, encoding P in V and either omit M entirely, or encode it by means of OTH, such as gerunds. With respect to Age, the hypothesis was likewise in line with earlier observations on monolingual acquisition, which suggested that typological information packaging tendencies are established from early on in both languages (by age 4) and remain relatively sta-

ble across development.[1] In terms of statistical analyses, no effects of Learner Type were thus expected, whilst results were predicted to replicate the effects of Language and Age obtained for earlier L1 studies.

6.2.2 Operationalisation and measurement

The analysis of Information Packaging examines *where* information is typically encoded, distinguishing between the main verb (**V**) and other devices (**OTH**). On this basis, quantitative analyses assess the frequency of occurrence in V/OTH of the following information types:

P: Path (e.g., in V: *monter* 'to go up'; in OTH: *down*)

M: Manner (e.g., in V: *to skate*; in OTH: *à quatre pattes* 'on all fours', *la cycliste* 'the cyclist')

PM: Path and Manner conflated (e.g., in V: *grimper* 'climb')

Z:[2] neither P nor M is expressed (e.g., in V: light verbs, such as *to go*; in OTH: locative prepositions, such as ***on*** *the lake*)

6.2.3 English results for Information Packaging

6.2.3.1 General trends of information distribution

Figures 6.1 (A)–(B) illustrate bilinguals' use of the devices V and OTH to encode the information types PM, P, M and Z as a function of age.[3] For comparison, English monolinguals' response patterns are displayed in Figures 6.2 (A)–(B). Comparing across the two learner types reveals clearly parallel distributional and developmental trends with respect to information encoding across the two

[1] With the exception of French L1 children's increasing use of OTH (see chapter 3.1.4).

[2] Z = zero-category is distinct from NR (no response). In Z-responses, some information is provided, but it is either not relevant to motion or does not directly express any of the defined semantic components.

[3] Calculated as the relative frequency with which each information component was expressed by V or OTH over the total number of (V/OTH-)responses.

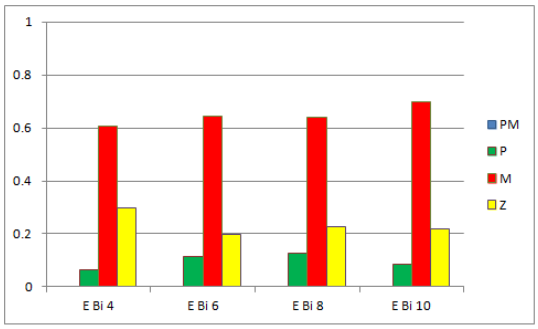

Figure 6.1 (A): V

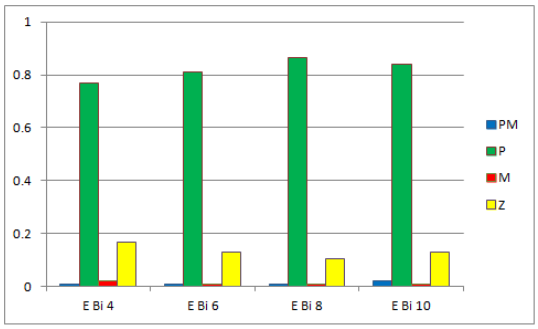

Figure 6.1 (B): OTH

Figure 6.1: VM 2L1 English Information Packaging as a function of age

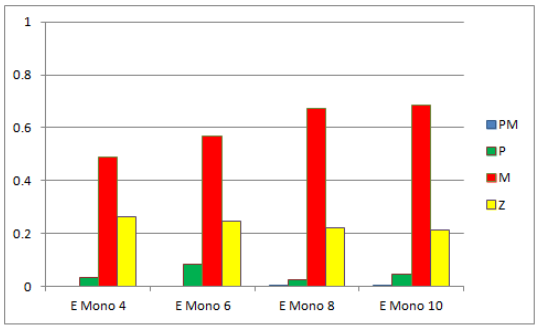

Figure 6.2 (A): V

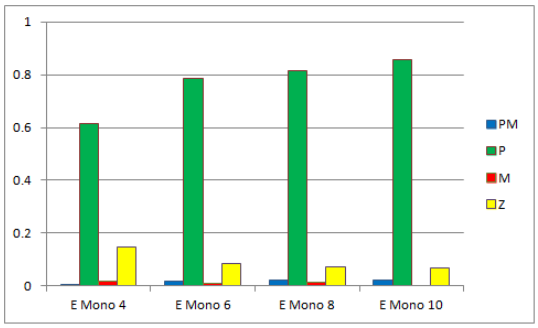

Figure 6.2 (B): OTH

Figure 6.2: VM L1 English Information Packaging as a function of age

linguistic devices: Both bilinguals and monolinguals display the same clear-cut division of labour between V and OTH, such that M is almost exclusively encoded in V, whereas P appears largely in OTH, thus following the expected satellite-framing pattern expected for English. (20) and (21) provide examples of typical responses taken from the bilingual data.

(20) The bear **climbs** [M in V] **up** [P in OTH] the tree. [EB06][4]

(21) She **skidded** [M in V] **over** [P in OTH] the frozen lake. [EB08]

With respect to Age, the figures show that this pattern of information distribution is already clearly established at the earliest tested age of 4 in both learner

[4]Throughout this thesis, all examples taken from my data will be followed by a code indicating the language group (i.e. (**E**)nglish and (**F**)rench) and Learner Type (i.e. (**B**)ilingual and (**M**)onolingual), followed by a number specifying the age group.

types and only changes minimally as age progresses, in accordance with predictions. This is confirmed statistically by a two-way factorial ANOVA with Age and Learner Type as independent variables, which showed no effect of Age on the various packaging strategies ($p > 0.05$).

6.2.3.2 Effects of Learner Type: Path in V

Despite the close developmental learner type parallels, the statistical analyses revealed an unexpected difference between monolinguals and bilinguals with respect to P-encoding in V. Although P was only encoded in a minority of verbs overall in both learner groups (on average, in 4.74% of monolinguals' V and 9.72% of bilinguals'), a three-way independent ANOVA testing the effects of Learner Type, Language and Age on the proportion of P-encoding in V revealed both a significant main effect of Language ($F(1,176) = 932.609$, $p < 0.0001$), in line with the expected typological contrast (F > E), but also a significant interaction effect between Language and Learner type ($F(1,176) = 4.825$, $p < 0.05$). To break down this interaction effect, a two-way independent ANOVA within English was performed,which established that bilinguals encoded P in V significantly more frequently than monolinguals ($F(1,88) = 5.254$, $p < 0.05$), as illustrated in Figure 6.3 (age groups collapsed).[5]

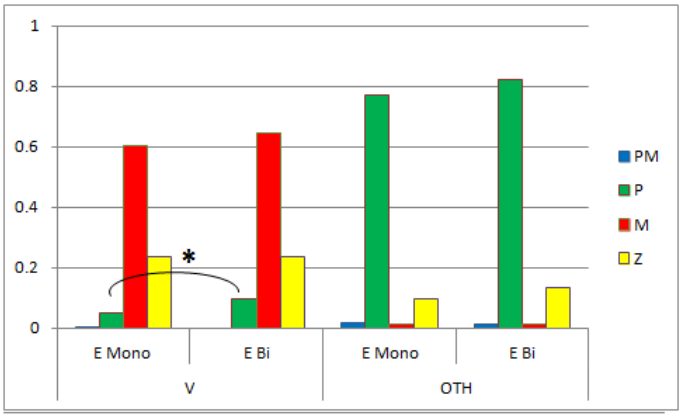

Figure 6.3: VM L1 and 2L1 English Information Packaging, ages collapsed

[5]Significant differences are indicated by asterisks in figures.

Further analyses of bilinguals' P-expressions in V revealed that this divergence was sensitive to event type and largely due to descriptions of *down*- and *across*-items, since these were the only event types to elicit P-verbs. This is illustrated in Figures 6.4 (A)–(B), which compare frequencies of P vs. M-verbs across the two learner groups as a function of event type. Qualitative analyses

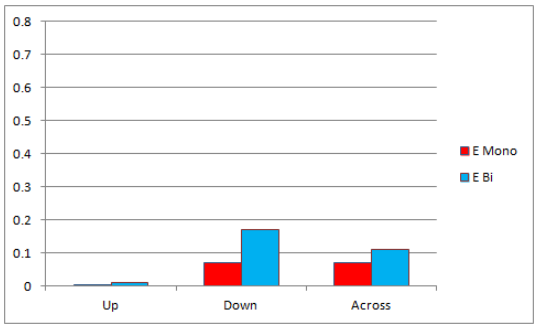

Figure 6.4 (A): P in V

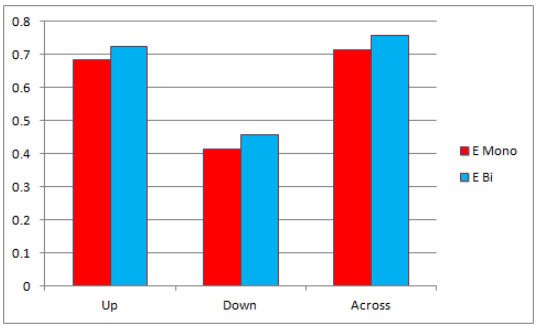

Figure 6.4 (B): M in V

Figure 6.4: VM L1 and 2L1 English P vs. M in V as a function of event type

of *down*-events showed that the learner type difference in P-expression resulted from bilinguals' more frequent use of the deictic verb *to come*, an example of which is provided in (22).

(22) He climbed up the grass. He ate a bit of the leaf, **came [P]** back down and walked away. [EB06]

Note that when bilinguals use P-verbs in *down*-events, they exclusively express deixis, whilst other aspects of the trajectory, such as directionality, never occur.[6] One could argue that deictic verbs such as *to come* should be disregarded as relevant P-expression given that they do not convey the specific nature of the trajectory expected (i.e. downwards movement), but instead appear to function as placeholders that maintain the typical satellite-framing pattern even when no specific M-information is expressed in the main verb slot, much in the style of light verbs (e.g., *to go*), which children of both learner types use frequently (e.g., *He goes up and down*). Two observations support this placeholder analysis. First, in the videos shown, *down*-items always immediately followed *up*-

[6]English verbs encoding directionality, such as *to descend*, are pragmatically marked and of higher register, which accounts for their absence in the child data.

items as part of the same event sequence and frequently with the same M of movement portrayed for both directions (e.g. a caterpillar crawls up and subsequently down a stalk, see Appendix A). As a result, children of both learner types frequently left M implied from the verb of the immediately preceding upward-scene without expressing it explicitly when describing the *down*-scene, as in (22) above. Accordingly, when we compare Figures 6.4 (A) and (B), it emerges that both learner types use M-verbs significantly more frequently in *up*-items (2L1: 72.58%, L1: 68.4%) than in *down*-events (2L1: 45.82%, L1: 41.32%), as confirmed by an effect of the within-subject factor of Event Type (*down* vs. *up*) on M in V ($F(2,92) = 60.09$, $p < 0.0001$).[7] The use of deictic *to come* could thus function as a placeholder for the implied M-information (i.e. *to climb* in the above case). Second, our qualitative analysis of deictic verbs in *down*-items also showed that they always co-occur with a satellite that explicitly specifies the trajectory (*down*), as is also the case in (22) above, suggesting that the P-component is not felt to be sufficiently conveyed by V, but is carried by OTH. Consequently, if deictic verbs are counted as placeholder light verbs, the cross-learner difference obtained for P-verbs in *down*-events would simply amount to a more frequent usage of light verbs (= Z-coding) with possible M-implication by bilinguals, rather than a cross-learner difference in P-expression *per se*.[8] Note that a similar finding regarding deictic verbs has been reported for a simultaneous English-Spanish bilingual child by Álvarez (2008) (see chapter 3.3.2.2), who similarly analyses the child's frequent use of 'to come' in English as a semantically vague 'all-purpose' expression of movement. Thus, this greater reliance on deictic verbs may be part of a more general tendency in bilingual children to rely preferentially on semantically non-specific verbs that can be applied in a variety of contexts.

In *across*-events, a qualitative look at bilinguals' choice of P-verbs shows a more uncontroversial semantic difference. In this event type, the quantitative learner type difference corresponds to bilinguals' more frequent use of the verb

[7] See Appendix E for Information Packaging results in each event type.

[8] However, disregarding the use of *to come* in the bilinguals' English data would necessitate a recoding of deictic expressions in the entire data set, including the monolingual data. To ensure comparability with earlier studies that employed the same coding scheme, I maintain the current coding convention of counting deixis as P.

to cross, illustrated in (23), which, by contrast, hardly ever occurred in monolingual English children's speech.

(23) She was on a bicycle and she **crossed [P]** the train tracks. [EB06]

Although *to cross* is not particularly frequent overall in the bilingual data (11.11% of all verbs in *across*-items), its occurrence is fairly stable across all tested age groups (4: 11.11%, 6: 12.5%, 8: 9.72%, 10: 11.11%). Its absence in the monolingual data and the parallel with the dominant French verb-framing pattern suggest that it may be the result of CLI from children's French. This interpretation is supported by the observation that bilinguals' use of *to cross* frequently co-occurs with qualitative idiosyncrasies that may also be linked to the presence of both languages. One frequent idiosyncrasy results from bilinguals' use of *to cross* in conjunction with a P-satellite, which gives rise to a semantically redundant and stylistically awkward double-encoding of the P-component, illustrated in (24) and (25).

(24) The baby went out of the pram and **crossed [P] over [P]** the road. [EB08]

(25) He **crossed [P]** the road # **onto [P]** the other side. [EB10]

Redundant P-expressions of this kind can be interpreted in one of two ways. One explanation is that motion expressions relying on verbs alone are felt to be incomplete by children as a result of the highly systematic and frequent nature of the English verb+satellite construction associated with motion.[9] Thus, the highly reliable form-function mapping in English may result in a strong association between motion meaning and the typical English verb + satellite-pattern, which may consequently encourage speakers to fill both the V and the OTH slot when expressing motion. Once children fill the verb slot with P-information by using *to cross*, they are not left with much choice when it comes to the semantics of the satellite, since this device is typically associated with P-information in English. Consequently, bilinguals end up filling both slots with P-information, resulting in a syntactically perfectly felicitous, but semantically awkward response pattern.

[9]For the effects of highly frequent and systemic form-function pairings, see construction grammar approaches, e.g. by Goldberg (1995, 2003) and Goldberg *et al.* (2004).

Alternatively, such redundant P-patterns can be analysed as the result of crosslinguistic mixing that combines the typical framing patterns of both languages within the same construction. As a result of influence from the dominant French pattern, children realise P in V, but then choose to have it both ways by adding the English satellite-framing equivalent. The result is in line with what Croft *et al.* (2010) refer to as 'double framing' that is, both construction types are instantiated and collapsed into one. If we adopt this second interpretation of mixed framing from both languages, these CLI are reminiscent of observations in developmental 2L1 research which Tracy (2000) refers to as 'crossover'. 'Crossover' denotes a not overtly visible type of CLI that consists in a blending of linguistic features of both languages and is not necessarily evident on the lexical level.[10] Moreover, an interpretation in terms of pattern mixing is consistent with other qualitative idiosyncrasies that occur in *across*-item descriptions and which are clearly motivated by influence from French. Examples (26) and (27) illustrate children's attempts to align the P-verb *to cross* with M-information by carrying over the frequent French gerundive construction into English, resulting in rather idiosyncratic utterances.

(26) The man there just **crossed [P]** the street **<on doing> [/] on doing running [M]**.

[EB04]

(27) The man **crossed [P]** the road # **<in running>** [//] **the running man [M] crossed [P]** the road. [EB08]

Interestingly, in (27), the child appears to be aware of the idiosyncrasy of the production, which he tries to repair by turning the attempted gerundive (*in running*) into an adjectival qualifier as part of a noun phrase (*the running man*).

Although the above qualitative divergences from monolinguals' verbalisations are not particularly frequent, their occurrence is nevertheless striking, given that they go against the expectation of conformity with monolingual production patterns in the VM task. Nevertheless, the overt cases of pattern mixing illustrated above were restricted to descriptions of *across*-items. Why

[10]As such, it differs from traditionally studied types of code-switching that involve the insertion of lexical material from the other language (Muysken 2000).

these items elicited more frequent P-expression in V as well as qualitative CLI is not clear. I return to this point after the analysis for event type descriptions in French.

6.2.3.3 Verbs

Turning to packaging strategies of other information types (PM, M, Z) within the main verb, results (see Figures 6.1 (A) and 6.2 (A)) indicate that bilingual tendencies closely parallel those of corresponding monolingual children. This is confirmed by our statistical analyses: Neither ANOVAs nor non-parametric Mann-Whitney tests detected any significant discrepancies between the two learner types with respect to how frequently M, PM and Z were expressed by V. These parallel encoding tendencies are briefly characterised in this section.

In both learner groups, Z constituted the second most frequent information type encoded by V, making up 23.49% of bilinguals' and 23.61% of monolinguals' verbs (ages collapsed). In most cases, Z-encoding corresponded to the use of light verbs (e.g. *to go*), that expressed motion *per se* without directly establishing reference to either motion component (P or M), as exemplified in (28).

(28) The monkey **went [Z]** up the tree. [EB04]

In both learner groups, the overall tendency for Z-encoding in the verb was to diminish slightly with increasing age (EB04: 29.62%, EB06: 19.9%, EB08: 22.68%, EB10: 21.75%; E04: 26.38%, E06: 24.53%, E08: 22.22%, E10: 21.29%), even though this developmental tendency did not reach statistical significance. The decrease of Z with age most likely reflects children's growing vocabulary sizes, which allow them to use more specific verbs to express motion.

Joint encoding of P and M (PM) hardly ever occurred in English descriptions produced by either learner type, owing to the lack of English verbs that lexicalise both components jointly. Accordingly, no instances were found in the bilingual data and only a few marginal instances appear in the monolingual data. These combine a deictic Path element with a Manner component (*to*

come running).[11] The absence of PM in V thus reflects language-specific lexicalisation properties of English and both learner groups align in this respect.

To summarise bilinguals' use of V as a packaging device in their English descriptions, the great majority of verbs produced were target-like, in line with the quantitative and qualitative tendencies found in corresponding monolinguals' event expressions. The only exception detected was a more frequent use of P-verbs in response to *down-* and *across*-events and some qualitative deviations in expressions of the latter event type.

6.2.3.4 Other devices

As regards bilinguals' use of OTH in English, Figures 6.1 (B) and 6.2 (B) above demonstrate the expected satellite-framing tendencies. Accordingly, OTH is almost exclusively devoted to packaging P-information in both learner groups, in line with typological expectations for satellite-framing languages. Developmentally, this packaging choice is clearly established as the dominant one from as early as 4 years and remains relatively stable across all age groups tested (EB04: 76.85%, EB06: 81.01%, EB08: 86.57%, EB10: 83.79%; E04: 61.57%, E06: 78.7%, E08: 81.48%, E10: 85.64%). Apart from P, hardly any other information type appears outside the verb in English descriptions. However, we do find some degree of Z-encoding, which mainly occurred in the form of prepositional phrases denoting a general location without establishing unambiguous reference to motion, as exemplified in (29). To some extent, Z-encoding in OTH also consisted of expressions that established a vague reference to M without directly specifying it verbally (e.g. *like that*), as shown in example (30).

(29) She skates **on [Z]** the ice. [E06]

(30) He goes back down **like that [Z]**. [EB04]

During the task, such utterances were mostly accompanied by gestures and hence indicated M non-verbally. Developmentally, the overall tendency for Z-encoding in OTH is to diminish with age in both learner groups, which was

[11] Note that even these instances are controversial, as P and M are not conflated within the same verb.

confirmed by an obtained main effect of Age detected by an ANOVA ($F(3,88) = 2.96$, $p < 0.05$). The decreasing trend is slightly more pronounced in monolinguals than in bilinguals (EB04: 16.66%, EB06: 12.96%, EB08: 10.64%, EB10: 12.96%; E04: 14.81%, E06: 8.33%, E08: 7.4%, E10: 6.94%), without reaching significance levels. In line with the developmental decline of Z in V, its decrease in OTH likely reflects children's growing vocabulary allowing them to provide more specific information. On the other hand, the decrease of vague non-verbal information also suggests an increase in cognitive abilities, particularly a better understanding of the communicative requirements of the situation.[12]

6.2.3.5 Summary: English Information Packaging

To summarise the findings for bilinguals' English Information Packaging, children's use of the packaging devices V and OTH indicated close parallels with monolingual tendencies, especially with respect to the systematic division of labour between V and OTH and its early developmental manifestation. Thus, bilinguals as well as monolinguals mainly encoded M-information in the verb and P in satellites and did so from the earliest tested age. However, statistical analyses also revealed an unexpected divergence from monolingual usage concerning the frequency of P-verbs. That is, contrary to our expectations, bilinguals encoded P-information in the verb more frequently than corresponding monolinguals and their use was sometimes accompanied by qualitative target deviations.

6.2.4 French results for Information Packaging

6.2.4.1 General trends of information distribution

Figures 6.5 (A)–(B) illustrate French packaging strategies in bilinguals as a function of age, compared to those of monolingual French control groups, shown in Figures 6.6 (A)–(B). A comparative look at the main trends reveals close cross-

[12]Recall that the fictitious listener was imagined to have no visual access to cartoons. Adequately explicit descriptions thus require some pragmatic understanding of shared and non-shared knowledge between interlocutors.

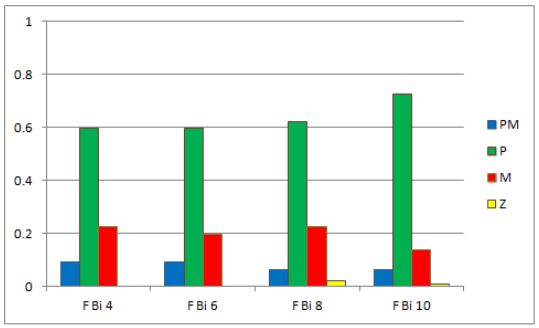

Figure 6.5 (A): V

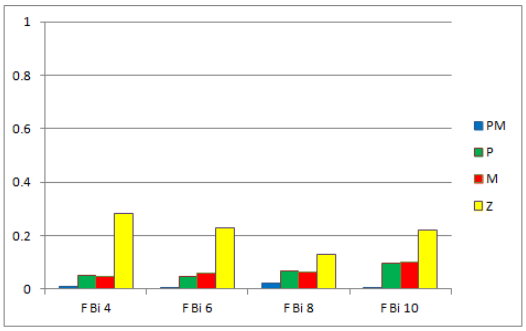

Figure 6.5 (B): OTH

Figure 6.5: VM 2L1 French Information Packaging as a function of age

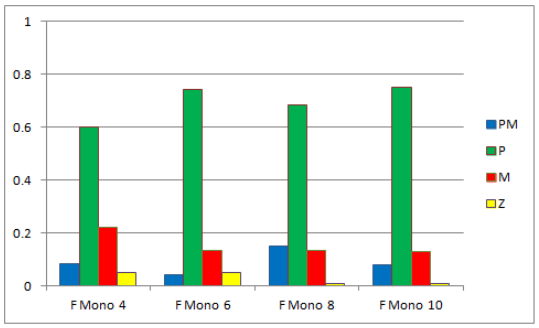

Figure 6.6 (A): V

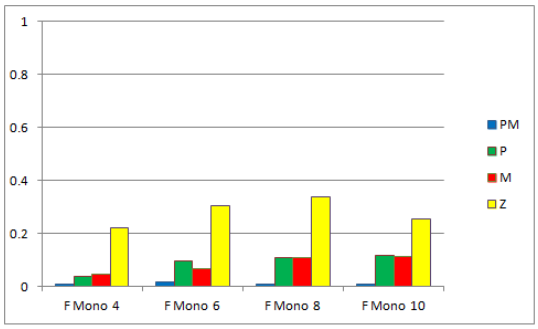

Figure 6.6 (B): OTH

Figure 6.6: VM L1 French Information Packaging as a function of age

learner parallels. With respect to V, bilinguals as well as monolinguals predominantly encode P-information (averaging across ages, in 69.44% of monolinguals' and 63.53% of bilinguals' verbs), in accordance with typological expectations. Developmentally, the strong preference for P-encoding in V emerges as early as age 4 (FB04: 59.72%, F04: 60.18%) and increases significantly with age in both groups (FB06: 59.72%, FB08: 61.99%, FB10: 72.68%; F06: 74.07%, F08: 68.51%, F10: 75%), as indicated by a main effect of Age ($F(3,88) = 4.7839$, $p < 0.05$).[13] In striking contrast to findings for English information packaging, French responses by both learner types rely much more heavily on packaging information inside the main verb and make only marginal use of other devices. Combining this tendency of V-reliant encoding with the strong preference for P in V accounts for the substantial proportion of bare verb P-only responses

[13]Two-way independent ANOVA, with Age and Learner Type as independent variables.

produced by both learner groups, as exemplified in (31) and (32).

(31) L'écureuil **monte [P]** l'arbre. Après, il **redescend [P]**.
The-squirrel ascends the-tree. Afterwards, he back-descends.
'The squirrel goes up the tree. Then, he goes back down.' [FB06]

(32) Elle **traverse [P]** les rails.
She crosses the tracks.
'She crosses the train tracks.' [F04]

6.2.4.2 Effects of Learner Type: Manner in V

In comparison to the predominance of P-verbs in both learner groups, M is much less frequently packaged in V (on average, in 19.66% of bilinguals' and 15.5% of monolinguals' verbs), which is in accordance with typological expectations regarding French verbs. Moreover, as P-verbs increase with age (see above), the figures show that M-verbs decrease developmentally in both groups of learners (FB04: 22.68%, FB06: 19.44%, FB08: 22.62%, FB10: 13.88%; F04: 22.22%, F06: 13.42%, F08: 13.42%, F10: 12.96%), as confirmed by a significant effect of Age obtained by a two-way independent ANOVA ($F(3,88) = 5.791$, $p < 0.005$).

Contrary to our predictions, statistical analyses revealed a significant effect of Learner Type on the frequency of M-verbs. A Mann-Whitney test showed that bilinguals (Mdn = 54.21) packaged M significantly more often in V ($U = 878$, $p < 0.05$) than monolinguals (Mdn = 42.79), as indicated in Figure 6.7, which illustrates both learner groups' information packaging strategies collapsed across all age groups. To ascertain whether this learner type difference was restricted to specific event types, a mixed ANOVA with Event Type (*up*, *down*, *across*) as within-subject and Learner Type as between-subject factor performed on the proportion of M in V indicated that Event Type significantly affected children's rate of M-verbs (significant main effect of Event Type: $F(2,94) = 280.586$, $p < 0.0001$). This main effect was followed up by Mann-Whitney tests[14] testing the effect of each event type separately. These tests showed that the Learner Type effect was indeed event-dependent and restricted to descriptions of *across*-items,

[14]The parametric requirement of homogeneity of variance (assessed by Levene's test) ANOVAs was not given.

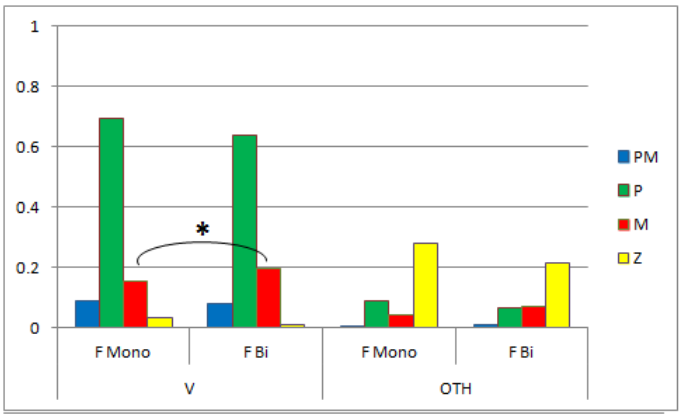

Figure 6.7: VM L1 and 2L1 French Information Packaging, ages collapsed

but did not hold for *up*- and *down*-events. Thus, the cross-learner divergence was due to bilinguals' more frequent use of M-packaging verbs in response to *across*-events, as illustrated in (33) and (34). In corresponding monolinguals' event descriptions, *across*-events more frequently elicited P-verbs (typically *traverser* 'to cross' and *passer* 'to pass'), as shown in (35).

(33) La petite fille elle **fait du patin à glace [M]**.
The little girl she does of-the skate of ice.
'The little girl is ice-skating.' [FB06]

(34) Le garçon il a **nagé [M]** dans l'eau.
The boy he has swum in the-water.
'The boy was swimming in the water.' [FB08]

(35) Un monsieur qui a **traversé [P]** la rue en courant.
A gentleman who has crossed the street by running.
'A gentleman ran across the street.' [F06]

Remember that the same event type also gave rise to cross-learner differences in the English descriptions (see 6.2.3). Interestingly though, in the English data, *across*-events elicited a greater frequency of P-verbs than in monolinguals, suggesting possible influence from children's verb-framing French. Thus, it appears that boundary-crossing events motivate some extent of bidirectional CLI. Whilst in children's English productions, *across*-events correlated with a more frequent use of P-verbs (mainly due to the use of *to cross*), French responses

displayed a significantly greater proportion of M-verbs than those of corresponding monolinguals.

A qualitative analysis of divergent responses in both languages suggests that the cross-learner difference may be linked to the design of *across*-item stimuli. Thus, an examination of bilinguals' M-verbs indicated that a different subset of *across*-items elicited the cross-learner divergence than the one observed for English. Thus, French M-verbs in the bilingual data occurred mainly in response to two specific items, namely the ones showing a girl ice-skating across a lake and a boy swimming across a river. These two items practically always produced M-verbs (*nager* 'to swim' and *patiner/faire du patin à glace* 'to ice-skate') in the bilingual group, as illustrated in examples (33) and (34) above. By contrast, the remaining *across*-items elicited no quantitative difference in M-encoding to monolinguals. The two items in question share certain properties that may explain this difference. First, note that ice-skating and swimming are both usually conceived of as leisure/sports activities that are not inherently goal-oriented. That is, they denote motions of a specific Manner that are performed for the sake of the movement *per se*, but not (usually) to reach a certain destination.[15] Children appear to share this leisure conception of the items in question, as suggested by occasional paraphrases they elicit, illustrated in (36) and (37).

(36) Une petite fille patine. Elle **joue sur** la glace.
A little girl skates. She plays on the ice.
'A little girl is skating. She's playing on the ice.' [FB06]

(37) Un garçon **se baigne dans** l'eau.
A boy himself bathes in the-water.
'A boy is bathing in the water.' [FB08]

Moreover, the visual design of the stimuli may have resulted in different degrees of visual salience of the Path and Manner components, which in turn may have contributed to the response patterns obtained. As the locative prepositional phrases used in (36) and (37) above indicate, children do not conceive of the Ground entities portrayed as including boundaries, but as surface areas

[15]See Pourcel and Kopecka (2005) for a similar distinction between motion as activity and end in itself (M = core schema) and as event (P = core schema).

within which an activity is taking place. In other words, the events are not conceptualised as instantiations of boundary-crossing, which would explain the high rate of M-verbs. What supports this interpretation is that in the English data, the cross-learner difference in P-verb production occurred in response to those items where the boundary was perceptually salient (road and train track) and where the activities shown could be conceptualised as a means of reaching a goal (running, cycling, crawling).

Furthermore, note that this item-specific outcome is not restricted to bilinguals. French monolinguals' use of Manner-verbs is also affected by event- and item-type, suggesting that the same properties of event design are at issue. Accordingly, *across*-events give rise to a greater proportion of M-verbs than the other event types, irrespectively of learner group, in accordance with the event-type-specific effects reported in previous research on L1 French (Ochsenbauer 2010). Earlier L1 findings on French also indicate a possible connection with boundary salience. In this respect, Ochsenbauer (2010: 202) reports that French children use the P-verb *traverser* ('to cross') more frequently in response to the three items described above, which portray a clear boundary entity (jogging and crawling across a road and cycling across train tracks). The item-specific learner-type difference detected in our data is thus not one of kind, but of degree. The same set of items elicits M-verbs more frequently in both learner types, but do so more prominently in bilinguals than in monolinguals. Thus, bilinguals may respond to Manner-reinforcing perceptual cues with a significantly higher rate of M-verbs than monolinguals due to indirect influence from English, which typically encodes Manner in verbs. On the other hand, visual Path-salience, such as clear boundary entities, may motivate influence from bilinguals' familiarity with their verb-framing French, resulting in a relatively higher rate of Path-verbs. If this is indeed the case, children's bilingualism interacts in complex ways with item-specific perceptual properties of the experimental design.

6.2.4.3 Learner Type parallels: Idiosyncratic verbs

In contrast to English, children's French verbs were also found to encode a minor proportion of PM-information (on average, by 7.83% of bilinguals' and 8.79% of monolinguals' verbs) owing to the availability of the verb *grimper* ('to climb'), which lexicalises both information components in the verb stem, as exemplified in (38).

(38) Le singe il **grimpe [PM]** sur l'arbre.
The monkey he climbs on the-tree.
'The monkey climbs on the tree.'

This language-specific difference in PM-conflation has been reported in earlier studies on L1 (Hickmann *et al.* 2009*b*, Ochsenbauer 2010). However, note that, in contrast to the closest English equivalent *to climb*, *grimper* is semantically restricted to upwards movement. This gives rise to some idiosyncratic verb forms in both the bilingual and the monolingual data as children sometimes overgeneralise the Manner meaning of *grimper* to downwards movements by adding the prefixes such as *re-*, *dé-* ('back/again') or even a combination of both (e.g. *redégrimper*) to the verb. This is illustrated in (39), where the context in which *redégrimper* is used (i.e. its occurrence after *monter* 'go up') makes it clear that the child's intended semantics is that of downwards trajectory.

(39) L'écureuil il est monté après dans le trou et après il est
The-squirrel it is ascended after in the hole and after it is
redégrimpé [PM].
back-again-climbed.
'The squirrel then went up in the hole and then climbed back down.'
[FB04]

Such creative neologisms appear in both learner types' data and likely reflect children's difficulties with French motion verbs, which are unsystematic with respect to the coverage of the various semantic components: Whilst most French verbs express either Path or Manner, the conflation of both elements is restricted to a very small set of verbs.[16] Children's attempts to systematise PM-

[16]Apart from *grimper*, a much less frequent alternative is *escalader* ('to clamber'), which, however, rarely occurs in children's data.

conflation to include downward trajectories reveal that they have not completely acquired the semantic restriction applying to the verb.

6.2.4.4 Manner in OTH

As regards the use of OTH as a packaging device, our quantitative analyses did not indicate any significant learner type differences. As emerges from a comparison of Figures 6.5 (B) and 6.6 (B) (see 6.2.4.1), OTH was dispreferred by both learner groups as a packaging device in French, tying in with the observed French preference for verbs to encode information. Nevertheless, both groups occasionally used OTH to encode M (2L1: 6.78%; L1: 3.93%) and P (2L1: 6.54%; L1: 6.94%). The expression of both information types outside the verb is achieved in a variety of ways, some of which are age-dependent and/or item-specific, as detailed in what follows.

With respect to M-information, both learner types across all age groups frequently achieve packaging in OTH by adverbial expressions, particularly in response to two specific items (showing a cyclist and a crawling baby), which are illustrated below in (40) and (41).

(40) Une dame **à bicyclette [M]** traverse les rails du train.
A lady by bicycle crosses the tracks of-the train.
'A lady is crossing the train tracks by bike.' [FB08]

(41) Le bébé traverse la rue **à quatre pattes [M]**.
The baby crosses the road by four paws.
'The baby is crossing the road on all fours.' [FB08]

Other types of OTH-devices for M-encoding depended to some extent on the age group and the item described. Thus, in the older age groups (8 and 10 years), a few items elicited noun phrases, which never occurred at age 4 and only very rarely at age 6. These concerned the items where the activity shown could be expressed by reference to the protagonist (e.g. *le coureur* 'the runner' or, less commonly, *le nageur* 'the swimmer' and *la patineuse* 'the ice-skater'), as shown in (42). The age-dependency of these devices may be due to their slightly higher register of these lexical items concerned, which children likely actively acquire with increasing literacy skills.

(42) Il y a <**un coureur**> [//] **un joggeur [M]** qui traverse la route.
It there have <a runner> [//] a jogger who crosses the road.
'There's <a runner> [//] a jogger who is crossing the road.' [FB10]

In this context, an idiosyncrasy shared by monolingual and bilingual children alike concerns the co-occurrence of such M-nouns with additional M-encoding in verbs, resulting in semantically redundant descriptions as exemplified in the idiosyncratic utterance (43) below.

(43) Un **coureur [M] court [M]** sur la route.
A runner runs on the road.
'A runner is running on the road.' [F08]

As regards the effect of Age, analyses show that children's M-packaging in OTH increases with age, irrespective of Learner Type, as evidenced by a significant main effect of Age ($F(3,88) = 3.58$, $p < 0.02$). Qualitative analyses suggest that this increase of M in OTH mainly reflects children's increasingly productive command of complex subordinate constructions, which allow them to systematically integrate multiple information components within and outside the main verbal complex. In the context of M-expression, such subordinate clauses are typically instantiated by gerunds in both learner groups, as illustrated in (44).

(44) Il traverse la rivière gelée # **en glissant [M]**.
He crosses the river frozen # by sliding.
'He's crossing the frozen river sliding.' [FB06]

In this context, bilinguals' productions were occasionally found to depart qualitatively from monolingual usage, regarding the positioning of the M-encoding subordinate element within the utterance. Contrary to the typical French order, where the gerund follows the matrix clause (see (44) above), bilinguals sometimes choose to pre-position the gerundive element, resulting in pragmatically awkward utterances, illustrated in (45).

(45) Il y a un garçon **en courant [M]** qui traverse la route.
It there has a boy by running who crosses the road.
'There's a boy who crosses the road running.' [FB08]

Note that on the level of information organisation, the above packaging strategy is perfectly target-like (P in V and M in OTH) and formally correct. The idiosyncratic flavour arises from the choice of element ordering, which shows influence from English by its reinstantiating of typically satellite-framing principles. The resulting utterance foregrounds the M-component both by its positioning in discourse, and syntactically, on account of the heavy peripheral structure.[17]

6.2.4.5 Path in OTH

As regards P-expression in OTH, a learner type comparison of expressions used reveals parallels as well as divergences. As for parallels, both bilinguals and monolinguals frequently use prepositional phrases that express P by reference to goals and/or source, as in (46).

(46) Il y a un garçon qui nage **jusqu'à l'autre côté [P]** de la
It there has a boy who swims to the-other side of the
rivière.
river.
'There's a boy who's swimming to the other side of the river.' [FB08]

Such prepositional phrases are common across all tested age groups and occur mostly in response to *across*-events, where children convey P by establishing locative reference to intrinsic parts of the Ground entity (e.g., *l'autre côté* 'the other side').

Bilinguals' P-expression in OTH also exhibited some unexpected qualitative divergences from monolingual packaging tendencies. One pervasive deviation that occurred across all age groups concerned bilinguals' frequent use of the idiosyncratic prepositional device *à travers* ('across'), used like a satellite to express boundary-crossing, as shown in (47).

(47) C'est une fille qui fait du patin à glace **à travers [P]** un lac
That-is a girl who does of-the skate of ice across a lake
gelé.
frozen.

[17]Interestingly, recent research on VM in L2 suggests that English adult learners of French produce similar pre-positioning of M (Hendriks and Hickmann 2011).

That's a girl who's ice-skating across a frozen lake.' [FB10]

The expression *à travers* is modelled on an existing French preposition meaning 'through/across'. However, in contrast to its English equivalent, it cannot be used to convey a Figure's change of location.[18] Note that its use constitutes a striking parallel with recent observations on English L2 learners' motion expressions (see Hendriks and Hickmann 2011). Despite the different acquisition contexts,[19] it appears that contact between the two languages results in some shared strategies regarding the maintenance of satellite-framing principles of information packaging. However, in the case of bilingual children, the use of *à travers* was often accompanied by indications of an awareness of its idiosyncrasy and by subsequent repair attempts, which frequently resulted in switching between different available packaging options. This is illustrated in example (48), where the child initially attempts to encode P peripherally (*à travers*), but subsequently switches to the more target-appropriate gerund construction. However, his failure to substitute the original M-verb for P in the reformulated utterance results in redundant M-encoding in both devices (V and OTH).

(48) C'est le [/] <le gars> [//] le sportif qui est en train de
That-is the [/] <the guy> [//] the sportsman who is in course of
courir <**à travers** la route> **[P]** [///] non # **en** [/] # **en courant** **[M]**.
running <across the road> [///] no # by [/] # by running.
'That's the guy the sportsman who is running across the road whilst running.' [FB08]

Such reformulations offer valuable clues for interpreting the motivation and status of these qualitative departures. In the above case, the child's switching to the gerund clearly demonstrates that competence or incomplete acquisition of adequate target constructions is not the source of these deviations. The child is clearly aware of and masters the target construction (gerund), which would allow the attempted packaging of both information types, so the hesitation in

[18] It is used in French to convey motion activities (figurative or real) *within* a given location, for instance, *regarder à travers la fenêtre* 'to look through the window'.

[19] The fact that adult learners acquire their second language once their first language system and their cognitive faculties are fully in place can be expected to result in qualitative differences in the acquisition process to 2L1 acquisition scenarios, where cognitive and linguistic development go hand in hand.

producing it must be due to other factors. It appears that during the online production process, the presence of English may be reinforcing a satellite-framing organisation option that in principle is available in French too (structural overlap), but whose usage is much more semantically restricted than in English. Thus, only a subset of French prepositional expressions can be used to express a change of location, whilst others, such as *à travers*, are infelicitous in this context. In other words, what we find in (48) qualifies as a case of convergence (see chapter 4.3.3.3): The child overextends the satellite-framing pattern that is partially also available in French to semantic contexts in which it can only systematically apply in English (change of location), but not in French.

6.2.4.6 Age effects on Path in OTH

With age, children's P-expression in OTH increased significantly in both learner groups, as indicated by a main effect of Age ($F(3, 88) = 6.121$, $p < 0.002$).[20] Qualitative analyses of the data show that the increase reflects children's more productive command of subordinate constructions, resulting in noticeable changes in responses from age 8 onwards. Two types of subordinate structures occurred in the data of both learner groups. On the one hand, children used infinitival clauses introduced by the preposition *pour* ('for/in order to') expressing an intention, as illustrated by (49). These infinitival constructions predominantly occur in descriptions of *across*-items.

(49) Le garçon il est en train de nager dans l'eau **pour**
The boy he is in course of swimming in the-water for
traverser [P].
to-cross.
'The boy's swimming in the water in order to cross.' [FB08]

The other subordinate construction to express P was the gerund, illustrated in (50).

(50) Une dame fait du vélo **en traversant [P]** des rails.
A lady does of-the bike by crossing some tracks.

[20]Increase of P in OTH as percentages: FB04: 5.06%, FB06: 4.52%, FB08: 6.85%, FB10: 9.71%; F04: 5.09%, F06: 8.33%, F08: 11.11%, F10: 10.18%.

'A lady is cycling whilst crossing train tracks.' [FB06]

As with the infinitival goal-construction above, the gerund mainly occurred in the context of *across*-items. However, in contrast to the latter, it was mainly used by bilinguals, especially at age 10, whilst it was comparatively rare in monolingual French. Despite their grammatical well-formedness, P-encoding gerunds are perceived as odd by native speakers of French (see Pourcel and Kopecka (2005) for L1 acceptability judgements) owing to their untypical information distribution that generates a reversal of the typical slots for P and M in French ('reverse pattern', see Pourcel 2004: 354). Accordingly, in the monolingual data, the rare occurrences of P-gerunds are often accompanied by hesitations, pauses and reformulations, indicating that monolingual children are aware of the oddness generated.

To ascertain whether P in OTH was indeed more prominent in *across*-items, mixed ANOVAs were performed with Event Type as within-subject and Age and Learner Type as between-subject factors. A significant interaction effect between Age and Event Type ($F(5.42, 158.989) = 2.713$, $p < 0.02$)[21] confirmed the impression based on our qualitative analyses: P-encoding in OTH increased with age, but mostly in the context of responses to *across*-items. Bilinguals' more prevalent use of gerunds as a means of encoding P for this event type may be linked to their higher production of M-verbs observed earlier for these items (see 6.2.4.2). Thus, having chosen to fill the verb slot with M-information in *across*-item descriptions, bilinguals will search for peripheral strategies of adding the P-component. Given the restricted options available in French, the gerund presents a convenient means of solving this packaging problem, which may explain bilinguals' more frequent recourse to this device, despite its idiosyncrasy.

6.2.4.7 Locative expressions in OTH

A substantial proportion of bilinguals' and monolinguals' use of OTH consisted of Z-packaging, across all tested ages (on average, 2L1: 21.57%, L1: 28%).

[21]Greenhouse-Geisser correction applied to degrees of freedom, due to violation of sphericity assumption.

Qualitatively, Z in OTH-responses almost exclusively corresponded to prepositional phrases denoting locations, as illustrated in (51).

(51) Un monsieur qui a couru **sur la route [Z]**.
A gentleman who has run on the road.
'A gentleman who's run on the road.' [FB06]

A mixed ANOVA carried out with Event Type as within-subject factor revealed that both learner groups produced such locative prepositions significantly more frequently when describing *up*-events ($F(1.652, 145.339) = 47.834$, $p < 0.0001$). This was largely due to the fact that the two verbs predominantly elicited in French to express upwards motion, *grimper* ('to climb') and *monter* ('to ascend'), were frequently used intransitively by children in combination with locative prepositions. These could be either semantically vague and add no further meaning to the verb (e.g. *à* 'at/on', *sur* 'on'), as exemplified by (52), or more specific (e.g. *en haut de* 'on top of'), in which case their semantic effect was to reinforce the directional meaning of the verb, as shown in (53).

(52) Une chenille qui **grimpe sur [Z]** une tige.
A caterpillar that climbs on a stalk.
'A caterpillar that's climbing on a stalk.' [FB06]

(53) Là la chenille [...] elle est **montée en haut [Z]**.
There the caterpillar [...] it is ascended on top.
'Here, the caterpillar's gone up on top.' [F08]

Z-packaging in OTH also exhibited some interesting cross-learner differences. Qualitative analyses suggest that bilinguals frequently attempted to use such locational markers as a means of conveying P-information by implication, especially when describing *across*-events. In these cases, children relied on the P-component to be inferred from reference to the Ground entity. This is exemplified in (54), where the child's locative reference to 'the other side' (*l'autre côté*) of the boundary referent allows contextual inference of the trajectory, in this case, the fact of boundary-crossing.

(54) Un garçon qui nage # **de l'autre côté [Z]** d'une rivière.
A boy who swims # of the-other side of-a river.
'A boy who's swimming at the other side of a river.' [FB08]

This analysis is supported by the linguistic context in which these locative expressions occur. Thus, when we take into account the utterances surrounding the target response, bilinguals are frequently found to refer to motion within a location at successive phases of the event, on the basis of which change of location can be inferred. Example (55) illustrates this strategy.

(55) Le petit garçon a **couru sur la neige** et **après** il a **glissé sur** #
The little boy has run on the snow and after he has slid on #
euh [/] # **sur la rivière** gelée # euh # debout et **après** il est
err [/] # on the river frozen # err # standing and after he is
recouru sur [/] # **sur la neige**. Mais **avant** il **était sur un côté**.
back-run on [/] # on the snow. But before he was on one side.
'The little boy ran on the snow and then slid upright on the frozen river and then he ran back on the snow. But before he was on one side.' [FB06]

Here, the child supplies a series of coordinated clauses, each of which expresses the protagonist's Manner of motion via a finite verb during a given phase of the event and provides locative reference by means of a prepositional phrase (*sur* 'on'). The directionality of motion (here the fact of crossing) thus gradually unfolds for the listener by inference from the succession of changes of location. Within each location, motion is linguistically conveyed as the Figure's Manner of motion (*(re)courir* 'to run (back)', *glisser* 'to slide'). The child reinforces the desired P-inference by recourse to temporal adverbs (*après* 'after(wards)/then', *avant* 'before'), that contrast different stages of the event. The same supportive use of temporal devices for spatial expression is also evident in the child's utterance in (56).

(56) Il y a une fille qui fait de la patinoire. **Avant** elle **était sur**
It there has a girl who does of the skating. Before she was on
un côté et **maintenant** elle est **sur un autre côté**.
one side and now she is on another side.
'There's a girl who's ice-skating. Before, she was on one side and now she's on the other side.' [FB08]

Why do *across*-items frequently elicit either indirect (as above) or otherwise target-deviant P-expression in bilinguals' productions? This outcome may well be linked to the greater proportion of M-verbs that this event type elicited (see

6.2.4.2), which would account for bilinguals' more pressing need to resort to alternative strategies of P-expression outside the main verb. In this respect, it is worth noting that the overwhelming majority of Z in OTH-responses occurred in *across*-items (43.06% versus only 3.13% in *up*-events and 3.47% for *down*-items), so a connection with other learner-type differences generated by this event type is likely. As observed in 6.2.4.2, in some of these items, the activity portrayed may render the Manner-component of motion particularly salient to the viewer. This and the fact that the depicted Ground referents may be conceptualised as a location rather than as a clear boundary could account for the great deal of locative expressions elicited. Thus, if the event is in fact conceptualised as motion *within* a location rather than as a change of location, the lack of straightforward means of P-encoding and the wealth of locative expressions elicited would not be surprising.

However, this explanation does not account for the obtained learner type differences, i.e. why both M-verbs and Z in OTH-responses are more prominent in bilinguals than monolinguals. Based on the above analysis, we either have to assume that bilinguals are more prone to conceptualising some of the *across*-items as motion events within a location, or that they respond differently to this set of items on the linguistic level, due to influence from their English. In line with the analysis proposed earlier, I suggest that given visual cues may interact with the availability of linguistic strategies of both languages. Thus, visual Manner-prominence may reinforce the use of the satellite-framing pattern in bilinguals to a higher degree than in monolinguals, due to indirect CLI from their English, which makes the Manner-component linguistically highly accessible to them. Monolingual French children, on the other hand, respond to the same set of Manner-prominent items in slightly different ways, in accordance with typological tendencies: Either, they encode M in V and omit the P-component altogether, or, they encode both components, but package P in the verb and M peripherally by means of gerunds and adverbial devices.

6.2.4.8 Summary: French Information Packaging

To summarise bilinguals' information packaging in French, the results showed general parallels with monolingual tendencies, both with respect to the strong reliance on verbs for encoding information and the semantic components expressed by each linguistic device. Thus, in accordance with typological expectations, both learner groups mainly used the verb to express Path and relied comparatively little on other devices for systematic information encoding. Developmental effects mainly concerned an increase in information encoded outside the main verb, which was evident across both learner types and reflected children's increasing syntactic command of subordinate constructions. Despite overall parallels, some unexpected learner type differences also emerged. First, bilinguals were found to encode Manner significantly more frequently in verbs than monolinguals when describing a specific set of Manner-salient *across*-items. Related to this, qualitative departures also occurred in relation to other devices, which bilinguals frequently used to establish satellite-framed Path-reference, either by creating idiosyncratic satellite-like devices, or by inference from locative expressions. The findings suggest that children's English exerted an indirect influence on bilinguals' event descriptions.

6.2.5 Summary: Information Packaging

In summary, bilinguals' packaging tendencies mirrored the predominant encoding strategies of respective monolingual French and English populations. However, contrary to predictions, a number of quantitative as well as qualitative divergences also emerged. *Across*-items in particular gave rise to bidirectional CLI that may be linked to the design-inherent visual prominence of Manner and Path respectively. That is, when the boundary entity presented was visually prominent, bilinguals' English descriptions made significantly more frequent use of Path-verbs (e.g. *to cross*) than those by monolinguals. However, when the Ground referent was not clearly perceived as a salient boundary and the activity portrayed was less goal-oriented, bilinguals' French descriptions revealed a greater preference for Manner-verbs, which also resulted

in idiosyncratic Path-marking in OTH. It appears that children's bilingualism may interact in complex ways with the particular nature of the situation to be described. The perceptual salience of specific semantic components may trigger influence from the language that facilitates the encoding of the relevant information component.

6.3 Semantic Density

Semantic Density (henceforth SD) refers to the total number of semantic components expressed by a target response. Given that VM items were designed to make two information types salient, Path and Manner, the maximal response density was 2 (= **SD2**), illustrated in (57). Responses expressing one of the relevant semantic components, i.e. Manner or Path, but not both simultaneously, were coded as **SD1**, as shown in (58) (Manner only), and (59) (Path only). When neither Path nor Manner were expressed, the response was attributed a zero-level of density (= **SD0**), as in (60).

(57) L'ours il **grimpe [P + M]** l'arbre.
The-bear he climbs the-tree.
'The bear is climbing the tree.' **[SD2]** [FB06]

(58) The man is just **running [M]**. **[SD1]** [EB04]

(59) He went **down [P]**. **[SD1]** [EB04]

(60) La petite souris elle est **allée sur [Z]** la table.
The little mouse it is gone on the table.
'The little mouse has gone on the table.' **[SD0]** [FB04]

Quantitative results, relating to the frequency of each density response type, are presented first in 6.3.2, followed by a qualitative analysis in 6.3.3, relating to the selected information types corresponding to density types.

6.3.1 Predictions for Semantic Density

Given the development of general cognitive abilities as well as representational and linguistic skills that come about with age, SD was expected to increase as

a function of Age, irrespective of Language and Learner Type. With respect to Language, results were expected to replicate the effect obtained in previous L1 research, which indicated that speakers of satellite-framing languages generally display higher SD in their event descriptions than speakers of verb-framing languages (Hickmann *et al.* 2009*a*,*b*, Ochsenbauer 2010), as a result of the availability of compact structures in satellite-framing languages. Since bilinguals were generally expected to follow the corresponding monolingual patterns in VM, a main effect of Language was predicted whereby English responses by children of both learner groups should display higher SD than those elicited in French.

From the present cross-learner perspective, we are interested in whether bilingualism affects SD. Given that English allows dense packaging with less costly means than French, the question arises whether bilinguals' event descriptions mirror the density levels of respective monolinguals in each language or whether children tap into the resources of their English to facilitate high SD in their French. In this respect, an exploratory hypothesis concerning CLI was that bilinguals' habitual processing and encoding of both Path and Manner (SD2) in their English may influence their French productions. That is, since children routinely attend to both information types when expressing motion in English, they may seek to achieve equivalent information density when describing events in their French.

In sum, given typological properties and previous L1 findings, I predicted main effects of Age and Language. The exploratory hypothesis was for Learner Type to interact with Language (effects only expected in French).

6.3.2 Results: Quantitative analysis

Figure 6.8 illustrates the development of SD in English responses by monolinguals (A) and bilinguals (B) in comparison to French productions by both learner types, shown in Figure 6.9 (A) and (B).[22]

[22]For Semantic Density results by Event Type, see Appendix E.2.

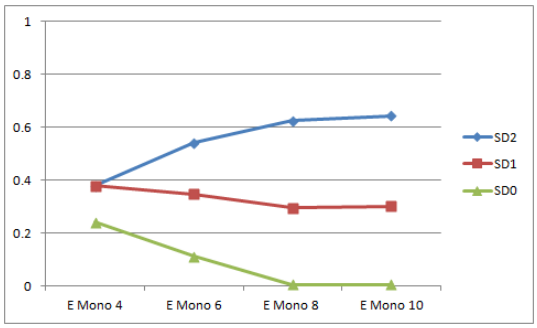

Figure 6.8 (A): L1 English

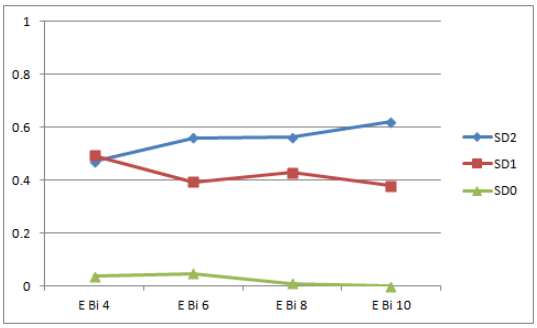

Figure 6.8 (B): 2L1 English

Figure 6.8: VM L1 and 2L1 Semantic Density in English as a function of age

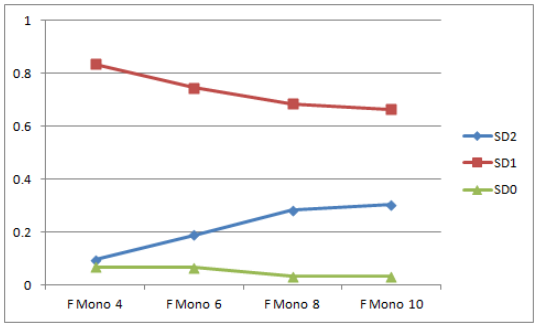

Figure 6.9 (A): L1 French

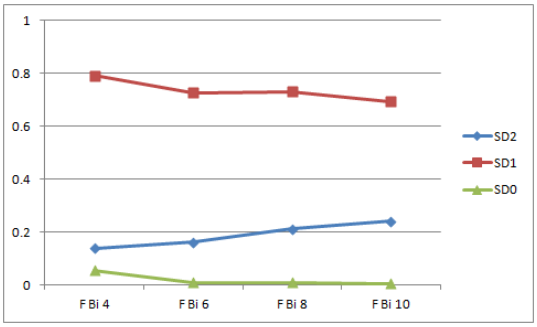

Figure 6.9 (B): 2L1 French

Figure 6.9: VM L1 and 2L1 Semantic Density in French as a function of age

6.3.2.1 Language

A comparison of English and French SD patterns reveals the expected language effect, confirmed by a three-way independent ANOVA with Age, Language and Learner Type as independent factors, which revealed a main effect of Language on scores of SD2-responses ($F(1,176) = 206.058$, $p < 0.0001$). In accordance with earlier findings on French and English L1, the figures show that English descriptions by both learner groups are systematically denser than French productions and at all ages of development. Thus, from the earliest tested age, bilinguals and monolinguals predominantly express two semantic components (SD2) in English, which made up 55.04% of all English productions (ages and learner groups collapsed), compared to only 20.31% of French responses. On the other hand, SD1-responses, which expressed either Manner or Path, but not

both together, constituted the most frequent response type in French descriptions, amounting to an average of 73.43%, compared to 37.72% of English target responses. Qualitatively, this language contrast reflects the French tendency to package information in main verbs (e.g. *Il **court** et il **traverse** la rue* 'He runs and he crosses the road'), which we observed earlier (see Information Packaging in 6.2) and which bilinguals as well as monolinguals adhered to. Since the coding scheme did not take into account information spread across verbs of several independent clauses, the French verb-reliant packaging strategy resulted in the obtained predominance of SD1-responses. In English, on the other hand, the availability of compact structures, allowing speakers to systematically integrate several information types (e.g. *He **runs across***), accounts for the observed majority of SD2-descriptions.

6.3.2.2 Age

With respect to developmental changes, the results confirm the predicted age effects. As above figures illustrate, SD2-responses show an increase across both languages and learner types, giving rise to a main effect of Age ($F(3,176) = 7.220$, $p < 0.0001$). In line with this increase in maximally dense descriptions, lower density response types (SD1 and SD0) decrease significantly in both learner and language groups, as indicated by two further main effects of Age on scores of SD1 ($F(3,176) = 4.46$, $p < 0.005$) and SD0 ($F(3,176) = 6.86$, $p < 0.0001$). These findings demonstrate that the previously obtained effects of Language and Age in L1 contexts also hold for 2L1 acquisition. Thus, as expected, density increases with age in bilinguals' descriptions elicited in both languages, but remains lower in French, in accordance with typological expectations.

6.3.2.3 Learner Type

Does children's bilingualism affect their response density? ANOVAs indicated no significant effects of Learner Type on SD-scores of any level. Likewise, analyses performed within each language separately showed no significant differences for density levels SD2 or SD1 in either English or French. Thus, the ma-

jority of target responses in both languages was in line with predictions, indicating that bilinguals generally followed monolingual tendencies with respect to how much information they chose to express. The only exception to this trend were SD0-frequencies (mere motion responses), which yielded an effect of Learner Type in children's English ($U = 1001.5$, $p < 0.04$), indicating a significantly higher proportion in monolinguals' (Mdn: 51.64) than in bilinguals' (Mdn: 45.36) responses.[23] Density analyses and general trends within each language separately are presented in the following section.

6.3.2.4 Semantic Density in English

In their English productions, bilinguals mainly expressed two semantic components (SD2: 55.33%), closely in line with monolingual tendencies (SD2: 54.74%). Although statistical analyses did not reveal significant discrepancies between learner groups' SD2-production, a comparison of developmental patterns in Figures 6.8 (A) and (B) indicates that the increase in SD2-responses is slightly more pronounced in the monolingual group, where children start off at a lower SD2-level than bilinguals (E04: 37.96% vs. EB04: 47%), but then catch up and overtake bilinguals' SD2-frequencies by age 8 (E08: 62.5% vs. EB08: 56.27%). At age 10, both learner groups produce practically equivalent rates of SD2-responses (E10: 64.35% vs. EB10: 62.03%).

SD1-responses (encoding either Manner or Path) show a decreasing trend across both learner types, although they remain slightly more frequent overall in the bilingual group and remain relatively stable across development (E04: 37.96%, E06: 34.72%, E08: 29.62%, E10: 30.09%; EB04: 49.3%, EB06: 39.35%, EB08: 42.79%, EB10: 37.96%).

As reported earlier, monolinguals' SD0-responses (encoding the mere fact of motion) are overall significantly more frequent than in the bilingual data. However, a cross-learner comparison of developmental curves (see Figures 6.8 (A) and (B)) indicates that monolinguals' SD0-responses decrease more sharply with age (E04: 24.07%, E06: 11.11%, E08: 0.46%, E10: 0.46%) than in bilinguals,

[23] A non-parametric Mann-Whitney U test was performed, as the homogeneity criterion was not met.

who rarely produce SD0 from the earliest tested age (EB04: 3.68%, EB06: 4.62%, EB0 8: 0.93%, EB10: 0%). Given that SD0-responses correspond to the expression of mere motion (neither P nor M), the cross-learner difference would at first glance be assumed to reflect a stronger monolingual tendency to use light verbs at early ages (such as *to go* or *to move*). However, recall that the Information Packaging analysis (6.2.3) indicated no learner type differences in this respect (i.e. Z in V). Consequently, the learner type effect on SD0-rates must reflect encoding differences in the periphery (OTH) of light verbs. Qualitative analyses confirm that the difference lies in young monolinguals' occasional use of bare light verbs, that is, without any information additions in the verbal periphery (e.g., *The mouse is* ***going***). Despite the statistical effect of learner group on SD0, note that this response type proportionally only represents a very minor response type in either learner group and, as seen above, fades out soon after age 6 in monolinguals.

Overall, SD in the English data by bilinguals and monolinguals displayed parallel tendencies. In both groups, maximum density of SD2 is established as the dominant response pattern early on in development, owing to the availability of low-cost compact structures. Responses exhibiting lower density decrease rapidly after age 4.

6.3.2.5 Semantic Density in French

SD levels in French event descriptions displayed very close cross-learner parallels, indicating no significant departures with respect to either of the three response types. In contrast to English, productions encoding one semantic component (SD1) represented by far the most frequent response type at all ages of development, making up an average of 73.61% of bilinguals' and 73.26% of monolinguals' responses overall. This results was in accordance with the earlier observed French tendency to rely mainly on main verbs for information encoding. On the other hand, SD2-responses constitute a comparatively minor proportion of descriptions, amounting to 18.86% of bilinguals' and 21.77% of monolinguals' target descriptions. SD0-descriptions are rarely produced by either learner group (2L1: 1.96% vs. L1: 4.96%).

From a developmental perspective, SD2-responses increase with age in both groups, reflecting our earlier results on Information Packaging (see 6.2.4), which indicated a greater reliance on peripheral devices with age, thus allowing a joint encoding of P and M. The figures show that this developmental increase is slightly more pronounced in monolinguals (E04: 9.58%, E06: 18.88%, E08: 28.19%, E10: 30.41%) than in bilinguals (EB04: 13.88%, EB06: 16.02%, EB08: 21.29%, EB10: 24.07%), without reaching significance levels. In line with the increase in SD2, SD1-responses show a developmental decline across both learner groups, but marginally more so in monolinguals (E04: 83.61%, E06: 74.58%, E08: 68.47%, E10: 66.38%) than in bilinguals (EB04: 79.16%, EB06: 72.68%, EB08: 73.14%, EB10: 69.44%).

6.3.3 Results: Qualitative analysis

Whilst SD2-responses correspond to the joint expression of Path and Manner, SD1-descriptions comprise two categories of responses: either expressions of Path-only or Manner-only. To elucidate whether learner types differed in the types of information selected for expression, Figure 6.10 provides an overview of the semantic components that monolinguals' and bilinguals' density response types corresponded to (age groups collapsed). The figure shows that in En-

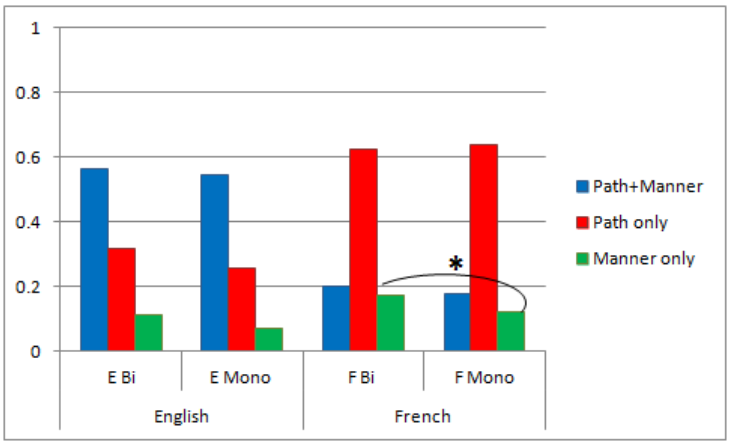

Figure 6.10: VM 2L1 and L1 Information Selection, ages collapsed

glish, the predominance of SD2-responses corresponds to children's joint encoding of Manner and Path-information, as expected for satellite-framing languages. The majority of SD1 reflects Path-only expressions (2L1: 31.9%, L1: 25.92%), whilst Manner-only responses are comparatively minor in proportion (2L1: 11.5%, L1: 7.17%). Although both Path-only and Manner-only responses are slightly more frequent in bilingual than in monolingual English overall (corresponding to the slightly more frequent proportion of SD1 reported earlier), these differences are not statistically significant when all event types are taken together. However, ANOVAs carried out within each target event type[24] separately revealed a significant learner type difference with respect to Path-only responses in *down*-events. That is, bilinguals produce Path-only descriptions (50.5%) significantly more frequently ($F(1,94) = 7.389$, $p < 0.0001$) in response to *down*-events than monolingual English children (34.02%), but do not display such selectional differences when describing other target event types. This event-specific discrepancy accords neatly with our findings for Information Packaging (see 6.2), where results revealed a more frequent production of Path-verbs (mostly in the form of deictic *to come*) in bilinguals' descriptions of *down*-events.

As for French, Figure 6.10 shows that the observed high frequency of SD1-responses in both learner types' data reflects the predominant selection of Path-only information (2L1: 62.32%, L1: 63.77%), as would be expected on typological grounds. By comparison, Manner-only responses are much less frequent across both learner groups, although they occur significantly more frequently in bilinguals (17.31%) than in monolinguals (12.44%), as revealed by an ANOVA within the French data ($F(1,88) = 6.246$, $p < 0.02$). This cross-learner difference is consistent with our results on French Information Packaging (see 6.2), which indicated that bilinguals produce significantly more Manner-verbs than monolinguals, particularly in response to *across*-events.

As a result, although we detected no major cross-learner divergences relating to the quantity of information (SD) bilingual children conveyed in tar-

[24] A mixed ANOVA with event type as within-subject factor and Learner Type as between-subject factor showed that the frequency of Path-only responses differed significantly depending on the target event described ($F(2,188) = 32.861$, $p < 0.0001$).

get event descriptions in either language, those responses that communicated only one semantic component (SD1) displayed some differences with respect to the types of information selected, which tie in closely with obtained results for Information Packaging. In French, bilinguals' SD1-responses more often corresponded to Manner-only expressions than in monolinguals, whilst in English SD1-descriptions by bilinguals more frequently reflected Path-only responses.

6.3.4 Summary: Semantic Density

The analyses of Semantic Density in bilinguals and monolinguals substantiated the predictions relating to the factors of Language, Age and Learner Type. Accordingly, the data revealed significant effects of Age and Language, but no effect of Learner Type, except for a more frequent occurrence of mere-motion responses (SD0) in young English monolinguals. Our exploratory hypothesis concerning the occurrence of CLI as a strategy of achieving English levels of SD in French was not substantiated. Bilinguals' SD in each of their languages mirrored that displayed by corresponding monolingual children. Thus, it appears that bilinguals are sensitive to language-specific differences with respect to the quantity of semantic information typically communicated and attend to these typological differences in their own productions.

Furthermore, a comparison of the types of information selected for expression revealed that the density levels analysed corresponded to the encoding of the same semantic components in bilinguals and monolinguals. Notwithstanding these close selectional parallels, SD1-responses exhibited a few cross-learner discrepancies that are in accordance with and complement the picture obtained in our analysis of Information Packaging (6.2). In English, bilinguals' SD1-responses more frequently focused on Path-information when describing *down*-events than monolinguals', which mirrored the event-specific nature of cross-learner differences obtained for Information Packaging. In French, SD1-responses by bilinguals more frequently focused on Manner-information than corresponding monolinguals' productions, which likewise accords neatly with findings on Information Packaging.

6.4 Utterance Architecture

As laid out in 5.6.2, Utterance Architecture measured syntactic complexity and compactness of target responses. Complexity took into account the presence and absence of subordinated elements (simple vs. complex), whilst compactness related to whether information was scattered (parataxis) or integrated within a single main clause (loose vs. tight). Crossing both measures resulted in four response categories, TS (Tight-simple), TC (Tight-complex), LS (Loose-simple), and LC (Loose-complex).[25]

6.4.1 Predictions for Utterance Architecture

Given the typological differences between English and French concerning the availability of compact structures, Utterance Architecture was predicted to show main effects of Language. Accordingly, the compact English pattern was expected to result in tighter and less complex descriptions than in French, giving rise to a majority of TS-responses in English. By contrast, the greater variability and formal complexity of French motion encoding should result in a more varied range of architecture types, manifesting a greater rate of complex response types.

Utterance Architecture was predicted to be sensitive to the factor of Age. Thus, children's growing cognitive and syntactic abilities were expected to allow them to produce increasingly more complex utterances, independently of language and learner type. Accordingly, main effects of Age were expected, showing an increase mainly in TC-responses. Given the greater reliance on formal complexity in French (particularly gerunds), an interaction effect between Age and Language was predicted, such that the developmental increase of complex responses should be more striking in French than in English.

In line with task dependency predictions, no effect of Learner Type was expected. However, the typological contrast suggests the following exploratory hypothesis: Given the complexity of French target structures and the structurally simple as well as highly systematic English pattern, bilingual children

[25]For examples of each category, see chapter 5.6.2.

may overuse TS-responses in their French as a result of CLI functioning as a syntactic relief strategy.[26]

6.4.2 Results for Utterance Architecture

6.4.2.1 Language and Learner Type

Figure 6.11 provides an overview of the response types used by both learner types in English and French (age groups collapsed). Contrary to typologi-

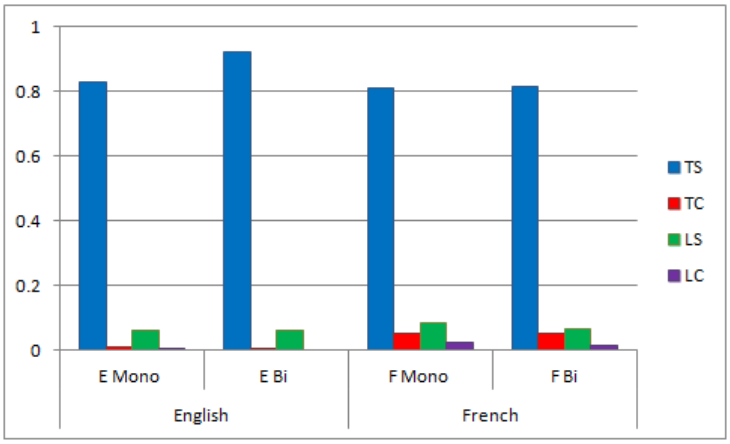

Figure 6.11: VM Utterance Architecture in English and French L1 and 2L1, age groups collapsed

cal expectations, the figure demonstrates that TS constituted the predominant structural choice across both languages and learner groups (English L1: 81.1%, 2L1: 92.25% vs. French L1: 80.9%, 2L1: 81.71%). This slightly surprising result is in line with recent findings comparing German and French L1 (Ochsenbauer 2010: 217), which demonstrated a similar language-independent predominance of TS-responses for voluntary motion descriptions. Despite the apparent crosslinguistic parallels, two-way independent ANOVAs testing the effect of Language and Learner Type nevertheless detected a significant main effect of Language ($F(1,188) = 33.89$, $p < 0.0001$), indicating that TS-constructions were

[26] See chapter 4.3.3.1 for details on 'Bilingual Bootstrapping'.

altogether more frequent in English than in French, in accordance with predictions. No effect of Learner Type emerged from the analysis, despite a slightly higher overall proportion of TS-scores in English in the bilingual group.

Qualitatively, the great majority of TS-responses in the English data corresponded to the typical combination of Manner-verbs with Path-prepositions or particles, exemplified in (61).

(61) The lady was cycling across the train tracks. **[TS]**[EB08]

In French, TS reflected to some extent the verb-reliant packaging strategy observed earlier (6.2) and hence comprised all responses that made use of one main verb either on its own, or including peripheral additions, typically in the form of prepositional phrases denoting goals, as in (62), or locations, as illustrated by (63).

(62) Elle patine jusqu'à l'autre côté.
She skates to the-other side.
'She skates to the other side.' **[TS]**[FB06]

(63) Un chat monte sur un poteau.
A cat ascends on a post.
'The cat is going up the post.' **[TS]**[F08]

As emerges from Figure 6.11, TC-responses were also affected by Language. In accordance with typological expectations, this response type was extremely marginal in English descriptions by either learner group (L1: 0.92%, 2L1: 0.23%), but made up a small proportion of French descriptions (L1: 5.44%, 2L1: 5.32%), giving rise to a significant Language effect, as shown by a Mann-Whitney test (Mdn English: 74.72, Mdn French: 118.29, $U = 2517.5$, $p < 0.0001$). Since the types of subordination used in these complex constructions depended partly on children's age, a qualitative analysis with examples will be provided in the presentation of Age effects (see 6.4.2.2).

LC-responses were barely produced by either group (English L1: 0.11%, 2L1: 0% vs. French L1: 2.31%, 2L1: 1.5%). However, their practical absence in the English data (only one occurrence in monolinguals' English, none in bilinguals') gave rise to a further significant language difference. Accordingly, a Mann-Whitney test revealed that LC-constructions occurred significantly more fre-

quently in children's French (Mdn French: 104.51, Mdn English: 88.49, U = 3839.5, $p < 0.0001$), where they corresponded to children's occasional repetition of an element provided in the first part of the utterance, either in a coordinated matrix or a subordinate clause. This is illustrated in (64), where the child first expresses Path in a simple main clause, then repeats the same Path-element (*pour descendre* 'in order to go down') within an added complex construction in which Path is syntactically subordinate to a matrix clause expressing Manner.

(64) Et après **il est redescendu et pour descendre** il a glissé.
And after he is back-descended and to descend he has slid.
'And then he went back down and in order to do so he was sliding.'
[LC][F06]

6.4.2.2 Age and Language

Let us now turn to developmental changes in children's Utterance Architecture. Analyses indicated that two of the response types examined, TS and TC, were affected by Age, which also interacted with Language, but not with Learner Type. Developmental patterns for both response types in both English and French are illustrated in Figures 6.12 (A), for monolinguals, and 6.12 (B), for bilinguals.[27] TS-scores showed a significant interaction effect between Age and

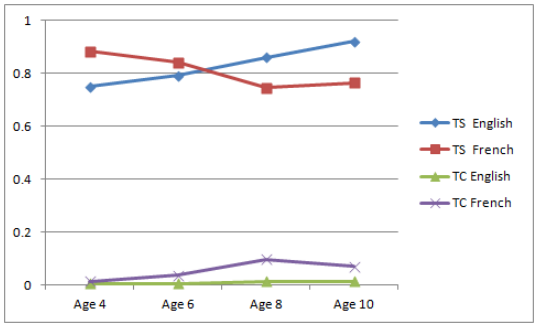

Figure 6.12 (A): L1

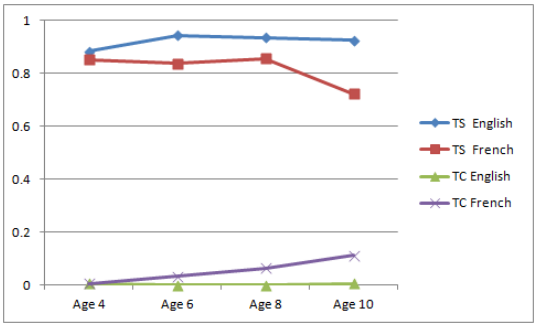

Figure 6.12 (B): 2L1

Figure 6.12: TS and TC in L1 and 2L1 English and French as a function of age

[27]Developmental patterns of all four response types are illustrated in Appendix E.3.

Language ($F(3,184) = 8.186$, $p < 0.0001$), indicating a developmental increase of TS-responses in children's English, but a decrease in their French. Although no significant interaction effect with Learner Type occurred, a cross-learner comparison of the above Figures (A) and (B) shows that the interaction is less pronounced in the bilingual group, where children reach ceiling levels of TS-scores earlier in their English than corresponding monolinguals (compare bilinguals' TS-rates at age 4: 88.42% vs. monolinguals': 75%).

As regards TC-responses, our analyses revealed the predicted interaction effect between Age and Language ($F(3,176) = 7.336$, $p < 0.0001$), indicating a significant age increase of TC ($F(3,88) = 9.134$, $p < 0.0001$) in the French data (L1: from 1.38% at age 4 to 6.94% at age 10; 2L1: from 0.46% at age 4 to 11.11% at age 10), but not in English, where TC remains marginal at all tested ages.[28] To locate this effect, further analyses were carried out within French testing the effect of Event Type. A mixed ANOVA revealed significant interaction effects between Age and Event Type ($F(6,184) = 4.354$, $p < 0.0001$). This result was followed up by Kruskal-Wallis procedures testing the effect of Age within each target event type separately. These indicated that the obtained Age effect on TC in French was only significant within descriptions of *across*-items ($H(3) = 25.455$, $p < 0.0001$), but not in other event types. Thus, although tight complex constructions in French generally increased with age, this increase was only significant in boundary crossing event descriptions. Figures 6.13 (A) and (B) illustrate this event-type sensitivity of TC-responses as a function of age.[29] A comparison of the two learner types (L1 in (A) and 2L1 in (B)) shows that both monolinguals and bilinguals display the same event-dependent tendencies: In both learner groups, TC-responses increase much more strikingly in *across*-items than in response to the other event types. Note also that monolinguals' production of TC-responses in *across*-items peaks at age 8 (F08: 22.22%), but drops thereafter (F10: 13.89%), whilst it continues to increase in bilinguals' descriptions (FB08: 16.66%, FB10: 22.22%). The types of constructions TC corresponded to in children's French descriptions will be presented in the following section.

[28] In total, only 2 instances are produced by bilinguals and 8 by monolinguals in the English data.

[29] For an illustration of all response types as a function of Event Type, refer to Appendix E.4.

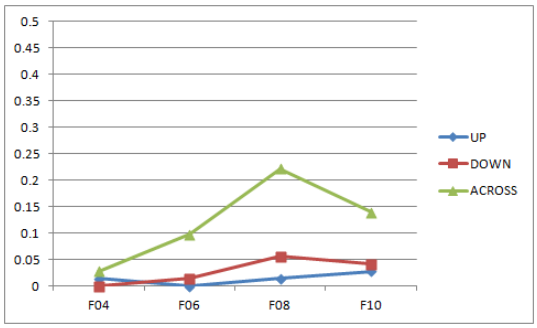

Figure 6.13 (A): L1

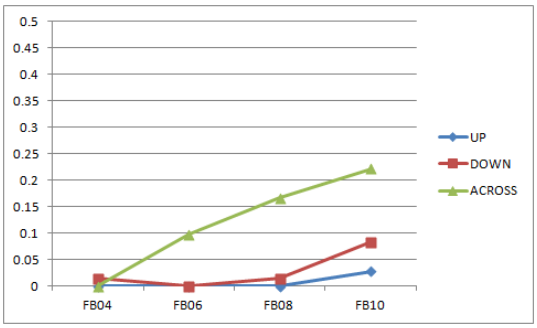

Figure 6.13 (B): 2L1

Figure 6.13: TC in L1 and 2L1 French by event type as a function of age

6.4.2.3 TC-responses in French

Qualitative analyses within French revealed that TC-responses in both learner groups comprised mainly two types of constructions. The first and most frequent one is the gerund. At age 4, the gerund only occurs in two cases produced by French monolinguals (no instances found in bilinguals) and its use displays a fair degree of hesitance and idiosyncrasy, as illustrated by (65).[30] Gerunds increase after age 6 (L1: 3.7%, 2L1: 3.24%) and by age 8 (L1: 9.72%, 2L1: 6.48%) are used fairly productively and without signs of hesitation by both learner groups, as shown in (66).

(65) Et ben là c'est bien parce qu'il a été **en courant**.
And well there it's good because he has been/gone by running.
'Well, in this one, that's good because he went by running.' **[TC]**[F04]

(66) La dame est passée sur le chemin de fer **en faisant du vélo**.
The lady is passed on the path of rail by doing of-the bike.
'The lady has passed the railroad tracks cycling.' **[TC]**[F08]

The second main type of TC-construction in French consists in infinitival clauses which predominantly served to encode Path information and were introduced by the preposition *pour* ('for/so as to') marking an intention. Similar to gerunds, such infinitival Path-clauses occur very rarely at age 4 (only 1 instance in both

[30]The child's combination of the *passé composé* form of *être* (in this context meaning 'to go') with the gerund is awkward.

the L1 and 2L1 data), but increase developmentally and are fairly common at age 8, when they are used by both learner groups to encode Path by reference to the endpoint of motion events, as illustrated in (67).

(67) Le garçon [...] glisse tout le long de la g(lace) [/] # (g)lace **pour**
The boy [...] slides all the long of the i(ce) [/] # (i)ce to
arriver de l'autre côté.
arrive of the-other side.
'The boy is sliding all the way along the ice to arrive on the other side.'
[TC][FB08]

Qualitative comparisons between bilinguals' and monolinguals' use of both types of TC-structures suggest that bilingual children more frequently encode Path rather than Manner in the subordinate element (the infinitive and the gerund), especially when describing *across*-items. This difference ties in with our earlier findings on bilinguals' Information Packaging in other devices, which similarly detected a preference for Path-encoding gerunds (see 6.2.4.5). An example of a typical *across*-item description by a bilingual 10-year old is provided in (68).

(68) Le monsieur il fait du patin à glace **pour traverser** la rivière.
The man he does of-the skate of ice to cross the river.
'The man is ice-skating to cross the river.' **[TC]**[FB10]

Remember that our findings for French Information Packaging (6.2.4) for *across*-items indicated that this event type elicited more frequent Manner-verbs in the French data generally, and in bilinguals in particular. Taking this finding together with the event-dependent age increase of TC-constructions, it appears that bilinguals capitalise on their acquisition of these complex structures as a convenient means of achieving joint expression of both Manner and Path whilst maintaining an 'English' style of information distribution.

However, the event-type effect on the TC increase affected bilinguals and monolinguals alike. Why did *across*-items elicit a much higher rate of TC-structures in older age groups than the other event types? I propose the following explanation. From the Information Packaging analysis, we know that *across*-items generate a greater deal of Manner encoding in main verbs than

other event types, independently of learner group (see Appendix E.1.2 for overview).[31] The choice of filling the verb slot with Manner creates a subsequent encoding problem for Path given the limited linguistic options available for doing so outside the verb in French. As children's syntax develops, their acquisition of subordinate constructions offers a convenient solution to this encoding problem which allows them to express both semantic components jointly. The two learner groups differ in how they make use of this syntactic solution. Whilst monolinguals mostly adhere to the typical French information organisation by adding Manner in the gerund, bilinguals more frequently prefer to maintain the English-style Manner-salient information organisation by packaging Path peripherally. That is, bilinguals as well as monolinguals are confronted with the same difficulties arising from the typological properties of French, which provide no systematic means of joint Path and Manner encoding except for formally complex constructions. Where the two learner types differ is in the ways they preferentially employ the range of linguistic solutions available to them as a result of indirect CLI, leading to subtle cross-learner differences.[32]

6.4.2.4 LS-responses

Contrary to predictions, LS-responses were not affected by Age. Instead of the expected developmental decrease, their occurrence remained relatively stable across children's development in both languages (consult figures in Appendix E.3). In fact, in French monolinguals, LS-constructions unexpectedly increased slightly with age (from 6.48% at age 4 to 10.18% at age 10),[33] whilst they fluctuated somewhat in corresponding bilinguals' and both learner groups' English development, but showed very similar rates overall when averaging across ages (English L1: 6.36%, 2L1: 6.01%, French L1: 8.33%, 2L1: 6.71%). A main effect of Event Type ($F(2,372) = 33{,}652$, $p < 0.0001$) indicated that LS was significantly more frequent in *across*-item responses, as illustrated by Figure 6.14. This

[31] As suggested earlier, this may be due to the type of event portrayed (activity-oriented) and a greater visual salience of Manner in these items (see 6.2.4.2).

[32] It is worth emphasising that bilinguals' solutions are grammatically perfectly felicitous, but nevertheless are qualitatively odd on account of the untypical information distribution.

[33] This replicates L1 French findings on VM by Ochsenbauer (2010: 216 ff).

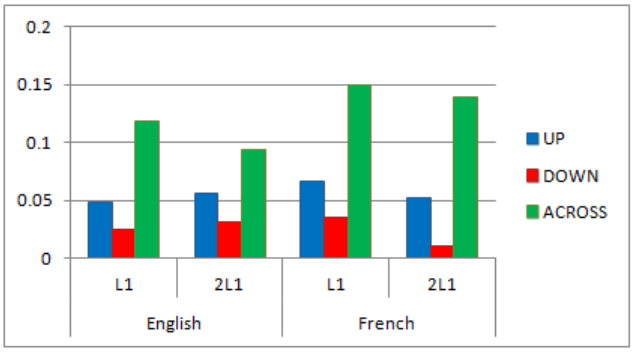

Figure 6.14: LS-responses by event type

event-type sensitivity applied to both learner and language groups, although the effect is somewhat less pronounced in the English data.[34]

Qualitative analyses of LS-responses give us some indication as to the reasons for their event-type sensitivity and their prevalent occurrence in French. These effects seem to be related to the same factor as the the high rate of TC in French elicited by *across*-items (see previous section 6.4.2.3). The great majority of LS-responses in children's French corresponded to a spreading of Manner and Path across several coordinated or juxtaposed clauses, as shown in the bilingual subject's response in (69) and the monolingual child's description in (70). Note that in both examples, children choose to express Manner in the first clause and add Path in the second.

(69) Cette fois un monsieur a **couru [M]** au dessus de la route. Il
This time a man has run on-the top of the road. He
a **traversé [P]** la route en plus.
has crossed the road in more.
'This time a man ran on the road. He also crossed the road.' **[LS]**[FB04]

(70) Y a une dame qui **faisait du vélo [M]** et elle a
There has a lady who was-doing of-the bike and she has
traversé [P] les rails.
crossed the tracks.
'There's a lady who was cycling and she crossed the tracks.' **[LS]**[F06]

Thus, it appears that LS constitutes speakers' response to the same difficulty of

[34]For an illustration of all response types as a function of Event Type, refer to Appendix E.4.

expressing Path in French once Manner has been encoded in a main verb, as is often the case in *across*-items (see 6.2.4.2). Information spreading is an attractive alternative solution to TC-structures, since it does not require command of subordination and is therefore a convenient resource to fall back on especially for the younger age groups. Note that two additional language-specific lexical and item-specific factors conspired to make information encoding more problematic in *across*-event descriptions than in other event types. First, the availability of the high-frequency lexical item *grimper* ('to climb'), which conflates Path and Manner, allowed children to circumvent the encoding problem in *up*-event descriptions. Second, since *down*-events directly followed *up*-items as part of the same video and mostly portrayed the same type of Manner, children could afford to rely more on pragmatic means for conveying the downwards sequence by explicitly encoding only Path (*(re)descendre* 'go (back) down') and leaving Manner to presupposition from the directly preceding upward sequence.[35] For these reasons, joint information encoding was by comparison relatively unproblematic in *up* and *down*-items, whilst neither strategy was available for descriptions of *across*-items, accounting for the much higher degree of both LS and TC-structures elicited by these items in French productions.

By comparison, joint encoding of multiple information types poses no problem in English, where the compact satellite-framing TS-pattern can systematically be applied to all three event types. This language difference accounts for the lower rate of LS-responses in English *across*-event descriptions. Nevertheless, even in the English data, *across*-events elicited significantly more LS-responses than other items (see Figure 6.14), which requires an explanation. Qualitative analyses of LS in the English data indicate that children's use of LS is trigged by some of the same item-specific factors as in French. Thus, as mentioned earlier, some of the activities portrayed in *across*-items appear to be salient to children (swimming, ice-skating etc.), resulting in a greater concern with expressing the Manner component, which is consequently frequently given linguistic prominence at the expense of Path. In the English data, this Manner salience was reflected in a number of descriptions which focus on the activity depicted as it is happening (often eliciting progressive forms) and add

[35] see Appendix E.1.2 for overview of encoding strategies in French by event type.

Path in a second separate clause as an afterthought, as illustrated by the 10-year-old's utterance in (71).

(71) A boy was **swimming [M]** in [/] in a canal <and went> [//] and then **went to the other side [P]** of the canal. **[LS]**[E10]

Utterances of this type have the effect of foregrounding the Manner activity, which is clearly conceived of as the component at the centre of the event by children. In line with this interpretation, LS-responses of this type occurred very rarely in descriptions of motion events along the vertical axis (*up*/*down*-events).

Other recurrent types of LS-responses were not restricted to *across*-items and occurred in both languages. A common LS-type for all participant groups consisted in reformulations that added semantic information in the second utterance. In these cases, children (particularly in the younger age groups) often elaborated on semantically vague information (e.g. light verbs) provided in their first utterance by adding a more specific expression in a second clause, as shown in (72) and (73). In the second example, the 4-year-old's first utterance only provides vague reference to a general location (*aller sur* 'go on'), whilst the second juxtaposed clause specifies the directionality of the movement (*monter* 'go up').

(72) The little monkey **went [Z]** up <the palm> [//] the # banana tree and **climbed [M]** up. **[LS]**[EB06]

(73) Il y a un chat. Il est **allé sur [Z]** le bâton. [...] Il est **monté [P]** sur le bois.
It there has a cat. It is gone on the post. [...] It is ascended on the wood.
'There is a cat. It's gone on the post. It's gone up on the piece of wood.' **[LS]**[FB04]

In a second type of LS-reformulation, children expressed one information type (either Path or Manner) in the first utterance, which they repeated (either verbatim or partially reformulated) and then elaborated upon by adding the other information element. This is illustrated in (74) and (75), where children only express Manner in a first clause, then coordinate it with a second clause in which

a prepositional Path-phrase is added.

(74) Un grand qui **faisait** **de la** **course [M]** et il a **couru [M]**
A tall who was-doing of the race and he has run
jusqu'en face **[P]** de la route.
to-the opposite of the road.
'A tall man who was doing a race and who ran to the opposite side of the road.' **[LS]**[F06]

(75) A boy **swimmed [M]** with swimming trunks on [...] and he **swimmed [M] across [P]** the river. **[LS]**[EB06]

An interesting variant of this elaboration function of LS is particular to the English data and is related to a typological discourse property of English. Occasionally, English descriptions display a very detailed tracking of the Figure's trajectory by means of multiple directional Path particles and prepositional phrases. This is illustrated in (76), where the child produces a series of coordinated main clauses, each of which provides different aspects of Path-information in the satellite, including both source and goal, whilst keeping Manner constant.

(76) A little girl **skidded [M] from** that way **[P]** and then she **skidded [M] around [P]** the pond and then **to** the other side **[P]** and then she **skidded [M] there [P]**. **[LS]**[EB06]

Such examples are consistent with claims made in the typological literature regarding language-specific discourse features. In this context, it has been argued repeatedly (e.g., Berman and Slobin 1994, Slobin 1997, 2004) that speakers of satellite-framing languages often provide highly elaborate Path descriptions involving multiple segments, owing to the syntactic and semantic versatility of directional satellites.[36]

[36]However, note that the typical adult pattern involves a compact stacking of Path-particles to the same Manner-verb, which is not the case in the above child's example. The redundancy of Manner above is probably a feature of child speech.

6.4.2.5 Bilingual-specific LS-responses

In the bilingual groups, LS-responses to some extent reflected certain recurrent speech phenomena that we observed earlier and that are motivated by children's hesitation between various options or a perceived need to remedy an idiosyncrasy. Accordingly, a proportion of LS-coded responses were generated by bilinguals' attempts to repair an idiosyncrasy produced in a previous clause. An example is given in (77), where the 10-year-old first attempts to integrate both information types by using the idiosyncratic satellite-device *à travers*, but then provides a reformulation in a coordinated clause in which Path is more target-appropriately conveyed by a main verb.

(77) Là il y a une petite fille [...] elle patine **à travers** une # ben
There it there has a little girl [...] she skates across a # well
sur une rivière [...] et donc elle **traverse**.
on a river [...] and then she crosses.
'There's a little girl. She skates across a # well on a river and then she crosses (it).' **[LS]**[FB10]

6.4.3 Summary: Utterance Architecture

The analysis of Utterance Architecture in bilinguals and monolinguals yielded the following results. Contrary to expectations, TS represents the predominant structural choice across both languages, learner types and all tested age groups.

Despite crosslinguistic parallels, language effects did emerge in line with typological expectations, suggesting that TS-responses were more frequently used in English whilst complex structures (TC, LC) occurred more frequently in French. Furthermore, our developmental analysis testing the effect of Age indicated that complex responses increased with age, as would be expected, but especially in French, where children make increasingly productive use of subordinate constructions such as gerunds.

With respect to Learner Type, bilinguals mirrored monolinguals' syntactic preferences quantitatively as well as qualitatively in most respects. This demonstrates that bilinguals are sensitive to typologically preferred constructions and follow these preferences in their event descriptions in accordance

with the language they speak.

However, the French data displayed a few qualitative learner type divergences, which were closely related to observation on event-type dependent tendencies in children's French Information Packaging. First, in descriptions of *across*-events, bilinguals' TC-responses corresponded to a different type of information organisation than in monolinguals, showing a preference for encoding Path in the subordinate clause. I argue that this qualitative preference allows bilinguals to maintain satellite-framing information structure in contexts where peripheral Path-encoding is convenient (i.e. *across*-items) whilst using target-appropriate formal means. Our exploratory hypothesis concerning the possibility of TS-overuse within French was not substantiated.

6.5 Summary: Voluntary Motion in 2L1 and L1

This chapter examined the effect of typological properties on bilinguals' development of voluntary motion expressions. On the basis of the typological contrast, the assumption was that bilinguals' event descriptions would follow monolingual patterns and therefore exhibit similar Language and Age effects, but no effect of Learner Type. Bilinguals' event descriptions were analysed across several verbalisation dimensions: the linguistic devices used to package semantic information (*Information Packaging*), the quantity of information types expressed (*Semantic Density*), and the syntactic complexity and compactness of utterances more globally (*Utterance Architecture*).

The results indicated that bilinguals generally adhered to the language-specific patterns found in corresponding monolinguals' event expressions, with respect to all aspects analysed. Thus, bilinguals' linguistic behaviour paralleled that of respective monolingual English and French children, resulting in similar developmental patterns. This in itself is an important finding to stress, since it shows that bilingual children differentiate their two languages from early on in development not only grammatically (Meisel 1989), but also with respect to typical tendencies of information organisation, including language-specific preferences relating to how much and what types of information are encoded and

what syntactic constructions are employed. As early as age four, bilinguals' productions demonstrated sensitivity to these fine-grained language-specific properties.

Notwithstanding these general cross-learner parallels, our findings also indicated a number of unexpected quantitative and qualitative divergences, that affected children's production patterns in both languages. Interestingly, such divergences primarily occurred in response to boundary-crossing events, which also gave rise to some anomalies in the monolingual data. In the context of Information Packaging, one notable divergence concerned the types of semantic information encoded in the main verb, which displayed bidirectional CLI. Whilst in French, bilinguals used Manner-verbs more frequently than monolinguals, English productions elicited a greater rate of Path-verbs. This demonstrates that bilinguals' performance patterns do not exactly replicate those of monolingual children in either language. Qualitatively, bilinguals' showed a preference for satellite-framing organisation principles in their French, which showed up in occasionally idiosyncratic attempts to encode Path peripherally (*à travers*). These learner type divergences in Information Packaging strategies were to some extent reflected in further qualitative differences detected in Semantic Density and Utterance Architecture, although neither dimension gave rise to statistically significant quantitative effects.

Although the divergences observed in the bilingual samples did not, on the whole, result in markedly target-deviant event descriptions on an individual level, they do point to measurable cross-learner differences that need explaining. Different underlying processes of online production may drive bilinguals' speech production, as a result of bilinguals' access and exposure to two sets of lexicalisation patterns that they routinely process.

The types of discrepancies detected in the context of bilinguals' verbalisations of *across*-events suggested that their bilingualism may interact in rather complex ways with item-specific event properties. Thus, the visual salience of a given event component may result in indirect CLI from the language in which the relevant component is more codable. Our findings suggest that certain event-specific perceptual cues may indeed influence bilinguals' lexicalisation choices, inviting them to draw to a greater extent on the resources of one

of their languages than on the other, when the former provides more readily accessible linguistic means of solving a communicative task. In this respect, it will be particularly interesting to see whether the boundary crossing items of the caused motion task result in similar cross-learner divergences.

Chapter 7

Results II: Bilingual Development of Caused Motion Expression

This chapter presents findings for the semantically complex CM task. In comparison to VM (see chapter 6), the CM task was expected to present a communicative challenge to the child learner. Successful communication of these complex events not only required the cognitive ability to mentally represent and comprehend the causal relationship obtaining between a multitude of event elements, but also involved finding adequate linguistic means that allowed joint expression of these components. Given the typological contrast at hand, the difficulty of overcoming the communicative challenge was to some extent relative to the language-specific properties. For the simultaneous bilingual learner, this contrast was expected to present an interesting scenario of unequal lexicalisation choices, prone to result in CLI. A comparison of bilinguals' linguistic behaviour across tasks of varying complexity was crucial for testing our hypothesis of task-dependency of CLI (see chapter 5.8).

To ensure comparability with the results for VM events, bilinguals' CM verbalisations are analysed and presented along the same dimensions, testing the same factors of Learner Type, Language and Age. Accordingly, this chapter is organised as follows: In 7.1, I outline the requirements of the task and the general predictions that follow from them. Results are then presented in terms of the three verbalisation variables defined in chapter 5, starting with findings for *Information Packaging* in 7.2, followed by *Semantic Density* in 7.3, and an analysis of *Utterance Architecture* in 7.4. Finally, a summary and discussion of CM results

are provided in 7.5. As with VM findings, results for each verbalisation variable are preceded by specific predictions. Quantitative and qualitative analyses are presented in direct relation to the performance patterns of respective English and French monolingual control groups.

7.1 Task-specific requirements and predictions

The CM task was considered more complex on account of the multitude of semantic elements it involved. In addition to the elements of **P**(ath) and **M**(anner), which also featured in the VM task, CM items presented participants with the additional core component of **C**(ause). Understanding the causal relationship between the Agent (A), the Figure (the displaced object) and the resulting movement was crucial to a successful event representation and hence a prerequisite of its adequate linguistic communication. In addition to the core components **C** and **P**, the stimuli featured three types of **M**(anner): The Manner of the Agent's action causing the displacement (henceforth **MAc**), the Object's Manner of motion (**MOb**) and, finally, the Agent's Manner of motion (**MAg**).[1]

English and French differ with respect to the accessibility of linguistic means allowing systematic combination of multiple elements, as described earlier (see chapter 2). On the one hand, English provides compact low-cost structures that allow speakers to systematically add P-information in the form of satellites to verbs conflating C and M information, resulting in a formally simple and highly accessible linguistic solution to integrating three semantic components. In French, on the other hand, expressing more than two components simultaneously becomes problematic due to the limited options for expressing motion-relevant information outside the main verb. Short of relying on formally more complex constructions or a small repertoire of prepositions, no systematically applicable means of doing so are available in French.[2]

Furthermore, as observed earlier, the English and French systems of mo-

[1] See 5.2.2 for details and Appendix A for examples of stimuli.

[2] As mentioned earlier (see chapter 2), prepositions expressing a change of location unambiguously are semantically rather restricted, since they only licence Path reference through a few aspects of the trajectory (goal, source, directionality), but disallow boundary crossing.

tion expression present some degree of pattern overlap. That is, variants of the satellite-framing pattern predominantly used in English are also available in French in the form of prepositional phrases encoding goal/source-aspects of P (e.g. *jusqu'à* - 'to'). Thus, in addition to greater formal complexity, the French motion system also displays more pattern variability and, potentially crucial for bilingual learners, some degree of crosslinguistic overlap or *Structural Ambiguity* (see Müller and Hulk 2001, defined in chapter 4.3.3.2) with typical English encoding strategies.

On the basis of the requirements of the task at hand, the general prediction for CM productions was that the above language-specific factors would conspire to give rise to a unidirectional pattern of CLI. The English lexicalisation pattern was expected to exert an influence on children's French productions, but not vice versa. Accordingly, French productions were expected to diverge from corresponding monolinguals', whilst bilinguals' English verbalisations should remain unaffected and parallel monolingual performance patterns. Mainly quantitative manifestations of CLI were expected, exhibiting an overuse of patterns that are felicitous in both languages, in line with the Structural Ambiguity hypothesis. Thus, the prediction for French was that bilinguals would more frequently rely on French encoding strategies that license the satellite-framing pattern, resulting in a higher rate of C+M-lexicalising verbs used in combination with P-prepositions. An exploratory hypothesis entertained on the basis of *Convergence* (see chapter 4.3.3.3) was that such overreliance on overlapping pattern might also result in some qualitative discrepancies reflecting a tendency to enhance crosslinguistic congruence between bilinguals' two systems.

In statistical terms, the three factors of Age, Language, and Learner Type were predicted to show significant effects on the three dependent verbalisation variables under examination. Given the hypothesised unidirectionality of CLI, a significant interaction effect between Language and Learner Type was also expected, whereby Learner Type should affect event descriptions in French, but not in children's English. Based on the *Bilingual Bootstrapping* hypothesis (see chapter 4.3.3.1), occurrences of CLI were expected to decline and/or disappear with increasing age, resulting in an additional interaction effect between

Age and Learner Type. Accordingly, any Learner Type effects obtained should either be restricted to or significantly stronger in the younger than in the older age groups.

7.2 Information Packaging

7.2.1 Operationalisation and measurement

Information Packaging is analysed from two related perspectives: (i) the *locus* of information, and (ii) *patterns* of packaging. The main analysis of locus, (i), focuses on *where* information is expressed, that is, the linguistic devices **V** (main verbs) and **OTH** (other devices) used to express the three main components of **C**(ause), **P**(ath), and **M**(anner). In the quantitative analysis, no distinction is made between the subcategories of **M** (i.e. **MAc**, **MOb**, **MAg**). Accordingly, statistical analyses tested the effects of Learner Type, Language and Age on frequencies of the information types C, P and M occurring in V and OTH respectively. The secondary analysis, (ii), aims to complement (i) by providing insight into the information types speakers typically combine in V and OTH. Thus, the pattern analysis (ii) builds on (i), but rather than looking at V and OTH separately, focuses on information type combinations. Accordingly, analyses of (ii) examine the frequencies of the following packaging patterns:[3]

C/M-P: C and/or M in V and P in OTH (e.g., *He **pulls** it **down***)

P-C/M: P in V and C and/or M in OTH (e.g., *Il **traverse** la rue en le **poussant*** 'He crosses the road whilst pushing it')

C/M-Z: C and/or M in V and either (i) no motion-specific information (i.e. neither C, P or M) in OTH (e.g., *He **rolls** it **in** the forest*) or (ii) no information in OTH (i.e. bare verbs) (e.g., *He's **pushing** it*)

[3]Note that analysis (ii) merely has an ancillary function and is pursued to follow up and elucidate effects detected in the main analysis (i). Therefore, (ii) is not presented separately.

P-Z: P in V and either (i) no motion-specific information in OTH (e.g., *Il **monte sur** la colline* 'He ascends on the hill) or (ii) no information in OTH (e.g., *Il **descend*** 'He goes down')

Z-P: No motion-specific information in V and P in OTH (e.g., *He's **going down***)

7.2.2 Predictions for Information Packaging

The hypothesised unidirectionality of CLI was predicted to give rise to an interaction effect between Language and Learner Type, whereby only bilinguals' productions in French were expected to diverge from monolinguals' encoding strategies, but not in English. More specifically, in their English descriptions, bilinguals were expected to follow the satellite-framing packaging tendencies of monolingual English children, and hence mainly encode C and M in V and P in OTH, resulting in a majority of C/M-P patterns, as exemplified by (78).

(78) He **slides [C+M]** the suitcase **up [P]** the hill.

Accordingly, no statistically significant divergences were expected with respect to how frequently bilinguals and monolinguals package each information component in V or OTH in English.

In French, on the other hand, whilst monolingual children were expected to produce a variety of packaging strategies (in line with recent findings on CM in L1 French, see Ochsenbauer (2010) and chapter 2), bilinguals were predicted to make more frequent use of the crosslinguistically overlapping strategy and hence overuse the satellite-framing pattern that is felicitous in both French and English. Consequently, we should find more occurrences of C/M expressed by V and P in OTH, amounting to a greater proportion of the C/M-P pattern, exemplified in (79). Conversely, fewer instantiations of the verb-framing pattern, illustrated in (80), were expected than in monolingual French.

(79) Il **tire [C+M]** le sac **jusqu'en haut [P]** de la colline.
He pulls the bag to-at top of the hill.
'He pulls the bag to the top of the hill.'

(80) Il **traverse [P]** la rue en **faisant [C] rouler [M]** la roue.
He crosses the road by making roll the wheel.
'He crosses the road whilst rolling the wheel.'

Learner Type was also predicted to interact with Age, such that the expected cross-learner effects should decrease with age. Thus, bilinguals' French packaging strategies should become more target-like with increasing age. As no Learner Type effects were expected for English, information packaging in both learner groups was predicted to exhibit the typical satellite-framing properties from early on and to remain fairly stable across development, in line with recent findings on L1 English (see Hickmann *et al.* 2009*a*).

An exploratory hypothesis concerned a possible Event Type effect, in line with observations in the VM task. Given the divergent response pattern elicited by VM boundary crossing items, the question was whether a similar effect would occur in CM boundary crossing events (*across* and *into*-items). Given the findings of the other task, these two sets of items were hypothesised to elicit stronger cross-learner effects than other event types (*up* and *down*-items).

7.2.3 English results for Information Packaging

7.2.3.1 General trends of information distribution

Figures 7.1 (A)–(B) illustrate bilinguals' Information Packaging in V and OTH as a function of age, compared to monolinguals', in Figures 7.2 (A)–(B).

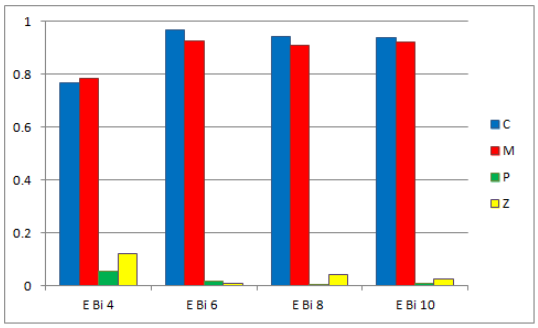

Figure 7.1 (A): V

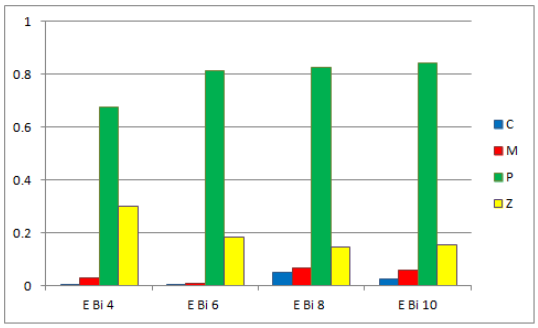

Figure 7.1 (B): OTH

Figure 7.1: CM 2L1 English Information Packaging as a function of age

As clearly emerges from a comparison of the two sets of figures, bilinguals'

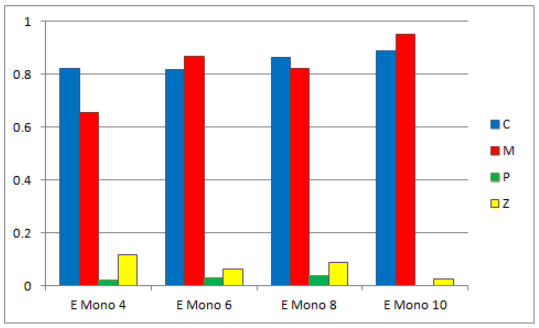

Figure 7.2 (A): V

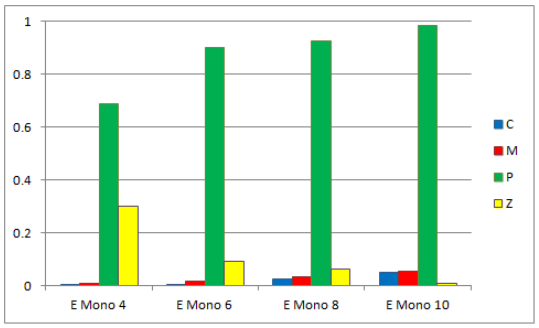

Figure 7.2 (B): OTH

Figure 7.2: CM L1 English Information Packaging as a function of age

packaging choices mirror those of monolinguals very closely. In both learner groups, the main packaging pattern is established as early as age 4 and remains fairly stable across development. Thus, as would be expected on typological grounds, verbs are used almost exclusively to encode C+M (on average in L1: C: 85.02%, M: 82.68% vs. 2L1: C: 90.49%, M: 88.54%), whilst other devices mainly express P (on average in L1: 90.88% vs. 2L1: 78.97%). Combining these two tendencies results in the expected predominance of the C/M-P pattern type, illustrated in (78) above, which makes up 63.93% of responses by bilinguals and 66.28% by monolinguals.

7.2.3.2 Effects of Age

With respect to developmental changes, the above figures suggest a fairly stable pattern featuring few changes across the four age groups examined. Nevertheless, statistical analyses detected some effects of Age. Two-way independent ANOVAs with Age and Learner Type as between-subject factors were performed on the various packaging combinations and revealed that the typical satellite-framing pattern, C/M-P, increases with progressing age, independently of learner type ($F(3,88) = 5.648$, $p < 0.002$). A post-hoc Bonferroni test pinpointed this effect to a significant increase ($p < 0.03$) between age 4 (2L1: 46.87%, L1: 46.42%) and age 6 (2L1: 71.35%, L1: 65.88%), after which C/M-P-responses reach a developmental plateau.

Complementary analyses within each linguistic device (V and OTH) separately confirmed the above age effect. Accordingly, in line with the increase in C/M-P patterns, children use C/M-verbs (e.g., *to push*, *to roll*) and P in OTH (e.g. *up*, *into*) more frequently as age increases, as indicated by ANOVAs performed on scores of C+M in V ($F(3,88) = 4.902$, $p < 0.004$) and P in OTH ($F(3,88) = 3.873$, $p < 0.02$), independently of learner type. These age effects suggest that both monolingual and bilingual children's information packaging still undergoes some developmental changes indicating an increasing approximation of satellite-framing principles of information organisation. However, the main packaging tendencies are acquired early and appear to be firmly established by age 4.

In accordance with the increase in information types expressed in both linguistic devices, ANOVAs showed that in both learner groups, Z-encoding decreases with age both in V ($F(3,88) = 3.667$, $p < 0.02$) and especially in OTH ($F(3,88) = 8.488$, $p < 0.0001$). Z-encoding in V typically corresponds to light verbs expressing the mere fact of motion, which is fairly common at age 4 (2L1: 11.97%, L1: 11.71%) and exemplified in (81).

(81) He's **going [Z]** up the seaside hill with the little blue toy car. [EB04]

The developmental decrease of Z-verbs (age 6: 2L1: 1.04%, L1: 6.25%) reflects children's growing lexical and possibly also general cognitive development. The latter enables children to process and identify the relevant event components portrayed, whilst the former allows them to communicate them more successfully by using more specific and motion-relevant vocabulary. With respect to Z-packaging in OTH, these instances reflected two main categories that were especially prevalent in the younger age groups. First, they corresponded to an encoding of fairly vague locative information that did not express the change of location they were shown. An example is given in (82). Second, they also reflected young children's incomplete descriptions that only relied on a bare verb, as exemplified in (83). This category was mainly restricted to 4-year-olds' productions.

(82) Hoppy is walking **in the forest [Z]**. [EB04]

(83) The ball is rolling. [E04]

The decline of Z in OTH goes hand in hand with the reported increase of P in OTH, reflecting children's increasingly explicit encoding of P-information specifically and a tendency towards more informative event descriptions more generally.

7.2.3.3 Effects of Learner Type

Notwithstanding the close cross-learner parallels observed above, statistical analyses also revealed some unexpected Learner Type effects. As regards the various types of information combinations, a Mann-Whitney test revealed that bilinguals employed the C+M-Z[4] pattern significantly more frequently (16.01%, Mdn = 57.98) than monolinguals (5.89%, Mdn = 39.02) ($U = 697$, $p < 0.002$). Further analyses examined the use of V and OTH as packaging devices separately and located this effect to quantitative differences with respect to packaging in the verbal periphery (OTH), which are indicated by asterisks in Figure 7.3. The

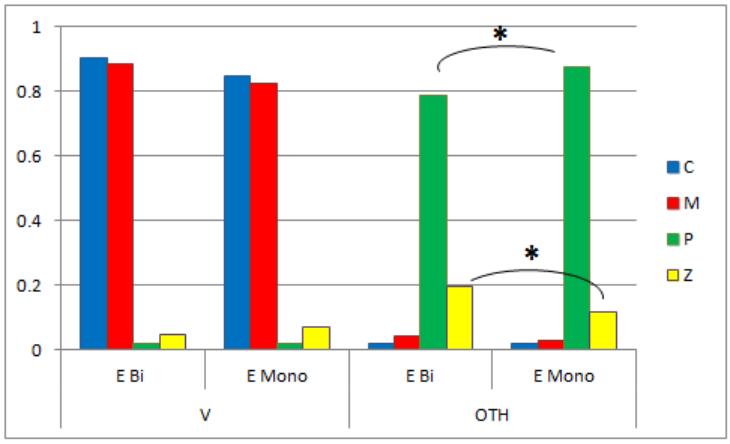

Figure 7.3: CM L1 and 2L1 English Information Packaging, ages collapsed

figure shows that learner types did not differ significantly with respect to C/M-encoding in V ($p < 0.05$). However, bilinguals displayed divergences when it came to packaging preferences in OTH. As evidenced by two-way independent

[4]C+M-Z refers specifically to all instances in which C and M are expressed jointly in V in combination with Z in OTH.

ANOVAs, bilinguals encoded P less frequently in OTH (78.97%) than monolingual children (87.5%) ($F(1,88) = 9.649$, $p < 0.004$). Instead, bilinguals produce significantly more instances of peripheral Z-encoding (19.53%) than monolinguals (11.65%) ($F(2,88) = 14.42$, $p < 0.0001$)

These learner type differences are also evident developmentally when we return to Figures 7.1 (B) and 7.2 (B), illustrating children's use of OTH across the four age groups. These show a more drastic decline of Z in OTH in monolinguals' English (age 4: 30.2%, age 6: 9.11%, age 8: 6.25%, age 10: 1.03%) than in bilinguals, where it is still fairly common even at age 10 (age 4: 29.94%, age 6: 18.22%, age 8: 14.58%, age 10: 15.36%). Conversely, P-encoding also displays a more pronounced increase in monolinguals (age 4: 68.75%, age 6: 90.1%, age 8: 92.7%, age 10: 98.44%), whilst its progression levels off after age 6 in bilinguals (age 4: 67.7%, age 6: 81.51%, age 8: 82.55%, age 10: 84.11%).[5]

Qualitatively, taking above learner type effects in OTH together amounted to two categories, which correspond to to bilinguals' greater proportion of C+M-Z patterns: First, bilinguals more frequently use C+M-verbs on their own, without adding information peripherally (i.e. Z = no information), which is illustrated in the 4-year-old's response in (84). Secondly, when information is encoded in OTH, bilinguals use it more frequently without expressing motion-specific information (i.e. Z = neither C, M or P). Typically, this latter category consists of prepositional phrases denoting a general location within which motion takes place. This is exemplified in (85), where the child's use of the preposition 'on' in combination with the ground referent 'the road' does not express the change of location (i.e. the boundary crossing) portrayed in the item.

(84) He **pulled [C+M]** the horse. [EB04]

(85) <He # pulled> [/] he **pulled [C+M]** the apples **on [Z]** the wet road. [EB04]

7.2.3.4 Effects of Event Type and Learner Type

To follow up on these learner type effects, further exploratory analyses investigated the role of Event Type. Mixed ANOVAs with Event Type as within-

[5]Note that these developmental differences do not amount to significant interaction effects between Age and Learner Type (Age*Learner Type: $p > 0.05$.).

subject factor indicated that the above learner type effects were indeed sensitive to the event type described, resulting in significant interaction effects (Event Type*Learner Type) for the three relevant variables: CM-Z ($F(2.3, 203) = 6.174$, $p < 0.003$), P in OTH ($F(2.59, 228.33) = 26.91$, $p < 0.003$), as well as Z in OTH ($F(2.43, 214.29) = 3.18$, $p < 0.04$).[6] This means that the strength of the obtained cross-learner divergences differed depending on the type of event children described. To follow up this result, ANOVAs were performed within each event type, which determined that the learner type effects obtained were in fact restricted to two event types, namely the two sets of boundary crossing events (*into* and *across*-items). These two event types elicited significantly more occurrences of CM-Z and Z in OTH in bilinguals. With respect to the latter variable, the event-type specific variation is illustrated for both learner groups as a function of age in Figure 7.4 (A) and (B).[7] A comparison of the figures shows

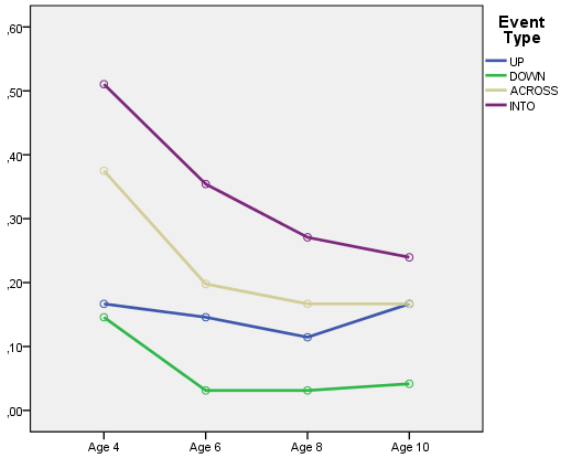

Figure 7.4 (A): Bilinguals

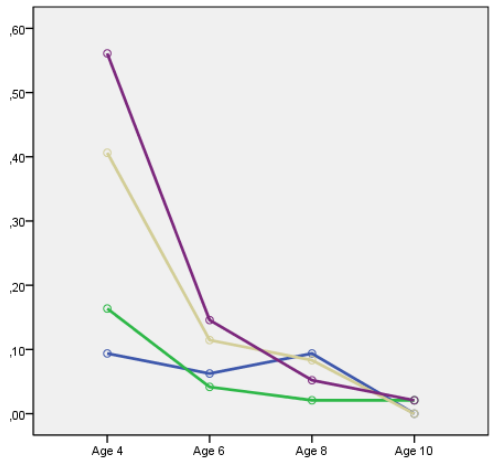

Figure 7.4 (B): Monolinguals

Figure 7.4: Z in OTH by event type as a function of age

that at age 4, both learner groups display a similar event-type specific pattern.[8] At this age, both bilinguals and monolinguals produce the greatest propor-

[6] Greenhouse-Geisser corrections applied in all three cases.

[7] Results for CM-Z are very similar, but are not illustrated due to space restrictions.

[8] Accordingly, the learner type effect does not hold at age 4, as revealed by ANOVAs within each age group.

tion of peripheral Z-encoding in response to *into*-events, followed by *across*-items. By contrast, *up* and *down*-events elicit far fewer instantiations of Z in OTH in both learner groups. However, with progressing age, the two learner groups' performance patterns start to diverge, due to bilinguals' maintaining the highly event-dependent behaviour to a greater degree than monolinguals. Thus, monolinguals' peripheral Z-encoding in boundary crossing descriptions declines noticeably after age 4, whereas bilinguals continue to encode Z significantly more frequently when describing these sets of items. Even at age 10, Figure 7.4 (A) shows that this variable remains event-type sensitive in the bilingual data, manifesting significantly higher occurrences in response to *into*-items (although not for *across*-events). The fact that monolinguals to some extent shared the same event type-specific behaviour suggests that the cross-learner divergence is not a categorial one, but reflects a difference in degree. That is, the same event types elicited qualitatively similar divergences in both learner types, but bilinguals differed in that these divergences display greater developmental persistence.

A qualitative look at the data reveals that the interaction effect between Event and Learner Type is due largely to bilinguals' frequent use of prepositional phrases that denote a general location rather than expressing P unambiguously. In the case of *into*-events, the effect corresponded to the locative preposition 'in' combined with a C+M-verb and a ground referent, which is illustrated in (86). In descriptions of *across*-events, peripheral Z similarly corresponded to the frequent occurrence of the locative preposition 'on' combined with reference to the boundary entity, which similarly fails to convey the change of location linguistically, as shown in (87). Both locative prepositions occur extremely frequently in bilinguals of all age groups, as well as in 4-year-old monolinguals.

(86) He's **pulling [C+M]** the chair **in [Z]** the cave. [EB04]

(87) He **pulled [C+M]** it **on [Z]** the road. [EB08]

Similar locative markers are also occasionally used by both learner groups in descriptions of motion events on the vertical axis (*up* and *down*-events), where children likewise establish reference to the vertical ground referent (e.g., *hill*,

dune etc.). This is exemplified in (88), where the locative *on* fails to express the directionality of the movement.

(88) He was **pulling [C+M]** the car **on [Z]** the hill. [EB06]

These event type-dependent divergences in the occurrence of locative prepositions (in order of frequency: *into* > *across* > *up* > *down*) may be related to the associated inferrability of Path meaning. That is, some combinations of dynamic verbs and locative prepositions are much more likely to elicit a directional interpretation than others. Note that various semantic and pragmatic factors combine to produce directional readings. Thus, the semantics of the verb (e.g. the degree of Path-orientation and causativity), activity involved (degree of associated goal-orientation) and characteristics of the ground referent all contribute to whether the description is interpreted as directional or as motion *within* a location (see Nikitina 2008, Thomas 2003, Tutton 2009). In the case of *into*-events, combining a force-dynamic CM-verb (*push*, *pull*)[9] with a locative preposition (e.g. *in*) involving a container ground referent (e.g. *cave*) triggers a directional reading of boundary crossing.[10] On the other hand, combining the same CM-verbs and type of locative prepositions with a different kind of ground referent, such as 'the road', exemplified in (89), does not trigger the same default inference of boundary crossing. Without any further contextual information, the resulting utterance is here interpreted locatively, although it does not exclude a directional reading.[11]

(89) He was **pulling [C+M]** a big basket **on [Z]** the rainy road. [EB06]

[9]Although *pulling* and *pushing* are not necessarily goal-directed, the effort involved and the causative semantics imply a purposeful goal-oriented activity rather than motion within a location. As observed by Tutton (2009:18), causative verbs are highly compatible with a boundary-crossing reading of 'in'.

[10]Note that the English prepositions *in* and *on* are sometimes claimed to be lexically ambiguous between a locative and a directional reading (van Riemsdijk and Huybregts 2002). But see Gehrke (2007*a*) and Goldberg (1995) for counterarguments.

[11]An alternative explanation of the prominence of locative markers in *across*-events is that children started verbalising the event *before* the actual boundary crossing was performed by Hoppy. Hence, their descriptions would accurately describe the process preceding the boundary crossing. This would not, however, explain the large number of locatives elicited by *into*-events. Also, children were urged not to start verbalisations before the end of video clips. The working assumption is that children followed these instructions.

The fact that both bilinguals' and monolinguals' use of locatives exhibited the reported event-type-sensitive variation supports an analysis in terms of ease of inferrability. It appears that bilinguals differ with respect to the degree to which they rely on pragmatic inferencing of Path instead of explicit verbalisation. Whilst monolingual children abandon the strategy of contextual inference soon after age 4 in favour of explicit linguistic means, bilingual children continue to rely heavily on it in the context of boundary-crossing events.

7.2.3.5 Qualitative Learner Type differences: Locative expressions

Further exploration of the data suggested that bilinguals' use of locative prepositions also displayed qualitative divergences, which may be due to influence from French. As with quantitative deviations, these qualitative discrepancies mainly occurred in the context of *across*-events and consisted of grammatically correct, but pragmatically infelicitous attempts to establish directional readings via a prepositional phrase. In these cases, children used prepositional expressions that can only receive a locative reading in English, but block a directional interpretation. One very frequently used expression in this category is *on the other side of*, illustrated in (90). Similarly infelicitous attempts to establish Path-reference locatively occasionally also occurred in response to *up*-items, as shown in (91). In examples (91) and (92), the participants' hesitation (note the pauses), reformulations and repairs (in (92)) when producing the locative marker suggests some degree of awareness of its idiosyncratic nature.

(90) He pushed the wheel **on the other side [Z]** of the road. [EB08]

(91) Well, he pushed the rubber ring # **at** [/] # **at the the top [Z]** of <the cliff> [//] # the dune. [EB10]

(92) Hoppy is dragging a rocking horse # **<on [Z]** the> [//] **towards [P]** the **right side [Z]** of the road. [EB10]

In the first two cases, children's addition of a clearly locative ground element within the prepositional phrase (i.e. *side of*, *top of*) disallows a boundary-crossing interpretation for English speakers, rendering the intended Path-reading unsuccessful. As a result, both descriptions can only be interpreted as motion

events *within* a given location, which clashes awkwardly with the directional meaning of the co-occurring main verbs, that is, the goal-orientation typically associated with the activities of *pushing* and *pulling*. Interestingly, recall that very similar prepositional phrases occur frequently in French descriptions in the VM task (see chapter 6.2.4.7), where speakers similarly use them in an attempt to elicit Path-inference pragmatically.[12] Relevant examples for French are repeated in (93) in (94).

(93) Le monsieur court # **de l'autre côté [Z]** de la route.
The man runs # of the-other side of the road.
'The man is running on/at the other side of the road.' [FB06]

(94) Un écureuil qui court **en haut [Z]** d'un arbre.
A squirrel that runs on top of-a tree.
'A squirrel that runs on top of a tree.' [FB08]

Note that corresponding locative markers in English almost appear to be relexified calque versions of the French expressions above. This and their absence in productions by monolingual English children strengthen their interpretation as being due to influence from French. However, the French expressions show a different pattern of pragmatic inferencing. Importantly, note that the French locative markers are not incompatible with a directional reading and may thus, despite their ambiguity, successfully elicit the intended inference of directionality. It appears that bilinguals' use of English locative prepositions is affected by French strategies of achieving directional meaning by contextual means. Due to crosslinguistic differences in how these locatives function pragmatically, the above cases of CLI interestingly lead to failure to communicate Path. The tendency to rely on contextual information to construct reference to motion has been observed to be a typical discourse feature of French (e.g. Pourcel and Kopecka 2005). The fact that bilinguals' productions appear to be influenced by these language-specific discourse strategies suggests that CLI as a phenomenon may affect subtle pragmatic typological properties that go beyond what is captured by lexicalisation patterns per se. That is, languages differ not only with respect to where motion information is encoded,

[12] As reported in chapter 6, this tendency was much more pronounced in the bilingual group, but was also used by monolingual French children.

but also when it comes to how much speakers typically rely on explicit linguistic versus implicit contextual means to convey information. It appears that such language-specific pragmatic principles may also be subject to CLI.

7.2.3.6 Manner in V

Recall that **M**anner is a broad category comprising three subcomponents (MAc, MOb, and MAg), which were not taken into account by the statistical analysis. A closer analysis of the types of M expressed by bilinguals' and monolinguals' main verbs revealed that learner types exhibited some differences with respect to the subtypes of Manner-information that speakers preferentially encoded in V, either alone or in combination with **C**ause. As Figures 7.5 (A) and 7.5 (B) illustrate, monolingual children's C/M-combinations comprised a greater range of M-subtypes. In particular, this concerns combinations of C and MOb (the object's Manner of motion, e.g. *roll*, *slide*), which monolinguals expressed more frequently (10.61% on average) than bilinguals (5.33%). By contrast, bilinguals' M-verbs almost exclusively focused on expressions of C+MAc (e.g. *push*, *pull*), which made up 80.01% of bilinguals' verbs on average, compared to only 65.09% in monolinguals. With increasing age, bilinguals' C/M-combinations

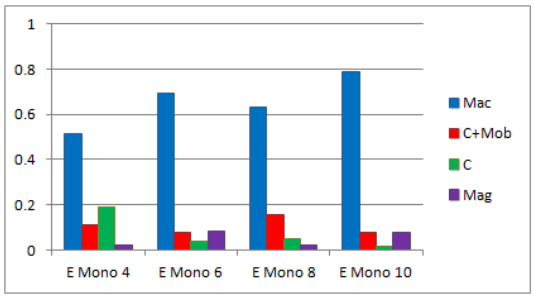

Figure 7.5 (A): Monolinguals

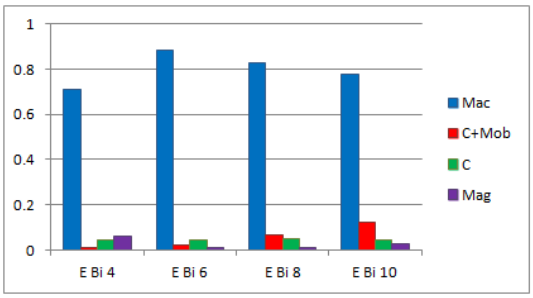

Figure 7.5 (B): Bilinguals

Figure 7.5: CM 2L1 and L1 English Manner-verbs as a function of age

displayed slightly more variation, owing to an increasing use of C+MOb verbs (EB04: 0.78%, EB06: 2.08%, EB08: 6.51%, EB10: 11.97%), an example of which is provided in (95).

(95) So <he's> [/] he's **rolling [C+MOb]** it up the house. [EB10]

However, even within the category of C+MOb combinations, bilinguals showed a more restricted lexical choice than monolinguals. Thus, a qualitative look at bilinguals' C+MOb-verbs revealed that this category almost exclusively corresponded to the verb *roll* and, very occasionally, to *slide*. Monolinguals, on the other hand, employed a more varied lexical repertoire, which also comprised less frequent verbs such as *wheel*, *drag*, and *spin*, even at a relatively young age, as demonstrated by the monolingual 4-year-olds' responses in (96) and (97).

(96) He **wheeled [C+MOb]** the cartwheel to the other side of the grass. [E04]

(97) **Spin [C+MOb]** it (a)cross the road. [E04]

The greater degree of semantic variation we find in monolinguals' main verbs was also partly due to a more frequent use of verbs that only expressed C (without M-conflation). Especially at age 4, such C-verbs were common in English monolinguals (E04: 18.75%, overall: 7.35%), whereas they only occur rarely in bilinguals (4.42% overall). Furthermore, the two learner groups also differed with respect to their preferred lexical choices that corresponded to the C-category. Monolinguals frequently used *move* causatively, as illustrated in (98), which is very rare in bilinguals, who tend to prefer *put* and *take*, shown in (99) and (100).

(98) He **moved [C]** that all the way over to the cave. [E04]

(99) He's **putting [C]** the tyre in the barn. [EB04]

(100) He's **taking [C]** it up the hill. [EB04]

Finally, MAg-verbs (expressing the agent's Manner of movement) also exhibited a slight but unexpected learner type difference. As emerges from Figures 7.5 (A) and (B), MAg-verbs show a declining developmental pattern in the bilingual group, where they occasionally occur at age 4 (6.25%), but only rarely after that age (EB06: 1.3%, EB08: 1.04%, EB10: 2.6%). By contrast, monolinguals' MAg-verbs are both more frequent overall (5.29%) and more stable developmentally, featuring the highest proportions at age 6 (8.33%) and 10 (7.81%). Qualitatively, MAg-packaging in V corresponded to similar lexical choices in both learner groups. As this information component was held constant in all items, most children used the expected verb *to walk*, either on its own (mainly

at age 4), or in combination with a P-satellite, as illustrated in (101), although very occasionally, *to climb* also unexpectedly occurred in response to events on the vertical axis, as in (102).[13]

(101) He's **walking [MAg] into [P]** the cave. [EB04]

(102) He was **climbing [MAg] up [P]** # a sand hill. [EB06]

The finding that emerged from the above analysis of verbs was that bilinguals use a more restricted range of semantic combinations and display less lexical variation than monolingual children. This result is consistent with a range of empirical studies on bilinguals' lexical development which have repeatedly shown that bilinguals' productive vocabulary sizes are smaller than in age-matched monolinguals (see Bialystok 2001 for reviews). Moreover, the observed reduction in lexical diversity also ties in closely with findings on motion verbs in English-Spanish bilingualism by Álvarez (2008), who similarly found motion verbs in the child's English to be semantically and lexically impoverished as compared to monolingual children (see chapter 3.3.2.2).

7.2.3.7 Summary: English Information Packaging

Our analysis of English information packaging in bilinguals and monolinguals demonstrated that children in both learner groups exhibited the typologically expected satellite-framing tendencies of encoding C/M-information in V and P in OTH. In line with earlier studies on L1 English development, this packaging strategy was established as the dominant pattern as early as age 4.

Contrary to our unidirectionality assumption, children's English responses did however manifest some unexpected cross-learner divergences. Quantitatively, these did not affect packaging in V, but were limited to OTH and related to the extent to which the verbal periphery served to encode motion-specific information types. Analyses suggested that bilinguals more frequently either do not use the verbal periphery at all to package information and instead rely on

[13]Unexpected because 'to climb' does not correspond to the actual type of MAg shown in the video.

main verbs alone,[14] or they tend to use OTH more often to encode information that does not explicitly denote any of the relevant motion components. Instead, bilinguals frequently use prepositional phrases that specify general locations rather than P. Qualitatively, these locative expressions reflected a tendency in bilinguals to rely to a greater extent on contextual inference for communicating P rather than explicit verbalisation. These locative expressions exhibited influence from French both lexically and with respect to their intended use as directional markers. Due to crosslinguistic differences, children's use of typically French strategies of eliciting P-inference often failed in English, resulting in pragmatically idiosyncratic utterances that disallowed a directional reading. This finding has implications for approaches that consider CLI as a strategy of overcoming temporary gaps and difficulties in acquisition (i.e. Bilingual Bootstrapping, see chapter 4.3.3.1). In the present case, carrying over pragmatic inferencing principles that are more typically applied in French resulted in a failure to establish reference with the intended information type and hence presented a communicative disadvantage to children. These findings imply, first, that even in simultaneous bilingual acquisition from birth, CLI can sometimes have infelicitous effects that are qualitatively not dissimilar to transfer phenomena in L2 learning situations. However, we would like to stress that no instances of ungrammaticality were found in bilinguals' English data and that the described discrepancies relate to semantic and pragmatic acceptability. A second implication is that CLI not only affect lexicalisation patterns, but also language-specific discourse principles. For a broader understanding of the phenomenon of CLI, this means that all levels of linguistic description, including subtle language-specific discourse differences, have to be taken into account.

When comparing the present findings with the VM task (chapter 6), some parallels also emerged with respect to bilinguals' peripheral packaging in their French (see 6.2.4.7), which suggest the possibility of a more general bilingual strategy. These concern both the tendency to leave Path information to pragmatic inference from locative contexts and to rely more on verbs alone for ex-

[14] A greater tendency for bare-verb utterances has also been reported for Spanish-English bilinguals' motion verbalisations by Hohenstein *et al.* (2006) (see chapter 3.3.2.2).

plicit information encoding. Findings for bilinguals' French CM-descriptions may provide insight into this. Thus, if children's French productions manifest similar tendencies, a more general bilingual phenomenon may be at work.

Finally, our exploratory hypothesis regarding the effect of Event Type was confirmed by our findings. Thus, similar to results for the VM task, CM-events portraying boundary crossing events, particularly *into*-items, elicited significantly stronger cross-learner effects than event types on the vertical axis. Taking findings of both tasks together, it appears that boundary crossing items elicit robust divergences in children's productions and also affect monolinguals' verbalisations. One possible explanation is that these events present greater representation difficulties to children, as suggested by Hickmann (2010). If children do indeed display such divergent event-specific production patterns independently of language and learner type, this would support a cognitive interpretation in terms of greater representational difficulty. Results for bilinguals' French descriptions of these event types, presented in the following section, are hoped to shed light on this issue.

7.2.4 French results for Information Packaging

7.2.4.1 Effects of Learner Type and Age

Figures 7.6 (A)–(B) provides an illustration of how frequently information types are encoded by V and OTH in bilinguals' French across age groups, compared to monolingual control groups, shown in Figures 7.7 (A)–(B).

A comparison of the two learner types' packaging strategies reveals markedly different main tendencies and developmental patterns. With respect to packaging in V, monolinguals display great variability. They encode all three information types to roughly equal degrees (on average: C: 55.53%, M: 44.92%, P: 49.93%). Whilst this highly variable pattern does not exactly conform to the typological classification of French, which would have predicted a much stronger prominence of P-encoding in V, it is in accordance with recent findings on French speakers' encoding strategies for CM events (Ochsenbauer 2010). By contrast, bilinguals show a much stronger preference for satellite-framing

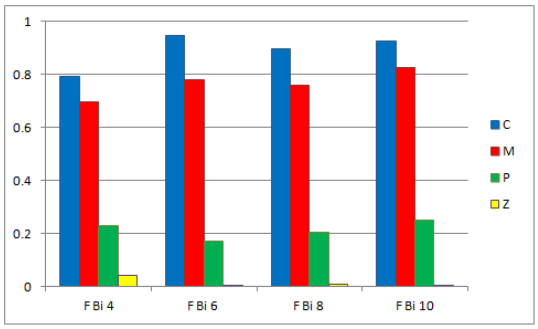

Figure 7.6 (A): V

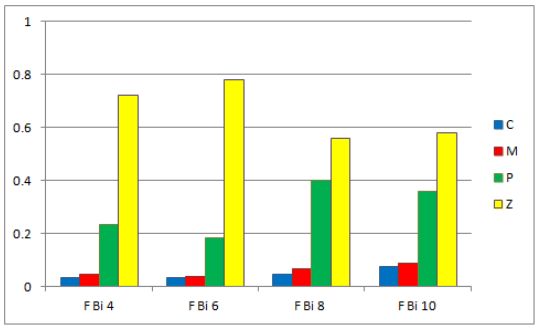

Figure 7.6 (B): OTH

Figure 7.6: CM 2L1 French Information Packaging as a function of age

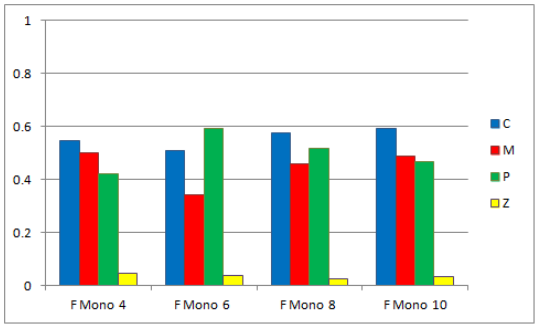

Figure 7.7 (A): V

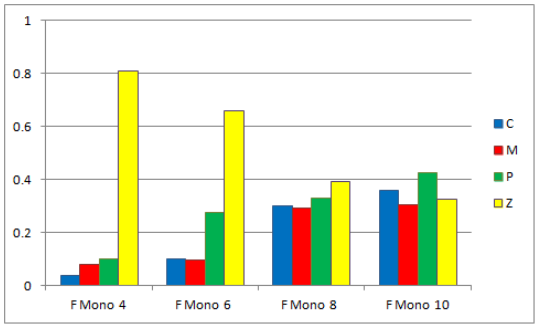

Figure 7.7 (B): OTH

Figure 7.7: CM L1 French Information Packaging as a function of age

strategies, mainly encoding C/M (C: 88.99%, M: 76.56%) in V, resulting in a significant Learner Type effect ($F(1,88) = 34.82$, $p < 0.0001$), as illustrated in the overview of Learner Type effects in Figure 7.8. Conversely, bilingual children use P-verbs significantly less frequently (21.48%, Mdn = 31.28) than their monolingual counterparts, giving rise to a further significant Learner Type difference, as revealed by a Mann-Whitney test (Mdn = 65.72) ($U = 325.5$, $p < 0.0001$), consistent with our learner type predictions.

Developmentally, packaging in V does not display dramatic changes in the encoding of any of the information in either learner group, as reflected by the absence of Age effects in our statistical analyses. Thus, in both learner groups, the encoding strategies described above are established from the earliest tested age and remain stable across the four age groups. Note that the absence of Age effects includes bilinguals' strong bias for satellite-framing packaging and

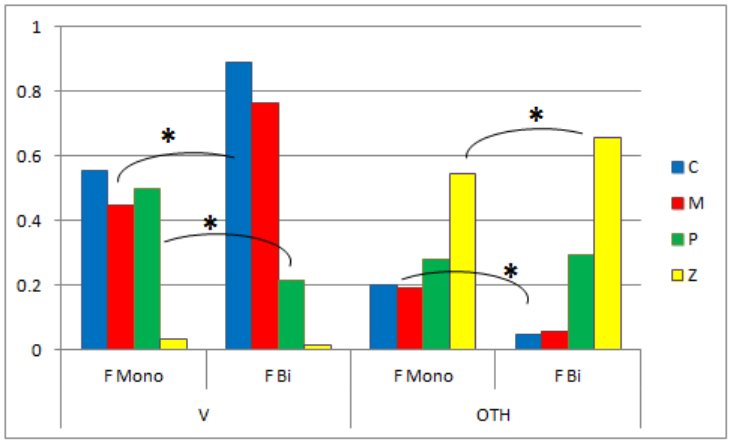

Figure 7.8: CM L1 and 2L1 French Information Packaging, ages collapsed

hence contradicts our prediction of age-dependency of cross-learner effects. The learner type deviations with respect to V-packaging thus remain significant across all tested age groups.

With respect to packaging in OTH, further cross-learner divergences are apparent from a comparison of Figures 7.6 (B) and 7.7 (B). Similar to their use of verbs, bilinguals manifest a systematic satellite-framing preference in their peripheral information encoding. Thus, in contrast to monolinguals, the only core motion component bilinguals encode systematically outside the main verb is P (29.49% on average). On the other hand, the semantic components typically occurring peripherally in verb-framing languages, C and M, are expressed comparatively infrequently by bilinguals (C: 4.75% and M: 5.92% on average) and constitute a significantly smaller proportion than in the monolingual data (C: 19.98%, M: 19.33%), resulting in significant Learner Type effects for scores of C/M in OTH, as revealed by a Mann-Whitney test ($U = 677.5$, $p < 0.001$, Mdn bilinguals = 38.61, Mdn monolinguals = 58.39).

Regarding effects of Age in OTH, P-encoding in OTH increased significantly in both learner groups, as shown by a main effect of Age ($F(3,88) = 3.093$, $p < 0.04$). For the bilingual group, where P is the only motion-specific information component that appears consistently in OTH, this means that the satellite-framing tendency is reinforced developmentally, despite some fluctu-

ations (FB04: 23.44%, FB06: 18.49%, FB08: 40.1%, FB10: 35.93%). Monolingual French children's development of packaging in OTH, on the other hand, moves towards a pattern of increasing encoding variability. Thus, monolingual children not only increasingly encode P-information in OTH with age (F04: 9.89%, F06: 27.6%, F08: 32.81%, F10: 42.45%) , but also C (F04: 3.9%, F06: 10.15%, F08: 29.94%, F10: 35.93%), and M (F04: 7.81%, F06: 9.03%, F08: 29.42%, F10: 30.46%), generating significant Age effects within the monolingual data (C/M in OTH: $F(3,44) = 5.594$, $p < 0.003$; P in OTH: $F(3,44) = 3.581$, $p < 0.03$). The comparatively very minor and not significant age increase of C/M-information in OTH in the bilingual data (C: EB04: 3.38%, EB06: 3.38%, EB08: 4.68%, EB10: 7.55%; M: EB04: 4.42%, EB06: 3.64%, EB08: 6.77%, EB10: 8.85%) resulted in a significant interaction effect between Age and Learner Type for scores of C/M in OTH (Learner Type*Age: $F(3,88) = 4.279$, $p < 0.01$).

A further learner type divergence in OTH that emerges from Figure 7.8 concerned Z-encoding.[15] Even though Z in OTH shows a significant developmental decrease in both learner types, as evidenced by a main effect of Age in a two-way independent ANOVA ($F(3,88) = 9.37$, $p < 0.001$), it occurred significantly more frequently overall in bilinguals (average of 65.95%) than monolinguals (54.68%), as evidenced by a further main effect of Learner Type ($F(2,88) = 4.38$, $p < 0.04$). The developmental decrease in both learner groups likely reflects general cognitive factors that enable children to communicate more motion-specific and event-relevant information and to make more productive use of peripheral devices generally, which frequently involve complex subordinate constructions in French. This explains why peripheral Z-encoding decreases whilst other information types show an increase.

The learner type difference regarding Z-scores in OTH is mirrored by another significant Learner Type difference that emerged from our secondary analysis of packaging patterns. Interestingly, in line with our results of bilinguals' English packaging (see 7.2.3.3), a Mann-Whitney test determined that bilinguals in French use the C+M-Z pattern significantly more frequently (Mdn = 61.78) than monolingual French children (Mdn = 35.22) ($U = 514.5$, $p < 0.0001$).

[15]Elaborations on what this category corresponds in the data are provided in the qualitative analysis in 7.2.4.3.

This means that bilinguals more frequently produced bare C+M-verbs in their responses (e.g. *Il le pousse* 'He pushes it') without peripheral addition, or combined a C+M-verb with spatial, but not directly motion-specific information, such as locative markers (e.g. *sur la colline* 'on the hill').

To summarise the Learner Type and Age effect with respect to French Information Packaging, French monolinguals approached a response pattern of maximal variability, equally distributing all three core information types (P, C, M) across both linguistic devices (V and OTH). Bilinguals, on the other hand, display much stronger satellite-framing preferences in their information packaging, as manifested by the predominance of C/M-verbs and P-satellites in all age groups tested and conversely, the significantly lower score of P-verbs. This result is in accordance with the expectation of a quantitative reinforcement of satellite-framing information strategies in children's French responses. However, the developmental persistence of these divergences disconfirms our prediction of age-dependency. That is, in both linguistic devices, bilinguals either maintain the satellite-framing type of information packaging (C/M in V) or reinforce it (P in OTH), contrary to the expectations that any cross-learner deviations would disappear or diminish with age.

7.2.4.2 Qualitative Learner Type differences: C/M in V

What types of responses do the detected quantitative divergences correspond to qualitatively in children's French descriptions? First, with respect to differences in verbal packaging (V), a closer look at the various conflation patterns falling under the broad category C/M[16] showed that, as illustrated in Figure 7.9, the learner type difference obtained for C+M-verbs corresponded to bilinguals' preference (61% vs. 36.52% in monolinguals) for verbs expressing C+MAc (e.g. *pousser* 'push' and *tirer* 'pull'), similarly to results obtained for bilinguals' English expressions (see 7.2.3). On the other hand, verbs conflating the object's Manner of motion (MOb) with Cause (e.g. *Il le roule* 'He rolls it') were used by both learner types to roughly equal degrees (2L1: 11.52%, L1: 10.48%), whilst verbs focussing on either C or any type of M (MAg/MOb) alone occurred very

[16]Remember that this category included all verbs expressing C *and/or* M (any subtype).

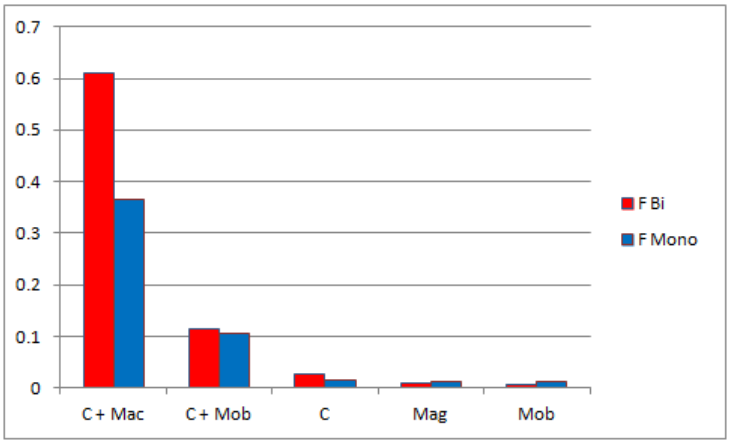

Figure 7.9: CM 2L1 and L1 French Manner/Cause-verbs, ages collapsed

rarely in either learner group. Connecting bilinguals' preference for C+MAc verbs with the differences detected for packaging in OTH amounts to the following qualitative response patterns. Younger bilinguals (mainly 4-year-olds) frequently used C+MAc-verbs on their own without any additional information in OTH, as illustrated in (103).

(103) Popi et ben il a **poussé [C + MAc]** la roue.
Hoppy and well he has pushed the wheel.
'Hoppy, well, he pushed the wheel.' [FB04]

C+MAc-verbs in combination with Z-packaging expressing other spatial information types are presented in the following section.

7.2.4.3 Qualitative Learner Type differences: Z in OTH

The overwhelming majority of bilinguals' instantiations of Z in OTH occurred in responses that combined C+M-verbs with adjuncts that expressed a general location rather than P-information (i.e. no change of location). Interestingly, this tendency mirrors the findings obtained both for bilinguals' English caused motion expressions (e.g. *on the road*, see 7.2.3) and children's voluntary motion verbalisations in French (e.g. *sur la glace* 'on the ice', see 6.2.4). Examples of the types of locative prepositional phrases typically used by bilinguals for each event type are provided in (104) to (107).

(104) Il a **poussé [C + MAc]** la valise **en haut [Z: Loc]**.
He has pushed the suitcase on top.
'He pushed the suitcase on top.' [FB04]

(105) Il **tire [C + MAc]** la grosse boîte **en bas [Z: Loc]** d'une colline.
He pulls the big box on bottom of-a hill.
'He's pulling a big box at the bottom of a hill.' [FB08]

(106) Il a **tiré [C + MAc]** le cheval **sur [Z: Loc]** la route mouillée.
He has pulled the horse on the road wet.
'He pulled the horse on the wet road.' [FB04]

(107) Il **tire [C + MAc]** une chaise **dans [Z: Loc]** une grotte.
he pulls a chair in a cave.
'He's pulling a chair in a cave.' [FB06]

Note that locative prepositions of this type are also found in monolingual children's responses (e.g. *dans la grotte* 'in the cave'), but they occur much less frequently than in bilinguals, as indicated by our quantitative results presented earlier. Moreover, in the bilingual data, locative Z-expressions frequently display qualitative departures from monolingual usage that indicate an intention by children to establish Path-reference inferentially, in line with our findings for voluntary motion. These qualitative differences are illustrated below.

First, qualitative cross-learner comparisons show that when bilinguals use locative prepositions, they are frequently followed by multiple reformulations which suggest difficulties arriving at a suitable directional marker during the online production process. Thus, (108) demonstrates a bilingual subject's initial attempts to convey directionality by using several locative expressions (*sur*, *dessus* 'on'), which the child abandons before settling on the more successful Path-marker *jusque* ('to').

(108) Popi il a poussé la bouée **sur [Z: Loc] [//] # dessus**
Hoppy he has pushed the rubber-ring on [//] # on-top
[Z: Loc] [//] # jusque [P] la colline.
[//] # to the hill.
'Hoppy pushed the rubber ring on # on top of # to the hill.' [FB08]

In other cases, the outcome is less successful, when children's repair process simply results in substituting one locative expression for another one, as illus-

trated in (109), which hence fails to unambiguously convey Path by linguistic means.

(109) Il tire une brouette <**en haut** de la> **[Z: Loc]** [///] # non # **de**
He pulls a wheelbarrow <on top of the> [///] # no # off
[P] [//] # **dans [Z: Loc]** la pente.
[//] # in the slope.
'He pulls a wheelbarrow <on top of the> [///] no off [//] in the slope.'
[FB06]

Secondly, similar attempts to convey directional meaning can be detected when taking into account co-textual information, which often serves to specify the starting and/or end location of the motion event.[17] Thus, in line with findings for bilinguals' voluntary motion expressions (see chapter 6), children in the present task also frequently attempt to achieve directional readings by relying on inference from information they provide to the agent's changing location. This is illustrated by (110) where the child initially attempts to add P-information peripherally to a C+M-verb, but then appears unable to access a suitable unambiguous P-marker outside V, and instead resorts to reformulating the whole utterance. The subsequent repair consists in leaving directionality information to be inferred from the combination of the agent's location at the beginning of the scene (*en haut* 'on top') and the end of the motion event. Temporal adverbs (*puis* 'then') frequently serve to reinforce the intended change of location reading, in line with observations for voluntary motion.

(110) Alors y a Popi # <qui tire une brouette # **en**> [///] # il
So there has Hoppy # <who pulls a wheelbarrow # at> [///] # he
est **en haut [Z: Loc]** d'une colline et **puis** il la tire **en bas**
is on top of-a hill and then he it pulls at bottom.
[Z: Loc].

'So there's Hoppy <who pulls a wheelbarrow on> [///] he is on top of a hill and then he pulls it at the bottom.' [FB08]

In descriptions of *across*-events, such inferred rather than explicit communication of P frequently takes the form of the locative expression *l'autre côté* ('the

[17]Note that these utterances are not part of the target response. That is, any semantic content conveyed is not taken into account by the statistic analysis of information packaging.

other side'), illustrated in (111). Similarly to the above case, the agent's change of location is implied by reference to different inherent aspects of the boundary entity (i.e. different sides of the road). This device is by now familiar both from bilinguals' frequent use in French voluntary motion productions (see 6.2.4) and the observed idiosyncratic parallel in children's English caused motion expressions (see 7.2.3).

(111) Il pousse la corbeille de pommes bien remplie # **de l'autre côté**
He pushes the basket of apples well filled # of the-other side
[Z: Loc] de la route.
of the road.
'He pushes the basket full of apples at/on the other side of the road.'
[FB06]

The frequent use of such locative prepositions as intended P-markers accounts for why bilinguals' significantly lower proportion of P-verbs (see quantitative results) is not compensated for overtly by more frequent peripheral expressions of P. That is, Z-encoding in OTH frequently represents children's attempts to express P, but their ambiguity or inferential nature mean that they are not reflected as such in the coding and are instead manifested as a more substantial proportion of Z-marking relative to monolinguals.

7.2.4.4 Qualitative Learner Type differences: P in OTH

Despite the absence of quantitative cross-learner differences with respect to P in OTH, our qualitative analysis of peripheral P-expressions revealed some divergences from monolingual usage, which in turn paralleled findings for French in the VM task. That is, *across*-events frequently elicited the idiosyncratic satellite-like device *à travers* ('across') in bilinguals' productions across all age groups, as in (112) and (113), which was also common in VM boundary crossing responses.

(112) Popi tire un landau # **euh** # **à travers [P]** la route.
Hoppy pulls a pushchair # err # across the road.
'Hoppy is pulling a pushchair # err # across the road.' [FB08]

(113) Popi <traverse la> [//] # euh pousse un panier de pommes #
Hoppy <crosses the> [//] # err pushes a basket of apples #
à travers [P] la route.
across the road.
'Hoppy <is crossing> [//] pushing a basket of apples across the road.'
[FB06]

In (113), the child initially intends to encode P in V (*traverser* 'to cross'), but in the subsequent reformulation opts instead for a C+M-conflating verb (*pousser* 'push'), which consequently leaves only the verbal periphery available for P-marking. Using the idiosyncratic satellite *à travers* thus provides a means of expressing boundary crossing outside the main verb. The child's use of this device in (113) is accompanied by hesitation markers and pauses, suggesting that the participant is partly aware of its idiosyncratic nature, but resorts to using it nevertheless when the choice of the main verb (C/M) constrains the linguistic locus left available for P-encoding.

Note that there is some controversy in the literature about the acceptability of *à travers* as directional satellite in French. Fong and Poulin (1998) claim that the preposition is compatible with a change of location reading and mirrors the semantics of the English satellite *across*, provided that the Ground referent following the prepositional phrase denotes a barrier. However, this would not explain why the device is not exploited by monolingual French speakers, even when the boundary entity is mentioned by speakers. Moreover, the analysis is incompatible with adult French speakers' consistent rejection of the device as boundary crossing marker (see findings by Filipović 2007: 25). Furthermore, the formal variation displayed by bilinguals' usage of the device in our data, illustrated in (114) to (117), suggests that it may not necessarily be modelled on the existing French preposition *à travers* ('through'). The variants of the device occurring in the bilingual data are sometimes more reminiscent of the verb *traverser* ('to cross'), as in (114) and (115), suggesting that the model underlying children's usage of the device is difficult to identify. Children may have multiple French sources in mind and blend them (both the verb *traverser* and the preposition *à travers*). The exact analogical extension at work may also differ from child to child on an individual basis.

(114) Il a fait rouler le truc pour jardiner **à traverser [P]** la
He has made roll the thing for gardening across the
route.
road.
'He made the gardening thing roll across the road.' [FB04]

(115) Popi roule une roue **à traverse [P]** la route.
Hoppy rolls a wheel across the road.
'Hoppy is rolling a wheel across the road.' [FB08]

(116) Ben # i(l) # tire une poussette # **en travers [P]** la rue.
Well # he # pulls a pushchair # across the road.
'Well he's pulling a pushchair across the road.' [FB10]

(117) Il roule # une roue de # carrosse # euh # au trottoir
He rolls # a wheel of # carriage # err # on-the pavement
au travers [P] là.
across there.
'He's rolling a carriage wheel err on the pavement across there.' [FB06]

The use of *à travers* and its variants also constitutes a striking parallel with transfer phenomena observed in English L2 learners' data reported by Hendriks *et al.* (2008), who found similar uses of satellite-like devices in boundary crossing descriptions by English L2 learners of French.[18] In the context of caused motion, the difficulty for both learner types is created by their shared preference for packaging C/M-information within the main verb, which subsequently restricts target-appropriate options of expressing P-information. It seems that this difficulty elicits similar English-style strategies of peripheral P-encoding in two very different acquisition situations. Thus, whilst the online pressure of finding suitable means of P-communication makes adult L2 learners fall back on familiar source language strategies (transfer), the same situation invites bilinguals to exploit a convenient packaging strategy from their English (CLI).

Another qualitative difference with respect to P-encoding emerged in the context of older bilingual children's (6 years and above) use of complex subor-

[18]In the study by Hendriks *et al.* (2008), note that L2 learners also used similar idiosyncratic prepositional satellite-devices for *into*-events, such as *entre* to express 'into'. However, equivalent devices for this event-type did not occur in the present sample of 2L1 bilinguals.

dinate structures. This concerned bilinguals' frequent use of complex constructions to maintain satellite-framing organisation principles by encoding the P-element within the embedded clause, rather than the typologically expected semantic components (C/M), as in (118) to (121). The specific constructions used by children mainly comprised gerunds, but infinitival goal-clauses also occasionally occurred. Note that in contrast to the VM task, where this tendency mainly surfaced in the context of *across*-events, P-subordinates in the present task were not confined to specific event types, but occurred independently of the directionality expressed.

(118) Popi pousse un gros cadeau **en montant [P]** une colline de sable.
Hoppy pushes a big present by ascending a hill of sand.
'Hoppy is pushing a big present whilst going up a sand hill.' [FB06]

(119) Ben i(l) # tire la # brouette # **pour descendre [P]** de la colline.
Well he # pulls the # wheelbarrow # for to-descend from the hill.
'Well, he's pulling a wheelbarrow to get down from the hill.' [FB10]

(120) Popi tire le cheval de bois **en traversant [P]** la rue.
Hoppy pulls the horse of wood by crossing the road.
'Hoppy is pulling the wooden horse whilst crossing the road.' [FB08]

(121) Il tire un caddie derrière lui **en entrant [P]** dans une grange.
He pulls a trolley behind him by entering in a barn.
'He's pulling a trolley behind him whilst going into a barn.' [FB10]

The above responses are grammatically perfectly felicitous and show that children have clearly acquired productive command of complex French constructions that enable them to integrate multiple information types. However, on the level of information distribution, the persistent encoding of the P-component outside the expected verb-framing locus has an awkward stylistic effect. Nevertheless, it must be said that subordinate P-packaging also occasionally occurs in monolingual French, but is not nearly as pervasive as in the bilingual data. This means that the idiosyncratic effect is not so much due to the occurrence of the structure as such, but to the systematicity with which bilinguals exploit it as compared to their monolingual peers. Thus, bilinguals' pref-

erence presents both a quantitative and qualitative divergence: the typologically marginal but grammatically felicitous French 'reverse verb-framed pattern' (see Pourcel 2004, Pourcel and Kopecka 2005) is thus more dominant in bilinguals' productions as compared to monolinguals'. Note that this behaviour once again parallels our findings for the VM task, where older bilinguals similarly prefer to encode P-information in gerunds or infinitival goal-clauses, once they have acquired the appropriate French syntactic means. Interestingly, this divergent tendency was also observed in adult L2 learners of French (Hendriks *et al.* 2008) of advanced proficiency levels, who make similar use of subordinate structures. Thus, the factors of advanced proficiency in L2 learning and growing syntactic abilities in 2L1 acquisition appear to result in similar outcomes, enabling both children and adult learners to express various information types jointly whilst maintaining satellite-framing packaging patterns.

Despite the apparent similarities with L2 learning, the bilingual data shows evidence that different underlying processes motivate these shared tendencies. In contrast to adult learners, bilingual children often co-produce both types of patterns within the same utterance, that is, the more typical verb-framed pattern alongside the more marked reverse-framed pattern illustrated above. This indicates that bilinguals' preference for the satellite-framing structure is not motivated by insufficient command of the more target-appropriate pattern. Moreover, bilinguals' frequent switches between lexicalisation patterns within the same response, often accompanied by markers of hesitation and pauses, indicate an awareness of the idiosyncratic effect produced by these P-encoding subordinate clauses. This is illustrated in (122), where the child initially encodes P in an infinitival clause, which, after some hesitation, is repaired by a more target-appropriate verb-framing strategy.

(122) <Popi # **pour monter [P]** le toit # tire en même> [//] # il
<Hoppy # for to-ascend the roof # pulls at same> [//] # he
monte [P] le toit **en tirant [C + M]** une voiture.
ascends the roof by pulling a car.
'<To go up the roof, Hoppy is pulling simultaneously> [//] he goes up the roof whilst pulling a car.' [FB08]

Given that bilinguals evidently master the more target-appropriate verb-framed pattern, why do they nevertheless display a preference for satellite-framing packaging strategies? Given that the atypical structures in question are within the range of acceptable French patterns, bilinguals' preference is consistent with the predicted reinforcement of crosslinguistically overlapping patterns (overuse), in line with theories of bilingual convergence and structural ambiguity approaches (see chapter 4), which we return to in the discussion.

7.2.4.5 Effects of Event Type

Did the detected cross-learner divergences interact with Event Type? The results are in line with our exploratory event type hypothesis and confirm the special status of boundary crossing events. Mixed ANOVAs testing the effects of Learner Type and Event Type revealed that two of the detected cross-learner effects, P in V and Z in OTH, interacted with Event Type. First, bilinguals' less frequent use of P-verbs was shown to depend on the event type described, resulting in a significant interaction effect ($F(2.41, 226.83) = 8.25$, $p < 0.001$).[19] Follow-up tests within each event type indicated that, although bilinguals' use of P-verbs was significantly lower in each event type, the effect was most pronounced for *across*-events, which elicited fewest P-verbs (e.g. *passer* 'to pass' or *traverser* 'to cross') as compared to monolinguals. Remember that *across*-events also gave rise to qualitative cross-learner divergences, such as bilinguals' use of the idiosyncratic P-marker (*à travers* 'across') and the frequent use of locative expressions intended to imply directional meaning (*de l'autre côté* 'on the other side').

Secondly, bilinguals' more frequent Z-encoding in OTH was also affected by Event Type, as revealed by a significant interaction effect ($F(2.71, 254.84) = 3.39$, $p < 0.03$). According to follow-up tests by event type, *into*-events elicited the most significant learner type differences ($F(1,88) = 11.34$, $p < 0.002$), that is, the highest proportion of peripheral Z-marking as compared to monolinguals. Qualitatively, this reflected bilinguals' extremely frequent use of the locative preposition *dans* ('in') when describing *into*-items (e.g. *dans la ferme* 'in

[19] Greenhouse-Geisser correction applied.

the barn'). Thus, both sets of boundary crossing items (*across* and *into*) produced significantly stronger learner type effects, in line with similarly event-sensitive outcomes detected both for bilinguals' English verbalisations (see section 7.2.3) and for the VM task. These converging results reinforce the impression that boundary crossing events may present a particular representational and/or communicative challenge to learners.

7.2.4.6 Summary: French Information Packaging

To summarise bilinguals' French information packaging, the results showed strong quantitative and qualitative cross-learner differences that pointed to a clear bilingual preference for satellite-framing information organisation principles, in line with predictions. In the verb, this tendency manifested itself as bilinguals' strong preference for encoding C/M-information at the expense of the typologically more typical P-component. In the verbal periphery, the same bias for typical satellite-framing principles was reflected in children's almost exclusive encoding of P-information at the expense of C/M, in contrast to monolinguals' developmental increase of all three information types in OTH. Covertly, these satellite-framing tendencies were also reflected in bilinguals' significantly more frequent Z-packaging in OTH, which often constituted attempts to convey P-meaning pragmatically by inference from locative prepositions (e.g. *de l'autre côté* 'at the other side')

Qualitative cross-learner deviations emerged in the context of peripheral P-encoding, which also mirrored tendencies detected in earlier studies on adult L2 learners' motion expressions (Hendriks *et al.* 2008). In the context of *across*-events, such deviant P-marking comprised the creation of the idiosyncratic satellite *à travers*, used by children to express boundary crossing and also encountered in bilinguals' voluntary motion descriptions. In bilinguals aged 6 and older and advanced L2 learners, a further idiosyncrasy consisted in the frequent use of subordinate structures, especially gerundives, to express P-information (e.g. *en montant* 'by ascending'). I argued that the observed parallels with L2 learners are linked to a shared tendency to encode C/M in the verb, which results in the same subsequent difficulty of accessing felicitous French

means of peripheral P-encoding.

In accordance with the exploratory event type hypothesis, results indicated that some of the learner type divergences were most pronounced in boundary crossing events. Thus, *across*-events elicited the lowest score of P-verbs relative to monolinguals and most occurrences of qualitative idiosyncrasies (*à travers*). *Into*-events gave rise to the highest rate of directionally used locative Z-expressions (*dans* 'in'). Thus, boundary crossing items elicit strongly divergent linguistic behaviour, in both of bilinguals' languages and in both tasks.

Returning to the main hypotheses for bilinguals' French, the findings are in line with the predicted overuse of crosslinguistically converging packaging strategies (C/M in V and P in OTH). However, the qualitative analysis showed that this bias did not always amount to reinforcing target-appropriate French satellite-framing options (e.g. *jusque* 'to'), but also comprised some idiosyncratic strategies, similar to L2 transfer phenomena. Thus, contrary to what structural ambiguity approaches would predict (Müller and Hulk 2001), bilinguals' satellite-framing structuring bias did not always favour the options that are strictly speaking acceptable in both languages. However, if we interpret idiosyncratic extensions of satellite-framing principles as a strategy of achieving maximal congruence between both language systems, our findings are compatible with bilingual convergence accounts (Bullock and Toribio 2004).

Contrary to the age-dependency hypothesis, the detected learner type differences do not fade out with increasing development. Surprisingly, some of the observed divergences, such as peripheral P-packaging, are even reinforced with age, as children acquire command over more formally complex means (specifically, gerunds and infinitival *pour*-constructions) that allow them to maintain the atypical satellite-framing packaging. This results in an interesting developmental disparity: Whilst with age, children's growing syntactic abilities (subordination)[20] allow them to produce increasingly target-appropriate responses on the grammatical level, children's use of these abilities to maintain satellite-framing preferences results in persistent target-deviations on the dis-

[20]I am aware that children already master some types of subordinate constructions, such as relative clauses, by age 3 (see e.g. Diessel 2004). 'Subordination' in the present context refers to the specific types of subordinate clauses typically used in French for motion event descriptions, i.e. gerunds and infinitival *pour*-clauses.

course level.

7.2.5 Summary: Information Packaging

The present investigation of bilinguals' information packaging tendencies yielded the following findings. Contrary to the unidirectionality hypothesis, the detected cross-learner divergences affected children's French as well as their English. Notwithstanding this bidirectionality of results, the unidirectional hypothesis is nevertheless supported by the relative strength of learner type effects. Thus, the strongest and greatest number of cross-learner divergences occurred in French, where children's responses displayed a systematic bias for satellite-framing principles of information packaging. In contrast, the learner differences detected in bilinguals' English did not affect major typological principles of information distribution. Even though learner type effects were present in the English data, bilinguals' descriptions largely followed the typical satellite-framing tendencies.

A second important finding concerned the nature of learner type divergences detected. The predicted reinforcement of satellite-framing packaging options in French was indeed substantiated by our quantitative results indicating more frequent CM-encoding in the verb and almost exclusive P-packaging in OTH. However, the qualitative deviations that emerged in the context of peripheral P-marking undermine an analysis in terms of reinforcement of only those options that are crosslinguistically acceptable. Rather, the occurrence of infelicitous packaging strategies (*à travers*, P-gerunds), which parallel L2 learner transfer phenomena, indicate that such reinforcement may also have qualitative effects, resulting in bilinguals straying beyond the scope of acceptable target options. Given that participants were simultaneous bilinguals, such qualitative deviations from monolingual usage were not anticipated. However, they could be reconciled with an analysis in terms of maximisation of crosslinguistic convergence (Toribio 2004). On this account, we understand such maximisation as an active process in which bilinguals do not only overuse acceptable convergent options (in line with ambiguity theories, see Müller and Hulk 2001), but also actively enhance congruence by assimilating existing French op-

tions to meet the demands of satellite-framing information structure. In the present case, bilinguals' target-deviant packaging choices have the effect of extending the rather restricted range of available French satellite-framing strategies by making them more congruent with the systematic pattern available in English.

Finally, some of the detected cross-learner differences occurred in both languages and paralleled divergent findings for the VM task. These differences concerned bilinguals' stronger reliance on bare-verb utterances for event communication and a preference for P-communication via locative prepositional phrases (corresponding to Z-marking in OTH). The latter may reflect a stronger tendency in bilinguals to rely on contextually derived rather than explicitly verbalised information. These shared learner type differences also exhibited the same event-type sensitive behaviour, manifesting stronger divergences in boundary crossing event types of both tasks. Thus, the occurrence of these learner type differences in both languages and tasks (see VM task in chapter 6 for similar results) suggests that a more general bilingual production phenomenon may be at work.

The nature of crosslinguistic divergences observed has important implications for theories of CLI, forcing us to reassess some of the assumptions entertained about CLI in the context of simultaneous bilingualism. First, the findings for English showed that CLI is not confined to properties that are structurally and/or communicatively advantageous in a given task. Specifically, influence from more typically French ways of establishing Path-reference inferentially resulted in failure to communicate the intended meaning (e.g. the idiosyncratic directional use of *on the road*). Thus, an interpretation of CLI as a bilingual strategy exploiting the most crosslinguistically efficient options is not always compatible with the data. This means that predicting the directionality of CLI on the basis of structural properties may not be as straightforward as assumed by ambiguity accounts (Müller and Hulk 2001). Secondly, the unexpectedly persistent nature of cross-learner effects across all age groups undermines the assumption that CLI in simultaneous bilinguals is necessarily a transitory phenomenon and that bilinguals uniformly converge with monolingual adult norms with progressing age.

7.3 Semantic Density

Semantic Density was defined as the total number of semantic components encoded by children's target responses. The task presented children with a multitude of semantic components, which represented a linguistic challenge, since the encoding of all semantic components simultaneously requires syntactically complex structures. However, the availability of compact finite constructions in English allows a less costly integration of several components than in French and may hence invite bilinguals to draw to a greater extent on satellite-framing linguistic strategies to achieve more comprehensive event descriptions.

Responses could maximally express five semantic components: **C**ause, **P**ath, and three types of Manner, comprising **MAc**, **MAg**, and **MOb**. Consequently, Semantic Density could range from zero to five components. However, maximal response density was extremely rare (see (123) for the only occurrence). Likewise, responses encoding four elements, although more numerous, were too scarce to constitute a separate category for statistical purposes. Therefore, descriptions expressing three or more elements were subsumed under the category *SD3/+*, as in (124) (four components) and (125) (three components). The remaining categories *SD2* (two components), *SD1* (one component), and *SD0* (mere motion) are illustrated in (126)–(128).

(123) Mister Popi was # **walking [MAg] down [P]** # the # hill # in the mountains, **pushing [C + MAc]** the # suitcase which was # **sliding [MOb] downhill [P]**.[21] **[SD5]**[E10]

(124) Popi **pousse [C + MAc]** la roue # qui **tourne [MOb]** pour
Hoppy pushes the wheel # which turns to
monter [P] la colline de sable.
ascend the hill of sand.
'Hoppy's pushing the turning wheel to go up the sand hill.' **[SD3/+]**[F08]

(125) He **rolled [C + MOb]** the beach ball **down [P]** the hill. **[SD3/+]**[EB06]

(126) He **walked [MAg] down [P]**. **[SD2]**[EB04]

[21]Multiple mentions of the same semantic component, as well as subtypes of P, were only counted once.

(127) Il **descend [P]** avec le ballon.
He descends with the ball.
'He's going down with the ball.' **[SD1]**[FB04]

(128) Il est allé sur la rue.
He is gone on the road.
'He's gone on the road.' **[SD0]**[FB04]

Statistical analyses consisted of three-way independent ANOVAs, which examined the effects of Age, Language and Learner Type (and interactions) on scores of all four density categories (*SD0–SD3/+*). The results are presented in section 7.3.2. Subsequently, two-way independent ANOVAs were carried out within each language separately, presented in sections 7.3.3 (English) and 7.3.4 (French).

7.3.1 Predictions for Semantic Density

Given the crosslinguistic differences with respect to the joint codability of multiple information types, English descriptions were expected to be denser than French responses, irrespectively of learner group, generating a main effect of Language. General cognitive development was expected to result in a main effect of Age: Both monolinguals' and bilinguals' descriptions in both languages should become denser with increasing age, reflecting both their growing representational capacities and syntactic abilities. Learner Type was predicted to affect children's semantic density in accordance with Information Packaging (see 7.2.2), resulting in a unidirectional divergent pattern. Consequently, cross-learner effects were expected to be mainly restricted to French, giving rise to an interaction effect between Language and Learner Type. This effect was expected to manifest itself as a boost of semantic density within French only, allowing bilinguals to express more information types than corresponding French monolinguals. Furthermore, the factor of Learner Type was hypothesised to interact also with Age. With progressing age, the bilingual advantage in semantic density was expected to diminish, as monolingual French children acquire the syntactic means that enable them to achieve equivalent density levels. As a result, the learner type divergence was hypothesised to weaken as age

increased.

7.3.2 Effects of Language, Learner Type and Age

Figure 7.10 provides a comparative illustration of frequencies[22] (age groups collapsed) of Semantic Density categories exhibited by bilinguals' and monolinguals' responses in English and French. First, a crosslinguistic comparison of

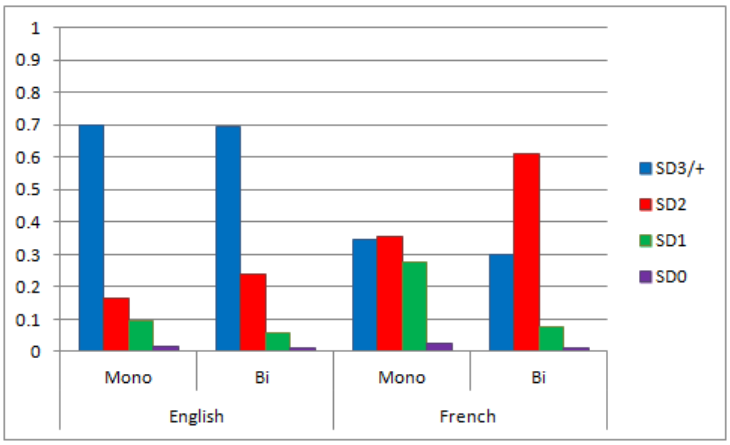

Figure 7.10: CM Semantic Density in English and French L1 and 2L1, ages collapsed

English and French confirms the predicted main effect of Language (scores of SD3/+: $F(1,176) = 114.93$, $p < 0.001$). Thus, irrespectively of learner type, English responses are denser than French descriptions, featuring a significantly higher proportion of SD3/+ descriptions (L1: 69.92%, 2L1: 69.59%) than the French data (L1: 34.7%, 2L1: 29.83%). Conversely, lower-density responses occur significantly more frequently in French than in the English data, which was the case both for SD2 ($F(1,176) = 86.14$, $p < 0.001$) and for SD1-responses ($F(1,176) = 25.53$, $p < 0.001$).

Secondly, main effects of Age were obtained for all density categories, substantiating the hypothesis that semantic density increases developmentally independently of learner and language group. Accordingly, high-density SD3/+

[22]Percentages of each density category are calculated relative to the total number of responses.

responses increased significantly in both languages and learner types ($F(3,176) = 20.13$, $p < 0.001$), whilst all lower-density descriptions displayed a significant decline with age: SD2-scores: $F(3,176) = 6.45$, $p < 0.001$, SD1-scores: $F(3,176) = 12.15$, $p < 0.001$, SD0-scores: $F(3,176) = 8.8$, $p < 0.001$.

Third, analyses revealed two main effects of Learner Type, indicating that SD2-responses were significantly more frequent in bilinguals overall ($F(1,176) = 30.44$, $p < 0.001$) and conversely, SD1-descriptions less frequent than in monolinguals ($F(1,176) = 24.52$, $p < 0.001$). Unexpectedly, these results were significant across both language groups, suggesting that learner type effects were not strictly unidirectional. Nevertheless, interaction effects between Language and Learner Type indicated that these cross-learner divergences were much stronger in French than in English (SD2: $F(1,176) = 8.77$, $p < 0.004$); SD1: $F(1,176) = 24.52$, $p < 0.001$), in line with the weaker version of our unidirectionality hypothesis. Contrary to predictions, the Learner Type factor did not interact with Age. This means that the obtained cross-learner differences do not significantly diminished with age, as we would have expected on the basis of our age-dependency assumption. For a closer examination of the detected Learner Type effects, the following sections provide a comparative cross-learner analysis within English (7.3.3) and French (7.3.4) separately.

7.3.3 English results for Semantic Density

Figures 7.11 (A) and (B) illustrate the development of response density in both learner types for English. In line with typological expectations, bilinguals and monolinguals mainly produce high-density motion descriptions, expressing three or more components jointly (on average, SD3/+ in 2L1: 69.59%, L1: 69.92%), from as early as age 4 (2L1: 49.21%, L1: 48.69%).

A qualitative look at SD3/+ responses confirms our earlier findings on Information Packaging (7.2.3), showing that children's early achievement of high-density responses is indeed due to their frequent use of easily accessible compact structures. These constructions allow children to combine finite C+M-verbs with P-satellites and hence to express three components simultaneously without having to resort to formally complex constructions. Typically, such

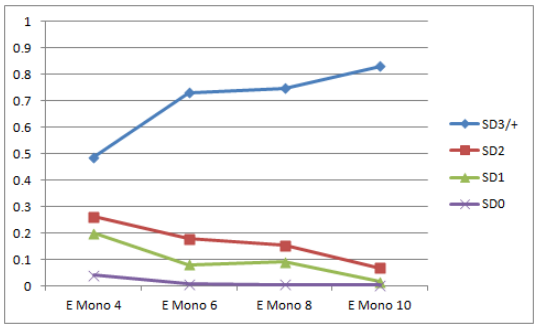

Figure 7.11 (A): Monolinguals

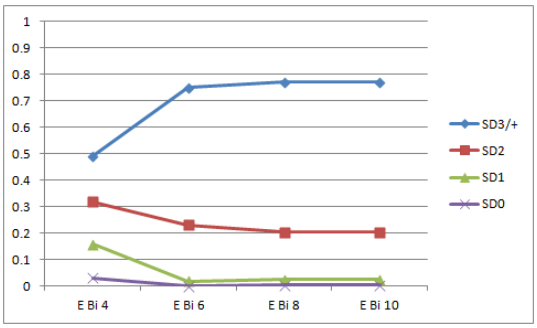

Figure 7.11 (B): Bilinguals

Figure 7.11: CM L1 and 2L1 Semantic Density in English as a function of age

responses consist of verbs conflating C and MAc in the verb (*push*, *pull*) with particles and prepositions expressing P, as illustrated in (129).

(129) He **pushed [C + MAc]** the ball **down [P]** the hill. [SD3/+][EB10]

Within the category of SD3/+, those responses that expressed more than three components jointly (SD4) did so by means of syntactic subordination. However, SD4-responses are extremely rare before age 10, and even then only make up a very slim minority (2L1: 2.86%, L1: 4.94%). In such cases, children of both learner types typically embedded C+MAc via a participial clause, in combination with a finite verb expressing the agent's Manner of movement (MAg) and a P-satellite, as shown in (130).

(130) He **walked [MAg] up [P]** the roof top of the house **pushing [C + MAc]** the present. [SD4][EB10]

English SD3/+ responses increased developmentally in both monolinguals and bilinguals, giving rise to a main effect of Age obtained by an ANOVA within the English data ($F(3,88) = 7.98$, $p < 0.001$). A post-hoc Bonferroni test revealed that the increase was significant between the ages of 4 and 6 ($p < 0.01$) in both learner types (age 4: 2L1: 49.21%, L1: 48.69%; age 6: 2L1: 75%, L1: 73.18%), but plateaued thereafter (age 8: 2L1: 77.08%, L1: 74.74%; age 10: 2L1: 77.08%, L1: 83.07%).

Conversely, low-density responses expressing only one (SD1) or no relevant information component (SD0) are relatively rare in English descriptions (on av-

erage: SD0 in 2L1: 0.91%, L1: 1.43%; SD1 in 2L1: 5.59%, L1: 9.7%). SD1-responses are mainly confined to the youngest age group (age 4: 2L1: 15.88%, L1: 20.05%), but decrease radically thereafter (age 6: 2L1: 1.82%, L1: 8.07%), as emerges clearly from Figures 7.11 (A) and (B), yielding another significant age effect ($F(3,88) = 7.28$, $p < 0.001$). When 4-year-olds use SD1-responses, the information type encoded varies depending on learner type. Bilingual 4-year-olds' SD1-responses mainly comprised P-only expressions (78.68% of all SD1), such as in (131) and (132), whilst monolingual 4-year-olds also used C-only expressions almost as frequently as P-only (C only: 46.75%, P only: 48.05%). Such C-only expressions corresponded to a variety of verbs, such as the transitively used *to move*, illustrated in (133), but other semantically vague high-frequency verbs such as *to put*, *to take*, and *to carry* also occur. By comparison, SD1-responses encoding C-information only, are extremely rare in bilinguals' English (only 5 instances in total).

(131) He's **crossing [P]** the road with the pram. [SD1][EB04]

(132) He goes **up [P]** # his house. [SD1][EB04]

(133) He's **moving [C]** it in the cave. [SD1][E04]

With respect to responses encoding two information types simultaneously (SD2), statistical analysed detected an unexpected learner type effect. Whilst SD2-descriptions decline with age irrespectively of learner type (significant age effect: $F(3,88) = 3.05$, $p < 0.04$), an ANOVA reveals that bilinguals produce SD2 significantly more frequently (23.89%) than monolinguals (16.6%) ($F(1,88) = 4.06$, $p < 0.05$). Our qualitative analysis shows that this ties in closely with the detected learner type difference for Information Packaging, which indicated a bilingual preference for the CM-Z pattern (see 7.2.3). Thus, the cross-learner divergence with respect to SD2-responses corresponds to bilinguals' preference for descriptions that either rely on C+M verbs only (mostly *push* and *pull*) or combine these verbs with Z-satellites, such as locative prepositions (e.g. *on the roof*), which did not count towards any of the relevant motion components and hence also contributed to the SD2-category. A mixed ANOVA tested whether the cross-learner difference in frequencies of SD2 was dependent on Event Type and revealed a significant interaction effect (Event Type* Learner Type: F(3,

282) = 6.72, $p < 0.001$). Follow-up tests located the learner type effect within *into*-events only. This means that it is only in response to *into*-events that bilinguals produce significantly more SD2-descriptions ($p < 0.002$). Qualitatively, children's *into*-descriptions suggest that this difference corresponds to bilinguals' dominant use of the locative preposition *in*, which was coded as Z (see 7.2.3). In combination with C+MAc-verbs, the use of this preposition gave rise to a large number of SD2-responses, as illustrated in (134).

(134) He **pulled [C + M]** it **in [Z]** the cave. [SD2][EB08]

Connecting the development of SD2-responses with that of SD3/+, a comparison of Figures 7.11 (A) and (B) shows that monolinguals' stronger decline of SD2 (L1: age 8: 15.36%, age 10: 6.77% vs. 2L1: both age 8 and age 10: 20.31%) is accompanied by a more pronounced increase in SD3/+ descriptions (age 8: 74.73%, age 10: 83.07%) as compared to bilinguals (77.08% at both age 8 and 10). Although this difference does not amount to a significant interaction effect between Age and Learner Type, it does contribute to the general picture of slightly deviant developmental patterns: When we compare the developmental curves in Figures 7.11 (A) and (B), monolinguals exhibit slightly more pronounced age-related changes after age 8 as compared to bilinguals: Whilst monolinguals continue to show increases in response density, bilinguals reach a plateau by age 8, which is slightly below the level achieved by 10-year-old monolinguals.

In summary, bilinguals' English responses closely mirrored the density levels of monolinguals, both in terms of the relative frequencies of each response category and developmentally, in line with our predictions for English. In accordance with typological expectations, English responses by monolinguals as well as bilinguals exhibited high semantic density levels. From as early as age 4, children combine at least three information types (SD3/+) in their responses, owing to their use of low-cost compact constructions. Our learner type analyses only revealed few cross-learner differences. First, bilinguals were shown to produce significantly more responses expressing two information components (SD2) when describing *into*-events, which reflected their preference for CM-Z responses detected for Information Packaging. Secondly, when bilin-

guals used SD1-responses, they more frequently corresponded to expressions of P only, whereas monolinguals' descriptions also frequently focussed on C alone. In terms of overall development, bilinguals reached ceiling levels at age 8, stopping slightly short of the increase displayed by monolinguals.

7.3.4 French results for Semantic Density

By comparison with English findings, results for French show more dramatic developmental changes for both learner groups, in line with typological expectations, as illustrated in Figures 7.12 (A) and (B). Independently of learner type,

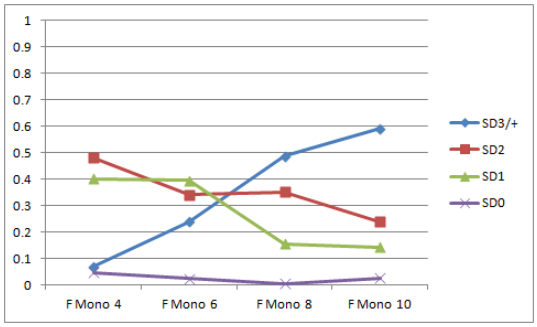

Figure 7.12 (A): Monolinguals

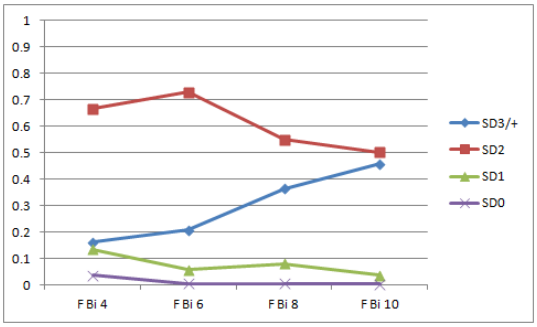

Figure 7.12 (B): Bilinguals

Figure 7.12: CM L1 and 2L1 Semantic Density in French as a function of age

children's production of high-density SD3/+ responses increase significantly with age, as evidenced by a main effect of Age ($F(3,88) = 13.97$, $p < 0.001$). In both learner groups, SD3/+ descriptions start off relatively infrequently at age 4 (2L1: 16.27%, L1: 7.03%), but by age 10 represent a predominant density category (2L1: 45%, L1: 59%). In line with this developmental increase, all lower-density response categories decrease significantly with age in both learner groups, resulting in the following main effects of Age: SD2: $F(3,88) = 3.69$, $p < 0.02$; SD1: $F(3,88) = 6.19$, $p < 0.002$; SD0: $F(3,88) = 3.39$, $p < 0.03$.

In accordance with learner type predictions, semantic density is strongly affected by children's bilingualism, resulting in main effects for both SD1 and SD2-responses: ANOVAs indicated a significantly higher frequency of SD2-responses overall in the bilingual data (2L1: 61.19% vs. L1: 35.35%; $F(1,88) =$

30.08, $p < 0.001$). Conversely, SD1-descriptions occurred significantly less frequently ($F(1,88) = 28.72$, $p < 0.001$) in bilinguals' (7.72%) than in monolinguals' (27.4%) French productions. A cross-learner comparison of the developmental curves for SD1 and SD2 in Figures 7.12 (A) and (B) indicates that the detected bilingual advantage in response density is age-dependent. Thus, in accordance with our prediction, bilinguals do indeed have a headstart in response density: At age 4, the majority of bilinguals' motion descriptions already combine two semantic components (SD2: 66.66% vs. L1: 48.17%), whilst monolingual peers still rely largely on responses communicating only one event component (SD1: 40.1%), which are comparatively rare in corresponding bilingual 4-year-olds' productions (13.38%). With increasing age, this cross-learner divergence diminishes as bilinguals' SD2-scores drop after age 6 (age 6: 72.89%, age 8: 54.95%, age 10: 50.26%) whilst monolinguals' SD1-descriptions decline steeply (age 6: 39.58%, age 8: 15.62%, age 10: 14.32%). This decrease of both density categories is directly related to children's rapid increase in high-density responses. Thus, the more children learn to express three or more semantic components (SD3/+) in their event descriptions, the less they rely on less informative response types, hence resulting in lower proportions of SD1 and SD2, which amounts to a gradual trend towards a levelling out of cross-learner divergences.[23]

Qualitatively, the initial density boost in the bilingual group is linked to the divergent tendencies observed in bilinguals' Information Packaging strategies (see 7.2.4), specifically children's preference for C+M-conflating main verbs, which automatically generates SD2 response density, even when young children produce simple bare verb utterances, as illustrated in (135).

(135) Il a **poussé [C + M]** la valise.
He has pushed the suitcase.
'He pushed the suitcase.' [SD2][FB04]

By contrast, when monolingual French children use bare verb utterances, they

[23]Nonetheless, even at age 10, scores of SD1 and SD2 still diverge significantly. Since the present study does not investigate bilingual development beyond age 10, we cannot tell whether the trend towards density approximation between the two learner groups continues after this age.

will most frequently choose to express P-information (see 7.2.4), as shown in (136), which accounts for monolinguals' higher score of SD1-responses in the younger age groups.

(136) Et bah il a **traversé [P]** la rue.
And well he has crossed the road.
'Well, he crossed the road.' [SD1][F04]

SD2-responses also displayed cross-learner differences with respect to the range of semantic combinations employed by children in the two learner groups and their frequencies,[24] which correspond to tendencies observed for Information Packaging (7.2.4). Figures 7.13 (A) and (B) illustrate that SD2-descriptions by bilinguals reflect a less varied choice of semantic combinations than in monolinguals, which holds across all age groups tested. Thus, in line with findings

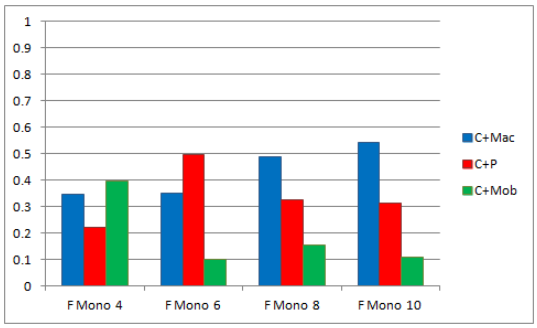

Figure 7.13 (A): Monolinguals

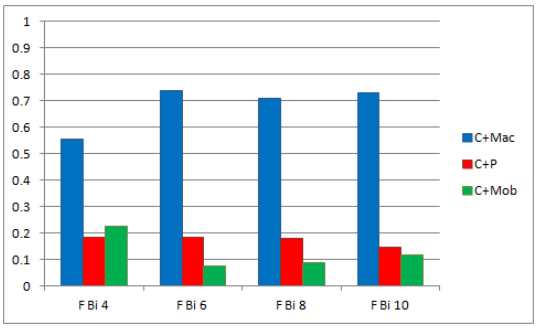

Figure 7.13 (B): Bilinguals

Figure 7.13: L1 and 2L1 French SD2-responses, ages collapsed

on Information Packaging, bilinguals' SD2-descriptions mainly reflect combinations of C with MAc. In the monolingual data, SD2-responses corresponded to a more diverse range of information combinations. Especially at age 4, monolinguals have a comparatively greater tendency to express C in combination with information about the object's Manner of motion (MOb: L1 age 4: 39.45% vs. 22.44% in 2L1), as illustrated in (137).

(137) <Il va> [/] il va **traîner [C +MOb]** le cheval de bois.
<He goes> [/] he go to-drag the horse of wood.

[24]These are calculated based on the total number of SD2-responses within each learner type.

He's going to drag the wooden horse.' [SD2][F04]

Independently of age, monolinguals' SD2-responses also more frequently correspond to combinations of C with P-information (on average: 33.97%) than in bilinguals (17.35%). Typically, such instances correspond to transitively used P-verbs, as shown in (138), or explicit causative constructions involving *faire* and an intransitive P-infinitive, exemplified in (139).

(138) Il a **monté** **[C + P]** quelque chose **sur [Z]** le toit de la maison.
He has ascended some thing on the roof of the house.
'He's taken something up on the roof of the house.' [SD2][F06]

(139) Popi il a **fait** **[C]** **descendre [P]** une brouette **en bas** **[Z]** d'une colline.
Hoppy he has made descend a wheelbarrow at bottom of-a hill.
'Hoppy made a wheelbarrow go down the bottom of a hill.' [SD2][F06]

Note that the above examples (137)–(139) demonstrate two typological packaging properties observed for French generally (see 7.2.4), which contribute to keeping density levels relatively low as compared to English speakers. First, both motion components typically appear in the main verb rather than in the periphery, in line with French speakers' observed strong reliance on verbs as information locus. Secondly, the locative prepositions used in (138) (*sur* 'on') and (139) (*en bas* 'at the bottom') demonstrate the French propensity observed earlier to leave certain information types to be inferred from the context provided by the surrounding utterance. Remember that the coding scheme only takes explicitly encoded information into account. Thus, a considerable proportion of SD2-descriptions in both learner types' French results from a combination of both packaging tendencies, the heavily verb-reliant information encoding and the propensity for implicit information reference in the periphery.

SD2-responses were also shown to be sensitive to the type of event verbalised in both learner groups, as revealed by a main effect of Event Type ($F(3,282) = 11.03$, $p < 0.001$). Mixed ANOVAs indicated that in both bilinguals and monolinguals, *into*-events elicited a significantly greater rate of SD2 than any other event type. This reflects the extremely frequent occurrence of the locative preposition *dans* ('in') in conjunction with C+M-verbs, illustrated in our

analysis of Information Packaging (7.2.4). This event-type specific behaviour not only ties in with the learner-type divergence observed for English SD2 *into*-descriptions (see 7.3.3), but also more generally confirms the special status of boundary crossing events, which repeatedly gave rise to divergent production patterns in our data and previous research alike.

A crucial finding concerns the absence of learner type differences regarding SD3/+ responses. As emerges from our analyses, the bilingual boost in density does not affect this high-density response type, which displays roughly similar frequencies (on average: 2L1: 29.83%, L1: 34.7%) and developmental patterns across both learner groups. This means that CLI does not in fact represent a communicative advantage for children in achieving the target density required for expressing the three core event components (C, P, M) relevant in the CM task. Thus, even though CLI from English packaging strategies initially results in the expected density boost, it does not confer an advantage on children for solving the specific communicative task at hand. This rather limited density advantage undermines our analysis of CLI as a communicative strategy. If this was the underlying motivation, we would expect children to exploit the less costly typically English strategies of satellite-framing means of P-encoding and hence achieve SD3-responses early on. That is, if we want to maintain an analysis in terms of strategic behaviour, we would have to concede that merely overusing C+MAc-verbs is not very effective for rendering complete linguistic event representations.

Another possibility to consider is that the coding scheme masks a bilingual boost in SD3/+ responses. Remember that findings for Information Packaging (7.2.4) indicated frequent attempts by children to express Path peripherally via locative prepositions ('Z'), which were however not coded as P-expressions due to their ambiguity. Recoding these intended directionals as P-markers may result in the expected boost in the relevant SD3/+ density category. However, this would necessitate an equivalent recoding of similar locative markers occurring in the monolingual data, which we refrained from in order to maintain comparability with the other subject groups.[25]

[25]Such recoding may simply result in boosting density levels in both learner types and hence dilute any potential cross-learner effects. Moreover, it would have required a distinction be-

In summary, bilinguals' French productions displayed an initial boost in semantic density, manifesting an early preference for encoding two semantic components (SD2) instead of only one (SD1). Furthermore, bilinguals' SD2-descriptions also differed from monolinguals in that they showed less semantic diversity of information combinations (mainly C+MAc), in accordance with results on bilingual Information Packaging. In line with typological expectations, high-density responses (SD3/+) increased dramatically in both learner groups, owing to children's increasingly productive command of complex subordinate constructions (see Information Packaging, 7.2.4). However, results indicated no bilingual advantage for the crucial density category of SD3/+, required for complete event descriptions. This restricted communicative benefit of English influence raises questions about the underlying motivation of CLI.

7.3.5 Summary: Semantic Density

Findings on Semantic Density in the CM task substantiated our main hypotheses regarding the factors of Language, Age and Learner Type. With respect to Language, response density in English productions of both learner groups was consistently higher than in French descriptions. From an early age, English motion descriptions by both learner groups mainly encoded three or more information components, while such high-density responses became productive much later in children's French development, and remained significantly less frequent across all age groups. As regards Age, responses showed the expected developmental density increase, which applied to both language and learner groups.

The results regarding the effect of Learner Type are more complex, partly substantiating and partly disconfirming our predictions. First, the unidirectionality hypothesis was confirmed in so far as cross-learner divergences occurred mainly within French, where they had the expected effect of initially boosting bilinguals' semantic density levels to SD2. Second, in line with the

tween expressions that are intended as directionals and those that are used locatively. Once we go beyond explicitly encoded semantic components, criteria for determining intended meaning inevitably introduce an undesirable subjective factor.

age-dependency expectation for CLI, this initial advantage levelled off soon after age 6 as a result of monolinguals' increasing use of high-density productions. However, contrary to unidirectionality predictions, cross-learner divergences also emerged within the English data, where bilinguals were found to use SD2-responses more frequently than monolinguals, thus mirroring the results for French. In both languages, bilinguals' significant preference for SD2-descriptions reflects the findings for Information Packaging, which indicated a stronger bilingual tendency in both languages to use C+M-conflating verbs either on their own (bare verb utterances) or in conjunction with no motion-specific information (CM-Z pattern). Moreover, results for French indicated no bilingual advantage for the crucial category of high-density SD3/+ responses, which undermines analyses of CLI in terms of a communicative strategy.

7.4 Utterance Architecture

Utterance Architecture refers to a combination of two structural dimensions of children's utterances:[26] Syntactic complexity, measured in terms of subordination, and compactness, taking account of the degree of structural integration vs. distribution (parataxis) of information (see 5.6.2 for more detailed definition). The coding distinguished four Architecture categories, which resulted from crossing the dimensions of complexity (distinguishing *loose* and *tight*) and compactness (either *simple* or *complex*): **TS** (Tight-Simple), **TC** (Tight-Complex), **LS** (Loose-Simple), and **LC** (Loose-Complex).[27]

Three-way independent ANOVAs tested the effect of Language, Age, and Learner Type and their interactions on frequencies of each of the four categories of Utterance Architecture (results in 7.4.2). Subsequent analyses within each language were performed to allow for a more detailed cross-learner comparison. Quantitative and qualitative findings for English (7.4.3) and French (7.4.4) are presented in the respective sections. Additionally, mixed ANOVAs with

[26] As laid out in chapter 5.6.2, Utterance Architecture was based on synthetic coding lines, which took into account not only the target response (basic coding lines), but also its structural relation to surrounding utterance elements.

[27] For examples of each category, the reader is referred to chapter 5.6.2.

Event Type as within-subject factor were carried out on the same dependent variables within French (in 7.4.4).

7.4.1 Predictions for Utterance Architecture

Given typological differences, a Language effect was expected, such that English utterances should feature tighter and less complex structures (more TS) than in French. Conversely, given that more complex constructions are required in French to achieve high-density responses, a larger score of complex response types (TC) were expected to occur in the French data. Due to general cognitive factors and children's growing syntactic abilities, main effects of Age were predicted, such that complex response types should increase (especially TC) with age, whilst loose structural categories (TS and LS) were expected to diminish. Language and Age were expected to interact with respect to TC-scores: Due to typological properties, French utterances were predicted to manifest a more dramatic developmental increase in TC than English responses, where TS should remain the predominant structural choice independently of age.

In line with unidirectionality predictions, the factor of Learner Type was predicted to interact with Language. Accordingly, cross-learner divergences were expected to occur only (strong hypothesis) or mainly (weak hypothesis) within the French data. Specifically, the expectation was that bilinguals would overuse the syntactically less costly structural choices that converged with the predominant English tendencies. Hence, a bilingual preference for TS-responses was expected for French, whilst bilinguals' English utterances were not expected to exhibit significant divergences from corresponding monolingual tendencies. Moreover, in accordance with age-dependency assumptions regarding CLI, a further interaction effect between Learner Type and Age was predicted for TS-scores within the French data. It was expected that bilinguals' overuse of TS-responses in French should diminish with age, as a result of children's acquisition of the more target-typical syntactic French tendencies (TC).

An exploratory hypothesis concerned the factor of Event Type and was based on the repeated observation of enhanced learner type divergences elicited by boundary crossing events. Accordingly, the possibility of an interaction

effect between Event Type and Learner Type was envisaged, such that *into* and *across*-events would trigger stronger CLI in bilinguals' French descriptions, manifesting more TS-responses than other event types.

7.4.2 Effects of Language, Learner Type and Age

Figure 7.14 below compares relative frequencies of each Architecture category in both languages and learner types.[28] As for the factor of Language, a com-

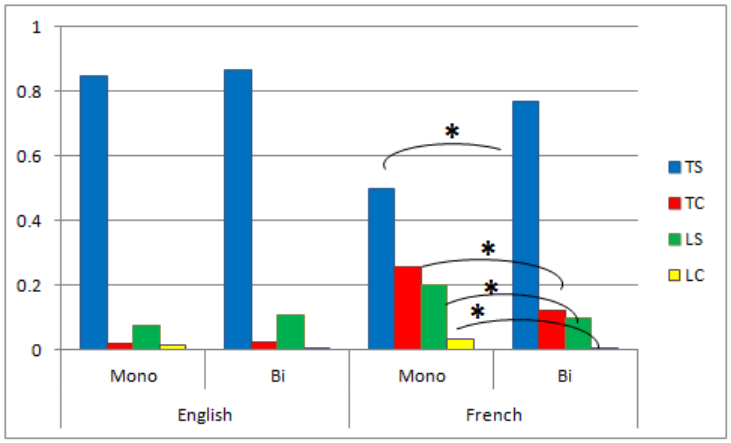

Figure 7.14: CM Utterance Architecture in English and French L1 and 2L1

parison between English and French demonstrates the expected crosslinguistic effect. Accordingly, TS-responses are significantly more frequent in English speakers of both learner groups (L1: 84.96%, 2L1: 86.52%) than in French (L1: 50%, 2L1: 76.75%), as evidenced by a significant main effect of Language on TS-scores ($F(1,176) = 80.04$, $p < 0.001$). Conversely, TC-responses occurred more frequently in the French data (L1: 25.78%, 2L1: 12.36%) than in English, where they were fairly marginal (L1: 2.01%, 2L1: 2.34%), in line with typological expectations ($F(1,176) = 95.46$, $p < 0.001$). Note that the more frequent occurrence of LS-responses in French also amounted to a Language effect ($F(1,176) = 11.91$, $p < 0.002$).

[28]Significant learner type effects are indicated by asterisks.

In accordance with unidirectionality predictions, cross-learner effects were indeed restricted to French, as indicated by the asterisks in Figure 7.14. This resulted in the expected interaction effects between Language and Learner Type regarding TS-frequencies ($F(1,176) = 30.99$, $p < 0.001$), indicating the predicted bilingual overuse (2L1: 76.75% vs. L1: 50%) and conversely, a significantly less frequent bilingual use of both TC (2L1: 12.36% vs. L1: 25.78%) ($F(1,176) = 14.59$, $p < 0.001$) as well as LS-structures (2L1: 10.09% vs. L1: 20.37%) ($F(1,176) = 16.77$, $p < 0.001$). On the other hand, Figure 7.14 demonstrates that Utterance Architecture in bilinguals' English productions remain unaffected by their bilingualism, manifesting no significant departures between the two learner groups.

ANOVAs also revealed the expected main effects of Age. Accordingly, irrespectively of language and learner group, complex responses increased developmentally, affecting both scores of TC ($F(3,176) = 17.04$, $p < 0.001$) and LC ($F(3,176) = 4.85$, $p < 0.004$). Conversely, TS-structures were shown to diminish significantly with age ($F(3,176) = 5.95$, $p < 0.002$). Analyses on TC-scores revealed the expected interaction effect between Age and Language ($F(3,176) = 9.36$, $p < 0.001$), indicating that this complex response type increased much more radically with age in French than in English.

7.4.3 English results for Utterance Architecture

Figures 7.15 (A) and (B) illustrate the development of Utterance Architecture in English responses by monolinguals (A) and bilinguals (B). The developmental curves as well as our ANOVAs within English[29] demonstrate close cross-learner parallels. In both learner types, TS-structures emerge as the clearly predominant choice from the earliest tested age (age 4: 2L1: 83.85%, L1: 94.27%). TS-responses show a slightly decreasing trend in both learner types, although this did not amount to a significant age effect ($p > 0.05$). Qualitatively, TS-responses corresponded to the typologically expected compact construction pattern of finite C/M-verbs, either in conjunction with P-satellites, as illustrated in (140), or used on their own, as was most frequently the case in 4-year-olds, as shown in (141). No qualitative differences were observed, neither between learner types,

[29]Age and Learner Type as between-subject factors.

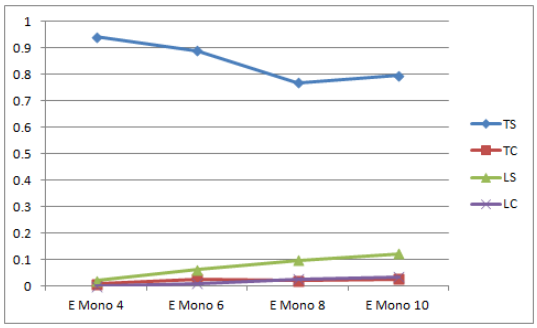

Figure 7.15 (A): Monolinguals

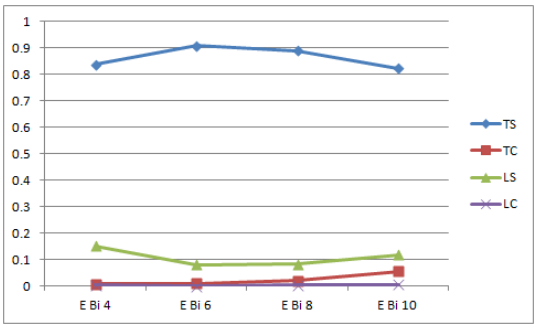

Figure 7.15 (B): Bilinguals

Figure 7.15: CM Utterance Architecture in L1 and 2L1 English as a function of age

nor across age groups.

(140) He's **pushing** the present **up** the roof. [TS][EB08]

(141) He's **pulling** it. [TS][EB04]

Compared to the overwhelming majority of TS-responses, other types of Utterance Architecture were fairly infrequent in English. Their use by both learner types is analysed in the following sections.

7.4.3.1 LS in English

Occasionally, LS-structures occurred, which showed a slightly (non-significant) increasing trend amidst monolinguals (age 4: 2.08%, age 6: 6.25%, age 8: 9.63%, age 10: 12.23%), but a more fluctuating developmental pattern in bilinguals, with highest LS-frequencies emerging in the youngest age group (age 4: 15.14%, age 6: 8.07%, age 8: 8.33%, age 10: 11.71%). Qualitatively, the majority of LS-responses reflect children's attempt to solve the complex communicative task by spreading various information types across coordinated main clauses. In both learner groups, one of the clauses typically involved a finite verb expressing C+MAc, whilst the second clause added another M-component, either focussing on the Object (MOb), as illustrated in (142), or on the Agent (MAg), as in (143). P-information is usually added via a satellite to either of these verbs, as in (142), or, in the case of younger children (< age 6), left out entirely, as shown in (143).

(142) He **pushes [C + MAc]** the wheel and it **turns [MOb] into [P]** the garage. **[LS]**[EB06]

(143) He's **walking [MAg]**. This time he's **pulling [C + MAc]** it. **[LS]**[EB04]

In some cases, LS corresponded to repetitions of a semantic component, which was elaborated in a second independent clause, either by adding further M-information (often adverbials), or a P-satellite. Both elaborations can be seen in (144), where the child's LS-utterance comprises three clauses, each repeating the same verb *to push*.

(144) So he's **pushing [C + MAc]** the cartwheel. Like, he's **pushing [C + MAc]** it **with two hands [MAc]** [...] # and he' s **pushing it [C + MAc] across [P]** the road. **[LS]**[EB10]

A qualitative difference between the two learner types' LS-responses occurred in the context of *across*-events. Whilst monolinguals' LS-responses typically scattered various types of M-components (with or without C-conflation) with a P-satellite usually added to one of the finite M-verbs, bilinguals occasionally devoted an entire clause to P exclusively (*to cross*), as exemplified in (145). Children's insecurity in using this verb, presumably reflecting infrequent occurrence in the English input, occasionally emerges in their idiosyncratic usage, as in (146), where the verb is seemingly modelled on the much more frequent preposition *across*. Note that such scattering of P and C/M-information across separate clauses is a typical discourse strategy in French children's motion productions (see (147) for illustration), as has been repeatedly observed in previous studies (Hickmann *et al.* 2009*b*, Ochsenbauer 2010).

(145) He **pulled [C + MAc]** the rocking horse and he **crossed [P]** the road. **[LS]**[EB04]

(146) <Hoppy pushed the> [//] **rolled [C + MOb]** the cartwheel and # **acrossed [P]** the road. **[LS]**[EB04]

(147) Et bah il a **poussé [C + MAc]** la [/] la roue de voiture. Il est
And well he has pushed the [/] the wheel of car. He is
rentré [P] dans la grotte.
entered in the cave.
'Well, he pushed the car wheel. He entered the cave.' **[LS]**[F04]

This discourse resemblance with French and the fact that such information distribution hardly ever occurs in the monolingual English data suggests that French discourse properties may affect bilinguals' English. This is supported by the fact that when English monolinguals occasionally devote a separate main clause to P-information, they typically encode P peripherally by means of a satellite, rather than in a verb, as in (148), thus following the more typical English structural choice.

(148) Ehm Hoppy went **across [P]** the road with his wheel and the wheel **span round [MOb]**. **[LS]**[E08]

As a further difference from monolingual usage, a certain number of bilinguals' LS-responses arise from failed attempts to produce an intended TC-structure. Thus, as (149) illustrates, bilingual children occasionally try to integrate C/M-information with a P-verb by subordination, as is more typical of French, but fail to find target-appropriate syntactic means of doing so in their English, as demonstrated by the hesitation and reformulations following the attempted subordinating conjunction *with*.[30] Subsequently, the child abandons the attempt to integrate information by syntactic embedding (TC) and instead opts for a more low-cost version of spreading information across two coordinated clauses, hence resulting in LS.

(149) So Hoppy **crossed [P]** the wet road # **with** [//] <and **with** dragging the> [//] and was **pulling [C + MAc]** <the rocking> [/] # the rocking horse. **[LS]**[EB08]

7.4.3.2 TC in English

Quantitatively, TC-structures only constituted a small proportion in both bilinguals and monolinguals (on average: 2L1: 2.34%, L1: 2.01%), but showed a slightly incremental trend in the bilingual data (age 4: 0.78%, age 6: 1.04%, age 8: 2.08%, age 10: 5.46%), which was absent in monolinguals after age 6 (age 4: 0.78%, age 6: 2.6%, age 8: 2.08%, age 10: 2.6%). From a qualitative perspective,

[30]The choice of *with* as a complementiser is interesting in itself, as it suggests an intended meaning of simultaneity of both information components, corresponding to the perceptual experience of motion events.

TC-responses displayed cross-learner deviations regarding the specific subordinate constructions used. First, monolinguals' TC-constructions almost exclusively consist of attributively used participial phrases, as shown in (150). Bilinguals' participial structures, on the other hand, are frequently preceded by the preposition *by*, as illustrated in (151), closely resembling the typical French gerundive construction. However, using *by* in this context without transparent instrumental meaning[31] is awkward in English and does not occur in the monolingual data. The construction appears to be motivated by direct CLI from the French gerund, which is the most frequently used type of TC-construction in French.

(150) He walked up the hill **dragging** a car behind him. **[TC]**[E10]

(151) He rolled the beach ball down **by pushing** it. **[TC]**[EB08]

Secondly, a further qualitative difference in TC-responses emerged in the context of boundary crossing events. When bilinguals described *across-* and *into*-events, they frequently used infinitival purpose clauses combining a light motion verb (e.g. *to go*) with P-encoding prepositions, as illustrated in (152) and (153). Note that these infinitival structures never occur in the monolingual data, but appear to be modelled on a French construction that was frequently observed in VM productions (see chapter 6), especially in bilinguals' responses to *across*-items. For comparison, a French example is provided in (154).

(152) He's pulling the pushchair **to go onto the other side of the road**. **[TC]**[EB10]

(153) He's just pulling the shopping trolley **to go into the garage**. **[TC]**[EB10]

(154) Le garçon # il est en train de nager dans l'eau **pour traverser**.
The boy # he is in course of to-swim in the-water for to-cross.
'The boy's swimming in the water in order to cross.' **[TC]**[FB08]

The close structural parallel with French and the absence of the construction in the English monolingual data once again suggest direct CLI from bilinguals'

[31]For a felicitous use of *by* with instrumental meaning: *The burglar managed to get in **by** climbing through the window.*

French.

7.4.3.3 Summary: English Utterance Architecture

In sum, the bilingual data featured no quantitative divergences from monolingual children with respect to the degree of complexity and compactness of motion descriptions, in line with predictions. However, our qualitative analysis revealed a few unexpected event-dependent divergences that suggest direct influence from frequent French construction types, particularly the gerund, but also to some extent infinitival purpose clauses. Furthermore, LS-responses occasionally manifested French discourse principles of distributing information types across separate clauses. Nevertheless, the great majority of bilinguals' syntactic structures closely followed monolingual usage.

7.4.4 French results for Utterance Architecture

In the French data, Utterance Architecture displays strongly divergent developmental patterns across the two learner types, illustrated in Figures 7.16 (A) and (B). This impression accords with our statistical analyses, which revealed

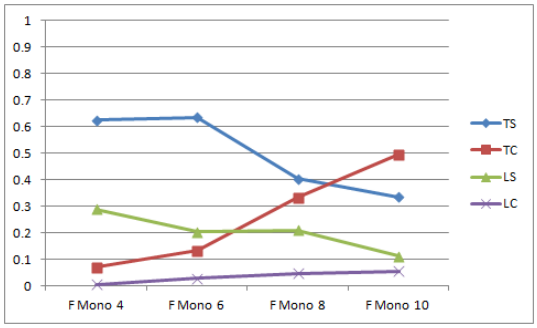

Figure 7.16 (A): Monolinguals

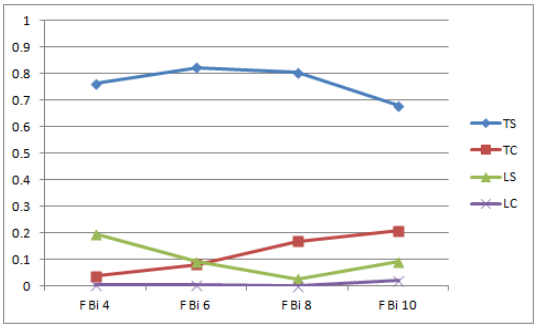

Figure 7.16 (B): Bilinguals

Figure 7.16: CM Utterance Architecture in L1 and 2L1 French as a function of age

significant Learner Type effects for all four response categories, analysed in what follows.

7.4.4.1 TS in French

In line with learner type predictions, results confirmed bilinguals' overuse of TS-structures ($F(1,88) = 37.89$, $p < 0.001$). As emerges clearly from comparing Figures 7.16 (A) and (B), this cross-learner divergence is already evident at the earliest tested age (age 4: 2L1: 76.3% vs. L1: 62.5%) and intensifies with age. This is due to a significant decline in TS-structures in monolinguals ($F(3,44) = 5.98$, $p < 0.003$) after age 6 (age 6: 63.54%, age 8: 40.36%, age 10: 33.59%), contrasting with an initial increase in the bilingual data, where TS-usage peaks at age 6 (82.29%), and exhibits a much weaker and non-significant decrease thereafter (age 8: 80.46%, age 10: 67.96%).

A qualitative examination of the data showed that TS-responses in both learner groups corresponded to two main categories. First, responses that only consisted of a finite verb, which were most frequent in 4-year-olds; secondly, finite verbs with peripheral additions, mainly prepositions and adverbials, which occurred frequently across all age groups. With respect to the first category, cross-learner differences converged with results on Information Packaging (see 7.2.4), indicating a bilingual preference for C/M-verbs (e.g. *Il tire le sac* 'He pulls the bag'), whilst monolinguals' bare-verb TS-responses mostly focussed on P alone (e.g. *Il monte* 'He goes up'). As regards the second category, peripheral information components added by bilinguals frequently comprised either locative expressions with implied P-meaning (as discussed in 7.2.4), as in (155), or P-prepositions (typically *jusque* 'to') expressing the goal (and sometimes the source) of motion in combination with a locative preposition, as illustrated in (156). Note that both TS-subcategories (locative or P-preposition) instantiate the crosslinguistically overlapping satellite-framing TS-structure and are hence compatible with an analysis in terms of indirect CLI.

(155) Il tire une chaise **dans** une grotte.
He pulls a chair in a cave.
'He's pulling a chair in a cave.' **[TS]**[FB08]

(156) Il tire sa voiture **jusqu'en haut** du toit de la maison.
He pulls his car to the-top of-the roof of the house.
'He's pulling his car all the way to the top of the roof of the house.'

[TS][FB06]

Both types of peripheral additions also occur in monolinguals, but they are not used as extensively, and they also frequently co-occur with P-verbs, as demonstrated in (157). Moreover, monolinguals' peripheral additions more frequently consist of comitative adverbials (*avec* 'with'), which are typically combined with P-verbs, as shown in (158).

(157) Il a **descendu** le coffre **jusqu'en bas** de la colline de neige.
He has descended the chest to-the bottom of the hill of snow.
'He brought the chest all the way down the snow-covered hill.' **[TS]**[F04]

(158) Popi il **descend** la colline **avec** sa malle.
Hoppy he descends the hill with his suitcase.
'Hoppy's going down the hill with his suitcase.' **[TS]**[F08]

Whilst the majority of bilinguals' TS-responses support an analysis in terms of covert CLI due to structural reinforcement, a minority of children's TS-responses elicited by *across*-items also suggest more overt CLI. These concerned cases in which children add the idiosyncratic P-satellite *à travers* (discussed at length in 7.2.4) to C/M-verbs to express the notion of boundary crossing peripherally. The use of this exisiting, but merely locative French preposition, is thus extended idiosyncratically by bilinguals to convey a directional interpretation, analagous to the equivalent English satellite *across*.

The other series of boundary crossing items, *into*-events, displayed a further anomaly. Thus, a mixed ANOVA with Event Type as within-subject factor revealed a significant interaction effect between Learner and Event Type ($F(2.6, 244.81) = 3.03$, $p < 0.04$), which indicated that *into*-events elicited the strongest learner type differences (although they were significant within each event type separately), hence, the highest scores of TS-structures relative to monolinguals. This finding converges with the interaction effects obtained for Information Packaging as well as Semantic Density and, likewise, reflects bilinguals' highly frequent combination of C/M-verbs with the locative preposition *dans* ('in') for *into*-event descriptions.

7.4.4.2 TC in French

In line with bilinguals' prominent overuse of TS-structures, all other response types occurred significantly less frequently in relation to monolinguals. In particular, this concerned TC-structures, which were not only less frequent overall ($F(1,88) = 13.76$, $p < 0.001$) in the bilingual data (on average: 2L1: 12.36% vs. L1: 25.78%), but also displayed a different developmental pattern. Thus, although TC-scores manifested a significant age-related increase in both learner groups (Age: $F(3,88) = 16.07$, $p < 0.001$), Figure 7.16 shows that monolinguals' TC-usage increases more sharply after age 6 (age 4: 7.03%, age 6: 13.28%, age 8: 33.33%) than in corresponding bilinguals (age 4: 3.64%, age 6: 8.07%, age 8: 16.92%).[32] Crucially, at age 10, TC has become the dominant construction in the monolingual data (TC: 49.47% vs. TS: 33.59%), whereas 10-year old bilinguals continue to use mainly TS-constructions (67.96%), with TC-frequencies remaining low by comparison (20.83%).

Qualitatively, TC-structures in both learner groups corresponded to two main constructions. In both bilinguals and monolinguals, the gerund was the most frequently employed TC-type and typically served to combine a finite P-verb with a C/M-encoding gerund, as illustrated in (159).[33] Infinitival goal-constructions, as shown in (160), represented the second main type of TC used by both learner groups. However, in contrast to the gerund, the subordinate semantic component was here typically P, or consisted of Z-coded attempts to express P implicitly, typically involving the light verb *aller* ('to go'), as shown in (161). Occasionally, children's TC-structures also corresponded to relative clauses, which typically served to express MOb in both learner groups, as in (162).

(159) Popi monte le toit **en poussant** un paquet cadeau.
Hoppy ascends the roof by pushing a parcel present.
'Hoppy's going up a roof pushing a present.' **[TC]**[FB08]

[32] Although this difference does not amount to a significant Age*Learner Type interaction effect.

[33] However, as discussed in 7.2.4, bilinguals also frequently used P-gerunds (e.g. *en traversant*), maintaining satellite-framing information packaging principles.

(160) Il pousse une valise # euh # **pour descendre** la colline.
He pushes a suitcase # err # for descending the hill.
'He's pushing a suitcase to go down the hill.' **[TC]**[FB10]

(161) Popi tire la chaise # **pour** # **aller dans** la grotte.
Hoppy pulls the chair # for # to-go in the cave.
'Hoppy is pulling the chair to go in the cave.' **[TC]**[FB10]

(162) Alors là i(l) traverse une route avec une roue **qui** **tourne** en
So there he crosses a road with a wheel which turns at
même temps sur elle-même.
same time on it-self.
'Well, there, he's crossing a road with a wheel which is spinning at the same time.' **[TC]**[F10]

Only slight learner type deviations were observed in the above illustrated use of TC-constructions. One concerns the extent to which children tend to combine the above constructions to form more complex structures involving more than one embedded element. Note that in both learner groups, such highly complex constructions only occur in the older age groups (8 and 10 years). A cross-learner analysis of TC-responses showed that monolinguals were more prone to combine several types of subordinate clauses, which allowed them to express a multitude of information elements at once. In these cases, children combined either gerunds with infinitival goal-constructions, as in (163), or added a relative clause to either of the latter constructions, as in (164). In contrast, TC-constructions with multiple subordinate clauses were extremely rare in bilinguals.

(163) Popi fait rouler le ballon **pour** le **faire** **descendre** **en** le
Hoppy makes roll the ball for it make to-descend by it
poussant.
pushing.
'Hoppy is rolling the ball to bring it down whilst pushing it.' **[TC]**[F10]

(164) Il traverse la rue **en poussant** la roue **qui** **roule** jusqu'à
He crosses the road by pushing the wheel which rolls to
l'autre trottoir.
the-other pavement.

'He's crossing the road whilst pushing the wheel which is rolling up to the other pavement.' **[TC]**[F08]

7.4.4.3 LS in French

Similarly to English results, a proportion of LS-responses in bilinguals' French data resulted from failed attempts to produce more complex TC-structures. Thus, (165) illustrates an 8-year-old bilingual's struggle to syntactically integrate C+MAc with P-information. After several unsuccessful reformulations of the initially produced infinitival P-clause, including an attempted adverbial *avec* ('with') as a subordinating conjunction,[34] the child abandons subordination and resorts instead to scattering information across two separate clauses, resulting in the obtained LS-response.

(165) Popi roule la poussette # **<pour traverser>** [//] # traverse la rue
Hoppy rolls the pushchair # <for to-cross> [//] # crosses the road
avec # **et** roule la poussette en même temps.
with # and rolls the pushchair at same time.
'Hoppy is rolling the pushchair # <to cross> [//] # he crosses the road with # and rolls the pushchair at the same time.' **[LS]**[FB08]

However, the great majority of LS-responses reflect a low-cost strategy of communicating several information types when syntactically more complex means are not yet mastered by children of either learner type. Accordingly, LS-responses are most frequent at age 4 in both monolinguals and bilinguals (L1: 28.9% vs. 2L1: 19.53%) and decline thereafter (L1: age 10: 11.19%, 2L1: 9.11%), as more complex response structures are acquired. Given the overwhelming preference for TS-responses detected in the bilingual data, bilingual children rely less on LS-structures overall than corresponding monolinguals, as confirmed by a significant Learner Type effect ($F1,88) = 11.56$, $p < 0.002$). From a qualitative perspective, LS-responses are very similar across learner groups in that they primilarly serve to communicate various event components by distributing them across several coordinated or juxtaposed clauses, as illustrated

[34]Interestingly, this mirrors idiosyncratic subordination attempts in bilinguals' English data. See (149) for an example using *with*.

in (166).

(166) Il l'a **roulée [C + MOb]**. Il l'a **poussée [C + MAc]**. Il l'a **montée [C + P]**.
He it-has rolled. He it-has pushed. He it-has ascended.
'He rolled it. He pushed it. He took it up.' **[LS]**[FB04]

When LS-responses comprise only two clauses, one of them typically expresses P, whilst the other one encodes information regarding C/M, as shown in (167). In the case of bilinguals, biclausal LS-responses also frequently focus on two different types of M, rather than P, most typically by conflating C/MAc in one clause and conveying MOb (on its own or conflating C) or MAg in the other, as shown in (168). In line with findings on bilinguals' Information Packaging, the P-component is often either not represented at all, as in the last example (168), or covertly in the form of a locative peripheral expression coded as Z, as in (169).

(167) Popi **pousse [C + MAc]** la table et **rentre [P]** dans la garage.
Hoppy pushes the table and enters in the garage.
'Hoppy pushes the table and goes into the garage.' **[LS]**[F08]

(168) Là il **marche [MAg]** et il **tire [C + MAc]** la chaise.
There he walks and he pulls the chair.
'Here he's walking and he's pulling the chair.' **[LS]**[FB06]

(169) Il **pousse [C + MAc]** une bouée et la bouée elle **roule [MOb] en haut [Z:Loc]** de la colline.
He pushes a floating-tyre and the floating-tyre it rolls at top of the hill.
'He's pushing a floating tyre and the floating tyre is rolling on top of the hill.' **[LS]**[FB06]

Thus, when LS-structures reflect children's intention to convey several event components, bilingual children show a slightly greater concern for communicating the various M-types involved, either in addition to or instead of P-information.

7.4.4.4 LC in French

The category of LC-constructions was marginal in both learner groups' French descriptions (L1: 3.38%, 2L1: 0.65%). Nevertheless, the virtual absence of this response category in the bilingual group gave rise to a significant learner type difference, indicating a more frequent occurrence in monolinguals ($F(1,88) = 15.93$, $p < 0.001$). Furthermore, ANOVAs revealed an increase in LC-responses with age independently of learner type ($F(3,88) = 3.21$, $p < 0.03$), in line with the developmental increase in complex structures more generally (see TC). Qualitatively, LC-responses exhibited no learner type differences. In both groups, LC often appeared to result from the semantic complexity of the task design, which made complete event descriptions by means of tight structures difficult, as it would require cumbersome multiple subordinate clauses. Accordingly LC-responses often reflected attempts by children to convey a further event component by adding a coordinated/juxtaposed simple clause to a tight complex one, as illustrated in (170).

(170) Popi **fait tourner [C + MOb]** la roue et **traverse [P]** la rue
Hoppy makes roll the wheel and crosses the road
en la **poussant [C + MAc]** toujours.
by it pushing always.
'Hoppy is rolling the wheel and crosses the road whilst still pushing it.'
[LS][FB10]

7.4.4.5 Summary: French Utterance Architecture

To summarise, bilinguals' Utterance Architecture in French descriptions diverged radically from monolinguals'. Divergences concerned both a quantitative overuse of crosslinguistically acceptable TS-structures, but also qualitatively deviant overextensions of satellite-framing patterns, suggesting both indirect and direct CLI. In line with exploratory hypotheses, *into*-events elicited the strongest learner type divergences and hence significantly higher TS-scores. Contrary to Age predictions, bilinguals' overuse of TS-responses was not only developmentally persistent, but also intensified with age.

7.4.5 Summary: Utterance Architecture

Analyses of bilinguals' and monolinguals' Utterance Architecture substantiated the main hypothesis regarding the factors of Language, Age and Learner Type. With respect to Language, English and French motion descriptions displayed the expected typological difference in syntactic complexity: Tight simple structures were more frequent in English than in French, independently of learner type. In line with Age predictions, complex constructions (TC and LC) increased in both learner and language groups with development. TC-scores also displayed the predicted Language and Age interaction, indicating a more prominent developmental increase of complex construction types in French than in English.

The Learner Type factor gave rise to the expected unidirectional bilingual overproduction of TS in French. However, our qualitative analyses relativise this unidirectional outcome, suggesting more complex interactions. Whilst quantitative divergences were indeed restricted to the French data, our examinations indicate that English structures are also qualitatively affected by French, hence suggesting bidirectionality of interactions. Thus, specific complex French constructions, such as the gerund, exert an influence on bilinguals' syntactic choices in English (e.g. *by pulling it*), frequently producing target-deviant effects. These findings not only invalidate the unidirectionality hypothesis, but also undermine its underlying assumption. The fact that patterns are evidently subject to CLI that are neither crosslinguistically felicitous (i.e. no overlap), nor necessarily structurally less costly (e.g. the gerund), demonstrates that a reassessment of purely language-systemic criteria such as Structural Ambiguity and costliness (formal complexity) is required.

In line with exploratory hypotheses, the identified cross-learner divergences were sensitive to Event Type. Thus, quantitative cross-learner differences were amplified in the context of boundary-crossing events (more TS-responses in *into*-events), whilst qualitative divergences mainly emerged in response to *into*- and *across*-events (e.g. gerund calques, such as *by pushing*). This mirrors the similarly event-sensitive findings obtained for other dimensions of the present analysis (for Information Packaging, see 7.2, and for Semantic Density, 7.3).

7.5 Summary: Caused Motion in 2L1 and L1

The chapter investigated bilinguals' developing expression of caused motion events in relation to monolinguals'. Our results support the unidirectionality hypothesis insofar as the most striking cross-learner divergences are indeed restricted to French. The detected divergences exhibit the expected characteristics. Thus, bilinguals display a strong bias for information packaging strategies more typical of English, particularly with respect to their tendency to express Manner and/or Cause within rather than outside the verb. This departure from monolinguals' packaging strategies is furthermore reflected in bilinguals' initial boost in semantic density as well as their syntactic preference for tight simple utterance architecture. However, contrary to unidirectionality assumptions, our analyses also revealed deviations in children's English. This finding is surprising not only due to the implication of bidirectionality of CLI, but also because the identified divergences revealed a number of shared tendencies that emerged in both of bilinguals' languages.

First, with respect to quantitative divergences, bilinguals in both English and French showed a preference for the CM-Z pattern, i.e. for combining verbs conflating Cause and Manner (e.g. *push*) with either no motion-specific (e.g. locatives) or no information (bare verbs). Related to this, a further shared bilingual divergence concerns encoding preferences in the verbal periphery (OTH). Thus, bilinguals in both languages frequently use OTH to encode locative rather than explicitly directional meaning. Moreover, the tendency to rely on pragmatic inference is not only present in both of bilinguals' languages, but also mirrors our findings for the VM task (chapter 6). Implications of these language- and task-convergent findings for bilingual-specific production behaviours are discussed in chapter 8.

Our qualitative analyses revealed a number of unexpected deviations which raise questions about the underlying mechanisms and status of CLI. As regards the French data, children's descriptions manifested some striking parallels with adult L2 transfer phenomena: This consisted mainly in bilinguals' imposition of satellite-framing information structure on French devices, even when doing so produced atypical or even infelicitous utterances. Notably, this

concerned the idiosyncratic 'satellization' of existing French locative prepositions (*à travers*) and the frequent use of subordinate clauses to encode Path. In English, we found instances of calques of French locative expressions (e.g. *on the other side of*) which are used infelicitously by children to elicit Path inference. Even though neither of these qualitative divergences are grammatically incorrect, they nevertheless demonstrate that even in simultaneous bilingualism, CLI can give rise to target-deviant phenomena similar to L2 learning. This and the fact that the detected deviations are neither crosslinguistically felicitous nor advantageous for solving the task at hand undermine our assumptions regarding the factors governing CLI.

As regards the factor of Age, our prediction that CLI would decline with age was only partly met. With respect to Information Packaging and Utterance Architecture, we found that, contrary to predictions, both quantitative and qualitative learner type differences were persistent and in some cases even intensified with age (e.g. satellite-framing encoding of Path). Our qualitative examination suggests that this rather surprising finding is linked to the fact that children's developing linguistic skills, especially their increasingly productive command of complex structures, enables them to exploit a wider variety of linguistic means to maintain satellite-framing information distribution. In contrast, our findings on Semantic Density developments substantiated the age-dependency hypothesis. Thus, the initial density advantage in French soon declines after age 6. Furthermore, the fact that high-density descriptions (SD3/+) are not affected implies that CLI is of rather limited advantage for solving the task at hand. This in turn undermines an interpretation of CLI as a strategic tool for solving linguistic tasks.

In keeping with our task-dependency predictions, the divergences observed in the present task were much stronger than those in the VM task. However, the nature of CLI, specifically the lack of an associated advantage for tackling the communicative task, suggests that the obtained task effect is not directly related to complexity (number of semantic components), as we had originally assumed. Implications of this and the above findings will be discussed in the following concluding chapter.

Chapter 8
Conclusions

This thesis investigated the impact of typological factors on the developing expression of motion events in the context of simultaneous bilingualism. The particular focus was on crosslinguistic interactions (CLI) and to what extent their occurrence and directionality was affected by typological properties and the factors of age and task complexity. The larger aim of this study was, on the one hand, to elucidate underlying speech production processes guiding the development of two languages from birth, and on the other hand, to contribute to our understanding of the role typological factors play in the acquisition and choice of linguistic means to express fundamental cognitive domains.

To this end, bilinguals and monolinguals were tested in a cross-sectional study across two production tasks of varying semantic complexity: a simpler voluntary motion and a more complex caused motion task. Bilinguals' event descriptions were analysed in relation to monolingual control groups across various dimensions. Quantitative and qualitative measures included the linguistic devices used for information encoding (information packaging), the number of information components expressed (semantic density), and their syntactic complexity (utterance architecture). CLI were predicted to exhibit the characteristics reiterated below:

Unidirectionality: CLI mainly (weak hypothesis) or exclusively (strong hypothesis) affects French

Task-dependency: CLI mainly (weak) or exclusively (strong) occurs in the caused motion task

Age-dependency: CLI diminishes or disappears with progressing age

In the following sections, findings of the present study are summarised and discussed with respect to each hypothesis (8.1), followed by a presentation of more global implications (8.2). We conclude this chapter with a presentation of limitations and shortcomings of the study and how these can be addressed by future research (8.3).

8.1 Discussion of main findings

In this section, we summarise and discuss results more globally as they pertain to each of our main hypotheses regarding directionality (8.1.1), the effects of age (8.1.2) and task (8.1.3), as well as unexpected bilingual-specific patterns (8.1.4). As a general remark, bilinguals' motion descriptions displayed manifold and complex discrepancies from monolingual production patterns, in both tasks and languages. Some of our findings are in accordance with our predictions. This mainly concerns the asymmetry of learner type effects with respect to directionality and task. Other findings are unexpected and do not neatly fall within the scope of our hypotheses.

8.1.1 Unidirectionality or bidirectionality?

Directionality predictions (see 5.8) were based on language-specific considerations pertaining to the English and French motion systems regarding the degree of variability, systematicity and formal complexity typically exhibited. Therefore, results were expected to reflect the impact of typological properties. The findings indicated a complex bidirectional, but nevertheless asymmetrical pattern of CLI. The weak version of our unidirectionality hypothesis was borne out: The most striking cross-learner discrepancies are indeed found in the French data. Thus, bilingual's French motion descriptions diverged drastically from monolinguals', particularly in the caused motion task (see 8.1.3). Specifically, most of these divergences reflected an overproduction of crosslinguistically available encoding strategies in French[1], consistent with a struc-

[1]This concerned mainly encoding in the verb.

tural overlap account (Müller and Hulk 2001). However, qualitative analyses showed that the bilingual effects were not restricted to a mere reinforcement of options acceptable in both languages, but also reflected qualitative differences from monolingual usage. This finding is hard to reconcile with a structural overlap analysis, as they demonstrate that CLI can occur even in the absence of crosslinguistic congruence.[2] Moreover, learner type discrepancies also emerged in our English data, which disconfirms the strong version of the unidirectional hypothesis.

The bidirectionality and quality of results have implications for our understanding of CLI and its effects on simultaneous bilingual development. They demonstrate that CLI can result in target-deviant production patterns that are sometimes akin to L2 phenomena, an outcome that was not anticipated in simultaneous balanced bilingualism. Secondly, they show that language-specific properties alone are not sufficient to accurately predict the directionality of CLI. In our case, the asymmetric directionality of learner type effects could be attributed to the overlap of satellite-framing lexicalisation strategies, but on its own, this factor is not sufficient to account for the full range of bidirectional interactions observed.

This leave us with the question as to whether other language-specific properties guide the interactions detected or whether entirely different non-structural factors (e.g. pattern frequency, input) are better predictors of directionality. In this thesis, I have argued that the detected bilingual effects most neatly fit an analysis in terms of Bullock and Toribio (2004)'s re-defined notion of *convergence* as "the enhancement of inherent structural similarities found between two linguistic systems" (Bullock and Toribio 2004:1). Crucially for the present purpose, convergence is a process driven by language-specific structural factors, but from the perspective of the bilingual learner. Thus, what is susceptible to CLI are patterns in the two languages that are *perceived* by the bilingual to be similar, but that do not necessarily constitute a case of formal overlap.

[2]However, note that the structural overlap hypothesis, as it was originally formulated by Hulk and Müller (2000), applies to formal grammatical properties, whereas the discrepancies detected in our data relate to speech characteristics going beyond a purely grammatical level. As such, our findings do not invalidate the theory's predictive power for formal grammatical investigations.

According to this account, bilinguals maximise existing parallels between the two languages both quantitatively, resulting in "the preferential use of some structures over other options" (Toribio 2004:167), and qualitatively, by actively assimilating parallel patterns.

Crucially, a convergence analysis can account for both the overproduction of crosslinguistically felicitous patterns we observed (i.e. the overuse of satellite-framing organisation principles), but also for the more problematic qualitative target deviations. From a convergence perspective, such idiosyncrasies arise when similar but non-identical linguistic properties are over-extended to contexts in the other language which do not meet the required language-specific discourse-pragmatic constraints. In our data, this concerned the target-deviant satellization of French prepositions (*à travers*), which are over-extended to directional contexts, thus violating the boundary-crossing constraint that operates in French. But this also applies to deviant encoding strategies detected in children's English, such as the expression of Cause and Manner in gerund-like structures (e.g. *by pushing*), which seizes on a perceived parallel with English participials and assimilates them to the French gerundive pattern. In both cases, bilinguals' violations of semantic or discourse-pragmatic principles have the effect of actively reinforcing already existing similarities between the two languages, and hence result in maximised crosslinguistic convergence.

Thus, the bidirectional, but strongly asymmetric pattern of CLI found in this study can be accounted for by the impact of inter-linguistic properties, that is, by the extent to which lexicalisation patterns of both languages are perceived as similar by bilinguals. Accordingly, bilinguals were found to overproduce patterns that work in both languages, resulting in a quantitative bias for satellite-framing information structure, and to loosen language-specific constraints for similar but non-identical encoding strategies, giving rise to qualitative discrepancies.

8.1.2 CLI in development: The effect of Age

As a function of age, bilinguals were predicted to increasingly conform to respective monolingual production patterns. Accordingly, CLI were expected to

diminish and eventually disappear with age. This was based on the assumption that extended exposure would allow children to tune into fine-grained language-specific differences regarding the quantity, distribution and structuring of information components.

Contrary to predictions, our results clearly showed that CLI are not a developmentally transitory phenomenon which children simply 'overcome' with time. On the contrary, findings showed that cross-learner discrepancies not only persisted across all tested age groups, but in some cases were also unexpectedly reinforced with age. The latter mainly concerned an increase in Path-encoding outside the main verb observed in French caused motion descriptions, which was facilitated by children's growing syntactic abilities. Specifically, their increasing command of subordinate structures allowed children to express multiple information components jointly and thus to add the Path-component to information about Manner and/or Cause encoded in the main verb.

This result was not anticipated and is difficult to reconcile with bootstrapping accounts (Gawlitzek-Maiwald and Tracy 1996), that would predict CLI to occur temporarily in development to fulfil a booster function for domains in which one language is more developed than the other. In our case, by contrast, CLI did not play a booster role, neither in terms of syntactic structures nor for semantic density (no advantage for high-density descriptions). Instead, what we find in the context of caused motion is the increased use of converging encoding strategies, manifested in children's reinforced production of satellite-framing patterns in their French. Thus, the developmental persistence and increase of CLI are consistent with a convergence analysis. From this perspective, a growth in general cognitive abilities makes children better at detecting crosslinguistic parallels and seize on them as loci for convergence. Secondly, the increase in linguistic skills allows bilinguals to exploit more linguistic resources (both lexical and grammatical) to actively maximise congruence between the two systems.

On this account, seeing CLI as reflecting an optimization strategy that helps bilinguals to deal with the cognitive costs of juggling two language systems, it is not unreasonable to assume that children's development should make them

better at dealing with the demands of both systems. This entails both that they become better at perceiving similarities between the two systems and at 'economising' cognitive costs by capitalising on those similarities through convergence.

Even though our age-related findings are compatible with a convergence analysis, our experimental design does not allow us to determine whether and when convergence reaches a plateau in development or whether CLI of the type indentified eventually diminish later in childhood or adulthood. Future studies investigating CLI in bilingual children older than 10 years and bilingual adults are necessary for a better understanding of the role of age in CLI.

8.1.3 Task-specificity of CLI

The assumption was that the semantic complexity associated with the caused motion task would result in a task effect, such that CLI would occur either exclusively or much more strongly in response to the caused motion task. We assumed that in this task, bilinguals would capitalise on their knowledge of English (particularly the availability of compact constructions) to help them produce complete event descriptions by syntactically less costly means in their French.

Our results did indeed indicate strong task-sensitivity of bilingual effects. Although cross-learner divergences emerged in both voluntary and caused motion descriptions, the caused motion task elicited the most dramatic and robust effects.[3] By contrast, the overall effect of learner type deviations in the voluntary motion task was rather limited: Main departures from monolingual tendencies were restricted to descriptions of boundary crossing items and mainly concerned slight discrepancies in information packaging tendencies. However, these did not amount to substantial deviations from typological trends. Generally, voluntary motion descriptions followed respective monolingual English and French tendencies.

However, the nature of our results suggests that the obtained task-specificity cannot be ascribed to the difference in semantic complexity. Thus, even though

[3]That is, effects occurred in each of the three dimensions analysed.

caused motion responses manifested the expected initial boost in semantic density in caused motion expressions (see chapter 7.3.4), CLI constituted no advantage for producing complete event descriptions. In other words, access to English lexicalisation strategies was not exploited by children to help them overcome the communicative challenge of the task in their French. This unexpected finding is incompatible with an interpretation of CLI as a bilingual bootstrapping strategy (Gawlitzek-Maiwald and Tracy 1996). Thus, the CLI that occur do not fulfil any booster function for the other language.

If semantic complexity is not at issue, which task property elicited the amplified learner type discrepancies in the caused motion task? The concentration of task-specific bilingual effects in the verb stem (overproduction of verbs conflating Cause and Manner) suggests that language-specific factors relating to the expression of causality may determine this outcome. Two factors should be considered. First, the causal component may be cognitively more salient and consequently evoke a greater need in speakers to encode causality linguistically. Our study and previous research in this project on caused motion expressions indicated that independently of language, age and learner type, participants always seek to express Cause in their descriptions. It is thus conceivable that in contexts of bilingualism, the salience of causality interacts with typological factors and activates the language in which the causal component is habitually coded in the verb stem, hence explaining the influence from English.

The second factor that may motivate the task difference is the typological variability of the French caused motion domain and the extent of overlap with English lexicalisation patterns. French caused motion expressions present much more variable encoding strategies than voluntary motion. Moreover, we find a substantial overlap of patterns with typical English strategies due to the availability of French verbs conflating Cause and Manner. From a convergence perspective, bilinguals are thus faced with a greater scope for crosslinguistic parallels amenable to convergence. The strong task effect obtained is thus compatible with a convergence analysis, which would predict more CLI in situations that present more opportunities for maximising congruence between bilinguals' two languages.

It is possible that both of the above factors, salience of causality and typo-

logical variability interact to reinforce the obtained task effect. However, our interpretation can only be speculative at this point, since the task design of this study does not allow us to isolate the factor that may have caused the difference in CLI effects. That is, the caused and voluntary motion tasks differed on more than just one dimension and any difference in linguistic behaviour may hence be due to other factors than the ones suggested here.

8.1.4 Bilingual-specific production patterns

Our findings revealed a number of unexpected learner type deviations which occurred independently of task, age and language of elicitation, hence suggesting a more general bilingual-specific production behaviour. This concerned two recurrent phenomena in our data: on the one hand, the inferential nature of certain information components, and on the other hand, the degree of variation in linguistic strategies.

As for the first, our data showed that bilinguals more frequently left the Path component to contextual inferencing from general locations (prepositions) rather than explicitly verbalising it. Thus, bilinguals were found to rely to a greater extent on discourse-pragmatic principles for establishing Path-reference. Note that such inferencing of semantic elements from contextual and general knowledge has been identified as a common characteristic of French (Pourcel and Kopecka 2005:12).[4] Consequently, we may wonder whether the detected learner type effect in our data indicates a bilingual-specific behaviour or rather a case of influence from French. However, the phenomenon is not restricted to English and even within the French data alone, bilinguals exhibit contextual Path inferencing to a significantly greater extent than French monolinguals. This and the fact that this tendency was evident in both tasks and across all tested age groups suggests an interpretation in favour of a bilingual-specific production phenomenon.

This leaves open the question as to what motivates this greater bias for Path inferencing and whether the tendency is specific to the language combination

[4]E.g. Manner of motion is often implicated by reference to certain Grounds (e.g. swimming typically occurs in water) or Figures (e.g. birds fly). See Pourcel and Kopecka (2005:12).

examined or whether it constitutes a more general bilingual production strategy. Although the limitation of the present study to English-French bilingualism does not allow us to generalise further, we may speculate about the first question. Thus, placing the inferential tendency in the context of the other bilingual deviations detected suggests a similar analysis in terms of convergence. Accordingly, the bias for implied rather than explicit communication of semantic elements can be interpreted as reflecting bilinguals' preference for crosslinguistically congruent strategies. Thus, even though English speakers typically rely less heavily on contextual inferencing to communicate Path than French speakers, it nevertheless constitutes a valid option in both languages. Adopting the convergence perspective, we may interpret the bilingual tendency as a processing strategy of reducing the cognitive costs associated with managing the two language systems (as suggested by Muysken (2000)) by over-relying on communication principles that work in both systems. This interpretation ties in with studies on simultaneous and early child bilingualism that observed similar 'reduction' strategies in bilingual processing in different domains, such as event construal (Flecken 2010) and object categorisation (Ameel *et al.* 2009).

Related to the above reduction strategy, the second bilingual-specific tendency concerned restricted variability in linguistic behaviour as compared to monolinguals, both with respect to lexical choices, but also at the level of lexicalisation patterns and syntactic structures. Thus, our results for both tasks and languages showed that bilinguals employed a more restricted range of verbs than corresponding monolinguals, reflecting fewer combinations of semantic components. For instance, in the caused motion task, bilinguals from the earliest tested age mainly used verbs conflating Cause with information about the Manner of the causing action (i.e. *push* and *pull*), but conflations with other components of Manner (e.g. the agent's or object's Manner of movement, i.e. *walk*, or *roll*) occurred less frequently. More generally, bilinguals exhibited more systematicity in linguistic strategies, which was evident across all three dimensions of our analysis. In each case, bilinguals tended to seize on a particular option early in development and subsequently consolidate and systematise its use further with progressing age. This was the case both for information distribution, which was less variable than in monolinguals, but also for syntactic

choices and even semantic density levels.

This reduced variation may be driven by the same processing strategy of cognitive cost reduction (Muysken 2000) that was suggested for the tendency of pragmatic inferencing. Thus, both preferential behaviours have the overall effect of reducing variability, both within each language separately, when it comes to lexical and pattern variation, and between the two languages (preference for converging strategies), and may hence result in reduced cognitive costs for bilinguals.

However, the present study does not allow us to generalise beyond the specific language combination investigated. Accordingly, we do not know whether such preference for systematicity is a more general bilingual processing strategy or reflects children's way of dealing with input from the specific combination of the highly variable French system and the very reliable form-function mappings in their English. Evidently, the scope for systematisation will depend on the degree of variability present in the languages children are exposed to. Thus, research on bilingual combinations with different degrees of variability and typological distance will be necessary to address this question adequately.

8.2 Implications

In this section, I relate findings of this study (presented above in 8.1) to the larger questions raised at the beginning of thesis. I present implications of my results for the debate on language-specific (8.2.1) and general (8.2.2) factors in the acquisition process and point out what this thesis contributes to models of bilingual language development and production processes (8.2.3).

8.2.1 Language-specific factors

One of the aims of this thesis was to shed light on the impact of language-specific determinants on the acquisition process more generally by taking simultaneous bilingualism as a test case. The major finding in this respect was

that some of the same typological factors constituting acquisitional challenges in contexts of L1 and L2 acquisition represented domains susceptible to CLI in 2L1 development. Thus, the present study confirmed the importance of a number of language-specific properties and broadened our understanding of how these properties can affect processes of acquisition in different contexts.

In particular, our comparison of caused and voluntary motion expressions allowed us to identify two properties associated with the French motion system that represent difficulties for acquisition: First, the formal complexity required for semantically dense descriptions and secondly, the highly variable information distribution, especially evident in the caused motion domain. Previous research in this project showed that in L1 contexts, these factors resulted in a more protracted course of acquisition for French as compared to English children (e.g. Hickmann 2010, Hickmann *et al.* 2009*a*), whilst in L2 learning, the same properties gave rise to persistent transfer from learners' source language (e.g. Hendriks and Hickmann 2011). In the present study, our findings showed that the very same properties constituted loci for CLI in bilingual development. Thus, the most striking learner type effects concerned bilinguals' deviation from these problematic factors. With respect to variability, our results revealed that bilinguals did not replicate the variable information distribution strategies evident in monolingual French, but instead preferred a much more systematic pattern of information distribution. As regards syntactic complexity, bilinguals did not conform to monolingual tendencies either. Instead, they showed a strong preference for tight simple instead of the more typical complex gerundive constructions.

Similarly, in the context of voluntary motion, language-specific lexical factors were shown to affect both monolingual and bilingual first language acquisition. Specifically, the unsystematic and unevenly distributed semantics of French motion verbs, which provide certain meaning conflations in some, but not all verbs, resulted in the same idiosyncrasies in bilingual as well as monolingual children's speech patterns. Thus, over-generalisations of verbs such as *grimper* ('to climb') to inappropriate semantic contexts (i.e. downward motion) emerged in both acquisition contexts.

In sum, our findings corroborate the impact of specific typological factors

whose import on the acquisition process had been singled out by earlier research. Bilinguals struggle with the same typological factors as monolingual and adult L2 learners, but differ from the former in that their simultaneous access to an additional language provides them with a further array of linguistic resources for dealing with them. Thus, bilinguals' linguistic strategies sometimes involve recourse to their other language and hence result in a number of similar phenomena as those observed in L2 learning. Moreover, an important implication of our results regarding the directionality of CLI is that research into the role of language-specific factors needs to take into account not only structural and systemic properties of each language separately, but also consider their extent of (perceived) overlap and similarity with those of the contact language.

8.2.2 General cognitive factors

Two dimensions of the present study are relevant for investigating the role of general cognitive factors in acquisition: the effects of Age and Event Type. In both cases, those effects that emerge independently of language, learner type and production task could be indicative of general cognitive determinants.

As regards Age, our results in this respect replicate previous findings on age effects in L1 acquisition and are mainly evident in the context of semantic density and syntactic complexity. As expected, findings showed that irrespectively of language and learner type, semantic density and syntactically complex structures increased with age. Both developments allow children to produce increasingly complete event descriptions and partly reflect a growth in linguistic skills (both lexical and syntactic). However, they also presuppose a growth in children's representational abilities, since complete event descriptions require an understanding of the relevant event components to be extracted for expression to enable interlocutors to understand the event. This means that children's cognitive processing of the event develops with age, independently of the language they learn and their context of acquisition. Our finding thus provides complementary support for similar results of general age-dependent increases in the context of L1 acquisition of a variety of languages (see e.g. Ochsenbauer

2010 for German and French and Ji *et al.* 2011*a*,*b*,*c* for Chinese and English).

With respect to Event Type, our findings indicated that children's bilingualism interacted in complex ways with the type of event described. Specifically, our results corroborate the special status of boundary-crossing events, which in previous studies had repeatedly led to divergent production patterns across a range of typologically highly diverse languages (e.g., for Chinese: Ji *et al.* 2011*a*,*b*,*c*). In our study, boundary-crossing events in both production tasks frequently resulted in reinforced learner type deviations. That is, existing differences in bilinguals' production patterns were even more pronounced in these sets of events. Interestingly, in many cases, the production divergences elicited by boundary-crossing items were of the same nature for both learner types, but were significantly stronger in 2L1 contexts. The general tendency for these event types was to elicit more Manner (and Cause)-encoding verbs, alongside a greater degree of locative prepositional phrases. Syntactically, these events triggered simpler and looser structures, reflecting the scattering of information types across several independent clauses.

One possible explanation for the robust event-type sensitivity of effects is that boundary-crossing events present greater representational difficulties, as suggested by Hickmann (2010:142). Such cognitive explanation is supported by the recurrent divergences elicited by this event type not only across a range of languages, but also in various acquisition contexts. As regards the latter, a number of studies on the L2 acquisition of verb-framed languages by native speakers of satellite-framed languages reported learners' persistent violation of the boundary-crossing constraint, even at advanced proficiency levels (Cadierno and Ruiz 2006, Larrañaga *et al.* 2012).

However, which factor makes boundary-crossing events more difficult to process? The feature that distinguishes this event type from the other items presented in the task is that they involve a change of state. It is possible that this added semantic notion amounts to greater cognitive complexity and results in a heavier processing load for children, although more fine-grained research on the processing of various event types will be required to ascertain the validity of such argumentation.

Alternatively, the divergent response patterns could also reflect the design

of experimental stimuli. Thus, boundary-crossing items differ from other event types on a variety of perceptual and semantic dimensions. Crucially, in the voluntary motion task, the motion types depicted in *across*-items are qualitatively different in that they involve less goal-orientation than *up* and *down*-items.[5] This may have triggered a construal of events in terms of a Manner activity within a location rather than a motion event implying a change of location (see Pourcel and Kopecka (2005) for the distinction). Such activity-oriented construal would tie in with the higher frequency of Manner-verbs produced in boundary-crossing items. However, our findings indicated similar divergences in response to caused motion boundary-crossing items, where the types of motion activities depicted are controlled for.[6] Thus, Manner-salience alone cannot be the reason for the divergences obtained.

Alternatively, it is possible that the divergent outcome reflects a basic conceptual difference relating to vertical versus horizontal movement. Thus, note that all boundary-crossing events in our two production tasks were carried out on the horizontal axis. The notion of vertical Path has been claimed to be conceptualised and acquired in speech much earlier than on the horizontal axis (e.g. Bloom 1973, McCune-Nicolich 1981, Nelson 1974), possibly reflecting a universally "pre-established cognitive category" (McCune-Nicolich 1981: 18), based on early sensorimotor experience of human bodily verticality. However, whilst this cognitive account would predict a later acquisition of the concept and linguistic expression of horizontal Path, it cannot easily account for the age-independent deviations triggered by horizontal events, which in our study are persistent even as late as age 10.

In sum, our findings confirm both the effect of biological age on event expression in children and the special status of boundary-crossing events. They underline the need for fine-grained studies to illuminate the role and interaction of various pragmatic, cognitive and perceptual factors as regards the processing of this event type in acquisition processes more generally.

[5]This is partly due to the nature of activities depicted (e.g. leisure activities, like *skating*, that are performed as end in themselves, versus *running* as a way of reaching a goal), but also to the absence or presence of goals portrayed in items (i.e. items on the vertical axis all portrayed food items to be reached).

[6]The same combinations of Cause and Manner are shown with all four event types.

8.2.3 Implications for bilingualism

The findings concerning bilinguals' production patterns have implications for our understanding of simultaneous bilingualism and crosslinguistic influence more generally. As regards the latter, our results demonstrate clearly that CLI is not an all-or-nothing phenomenon in bilingual development. Instead, its occurrence and directionality of manifestation are highly complex and domain-specific. Thus, CLI may emerge in some but not all aspects of event expression, and not always affect both languages to the same extent. Specifically, the present study showed that CLI in the context of English-French bilingualism manifested itself more in the domain of caused than voluntary motion, and its directionality varied somewhat according to the pattern or construction analysed, suggesting a highly localised mechanism. Such domain-specific behaviour is in line with findings by psycholinguistic studies that draw attention to the highly dynamic nature of bilingual processing and production, which changes in accordance with the circumstances and requirements (social and linguistic) of a given task (e.g. Flecken 2010, Grosjean 2001, 2012, Hernandez *et al.* 1994), indicating a high level of plasticity.

Moreover, the observation that bilinguals' production patterns did not replicate those of corresponding monolinguals in either of their languages suggests that even in situations of balanced exposure to both languages from birth, the bilingual speaker has to be considered a learner type in his own right and displays linguistic behaviour types that are different from those of monolinguals. This accords with the influential assertion (Grosjean 1985, 1989, 2008) that bilinguals are more than just two monolinguals in one mind and should consequently be studied as a "unique and specific speaker-hearer" (Grosjean 1989: 13).

Furthermore, the present findings contribute to the ongoing debate regarding the degree of independence versus interdependence of bilingual language processing. In this respect, the production patterns detected imply that bilingual language processing does not happen completely separately, but allows for interactions. This in turn supports the growing evidence in psycholinguistic research that even when performing tasks in a maximally monolingual mode,

the language that is not in use will nevertheless affect the processing of the target language, suggesting simultaneous activation of both language systems (e.g. Costa 2008, Dijkstra *et al.* 1999, Grosjean 2001, Kroll *et al.* 2006, Merian *et al.* 2003).

8.3 Limitations and future research directions

8.3.1 Alternative explanations: input and dominance

The focus of the present thesis on the impact of language-internal factors on CLI may be argued to not allow sufficiently for considerations of alternative non-structural factors, such as the role of input. Quantitative and qualitative imbalances in the input bilinguals receive can result in the dominance of one language, which may provide the following alternative interpretations of our results.

First, the strongly asymmetric manifestation of crosslinguistic effects within French may be interpreted as reflecting children's English-dominant competencies. Thus, the detected bias for more typical English encoding strategies is symptomatic of the kinds of transfer phenomena occurring in imbalanced bilinguals' weaker language. According to several proposals in the literature, bilinguals' stronger language can serve a gap-filler function (see 'Ivy Hypothesis', by Bernardini and Schlyter 2004, Schlyter 1993) or bootstrapping function (Gawlitzek-Maiwald and Tracy 1996). Such language dominance can result from quantitative differences in the input, but has also been claimed to reflect the role of the dominant language of children's environment (e.g. Daller *et al.* 2011).

A related alternative interpretation considers the target deviations and L2 parallels in our French production patterns as indication of children's actual status as child L2 learners. Accordingly, the discrepancies in bilinguals' French data would be interpreted as typical interlanguage phenomena (Selinker 1972) arising from children's lack of full proficiency in French. Analogous qualitative target deviations have been demonstrated by recent research as charac-

teristic of successive bilingualism and early child L2 acquisition (Meisel 2008, 2010). Thus, according to this interpretation, the asymmetric and target-deviant nature of crosslinguistic effects imply a different learner population than assumed.

A third alternative that is left unexplored in the present thesis concerns the possibility of qualitatively skewed parental input (for a discussion of its impact on 2L1 (see Paradis and Navarro 2003, Silva-Corvalán 1994). Thus, children's productions may reflect qualitatively deviant input from parents who, as a result of their own bilingualism or contact with a second language (often through communication with the partner), may have developed a contact variety of the language.[7] Although the scope of our data collection did not allow us to measure care-givers' input, such measure would be highly valuable for future research since it would allow us to gauge to what extent target discrepancies represent replications of parental input or child innovations.

Although a closer assessment of input factors would be desirable for follow-up studies, I reject the above alternative interpretations of my data due to the following considerations. From a theoretical perspective, attributing target-deviant CLI to unbalanced bilingualism runs the risk of circularity. In this study, we have adopted a definition of bilingual learners that was based on age of acquisition and daily use of both languages (see chapter 4.1.2 for definition). Great care was taken to ensure the exclusive selection of participants that met the relevant criteria (see chapter 5.3) whose validity has to be the working assumption if one wants to avoid circularity. Nevertheless, a weakness of our participant selection was its reliance on parental evaluations from questionnaires (see chapter 5.3), which runs the risk of distorted information reflecting parents' subjective attitude towards bilingualism. Therefore, additional independent measures of proficiency/dominance and input would be highly desirable for future research to rule out possible confounds of linguistic imbalance. Additional measures of parental input may be more realistically achievable in longitudinal studies involving fewer participants.

As regards the proposed role of the dominant environment language, I

[7]Similarly, the role of maternal input specifically and that of (older) siblings may affect children's linguistic balance and should ideally be controlled for in follow-up studies.

object that the entire data collection in this study was conducted in France. Therefore, from the perspective of the deterministic role of children's environment, we should expect the ambient language, that is French, to affect children's English. The fact that our data shows the reverse outcome strengthens the proposed interpretation in terms of language-internal factors. Nevertheless, a comparative study testing bilinguals' productions both in English and French-dominant environments (as in Daller *et al.* 2011) would be of interest for future studies to disentangle the roles of both language-internal and external (societal) factors.

8.3.2 Methodology: Design limitations

The experimental design adopted in this thesis entails a number of limitations regarding the external and ecological validity of our findings. In this respect, a drawback associated with the experimental tasks is that the elicited productions may not adequately reflect spontaneous speech patterns. That is, the communicative situation of the task, which required children to recount events seen on a screen, can be argued to be not entirely natural and may hence fail to elicit representative motion descriptions. This potential skew may also affect the rate of target-deviations, which in some studies has been shown to be significantly higher in elicited than in spontaneous production tasks (see e.g., Nicoladis 2002*a*). Due to the short time period during which the child is tested, experimentally elicited data may give rise to more deviant peformance in response to complex tasks than spontaneous speech situations, in which children have more ways of avoiding difficulties by choosing what to say.

Closely related to the above constraint, the repetitiveness of stimuli in our design may encourage children's settling on specific lexicalisation routines once they have become aware of the relevant recurrent features. As a result, the elicited productions patterns may exhibit less variability than may be representative of spontaneous motion expressions.

Whilst experimental tasks cannot entirely avoid compromising ecological validity, triangulating our results with spontaneous speech and corpus data in follow-up studies would allow us to identify potential skews in production

patterns that are due to the artificial nature of the task.

The specific language combination examined in this thesis implies limitations affecting external validity, that is, the extent to which our findings can be generalised to mechanisms of CLI in bilingualism more broadly. Given that English and French are relatively closely related typologically, follow-up research would greatly benefit from comparative studies of language pairs that present various degrees of typological distance, which would allow us to ascertain a more general applicability of our findings. Specifically, an assessment of the validity of convergence proposals (e.g. Toribio 2004) requires a comparison of various language combinations presenting different degrees of structural overlap and associated potential for convergence.

A related constraint on internal validity is associated with the confound of language-specific factors of our language combination. Thus, the fact that both English and French confound a number of typological properties makes it difficult to isolate the factor(s) that are the source of the detected effects. Although the present comparison of their impact across two acquisition modes (2L1 versus L1) has provided us with valuable insight, further support from different 2L1 language combinations with different typological properties, as well as additional different acquisition scenarios (such as child and adult L2 acquisition), will be required in future research to disentangle the effect of specific properties.

In sum, to increase validity, the inclusion of additional language combinations, acquisition types, as well as different data sources (spontaneous longitudinal and corpus) would be highly desirable for future research in this domain.

8.3.3 Moving forward: motion in bilingual cognition

An important question raised by our study concerns the cognitive implications of our findings. More specifically, to what extent do the crosslinguistic effects demonstrated on the linguistic level imply interactions in bilinguals' conceptualisations of motion events? Exploring motion events beyond language use in bilingual cognition constitutes an promising avenue for future research. If we assume that different lexicalisation patterns imply different ways of *thinking for*

speaking (Slobin 1996*a*), cognitive investigations need to address the following questions: Do bilinguals develop and maintain one or two conceptual representation(s) of motion? If bilingualism implies two conceptual systems, to what extent do they allow for dynamic interactions, or even convergence, paralleling our findings on the linguistic level? If so, does the nature and occurrence of interactive processes change during the course of development? By contrast, if one conceptual system is in place, to what extent is it language-independent and reflects universal constraints on cognition and to what extent is it shaped by one or both of bilinguals' lexicalisation patterns?

Given that the present thesis aimed to investigate *linguistic* productions of motion events, any answer regarding cognitive implications can only be speculative. However, a thorough understanding of the linguistic expression of motion is a crucial first step, since any exploration of the causal connection between language and thinking will require a demonstration of a robust correlation between the two, as repeatedly argued by Lucy (1992*b*, 1996). Thus, the present thesis has contributed to establishing this prerequisite for further cognitive explorations that will be the task of future research.

The challenge that investigations of motion cognition will have to face lies in the need to find methods that allow us insight into conceptual processes. In this respect, it is hoped that future research will continue to elaborate on the promising foundations laid by recent pioneering research into motion gestures, which offer a window on conceptualisation (e.g., for bilingual gestures: Brown and Gullberg 2008, Gullberg 2009*a*,*b*, 2011, Nicoladis 2007, Nicoladis *et al.* 2009, Pika *et al.* 2006).

A further promising research avenue to explore is offered by recent advances in eye-tracking techniques that allow us to measure visual attention, and by extension, provide insight into event perception and processing. Future inquiry can build on the stimulating insights gained from recent crosslinguistic studies on L1 speakers' motion perception (Gennari *et al.* 2002, Papafragou *et al.* 2008, Soroli 2011). To date, comparable investigations into early bilinguals' event conceptualisation are extremely sparse (Flecken 2010, 2011), but constitute an obvious direction for follow-up studies on language production.

It is hoped that such methods of tapping into cognitive processing will fur-

ther our understanding of the bilingual experience and will bring us closer to answering the question of whether speaking two languages entails, in Whorf's words, entertaining "different views of the world" (Whorf 1956: 221).

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Appendix A

Materials

A.1 Experimental items: Voluntary Motion

A.1.1 Training item

0. **XGRE**[1]
   A frog jumps into a pond.

A.1.2 *Up*/*down*-target items

1. **XSOU**
   A mouse tiptoes to a table, climbs up a table leg, grabs a piece of cheese lying on top, slides down backwards with the cheese and tiptoes away.

2. **XCHE**
   A caterpillar crawls to a plant stalk, crawls up the stalk to a leaf, eats a piece of the leaf, crawls back down head first and crawls away.

3. **XCHT**
   A cat runs to a telephone pole, climbs up the pole to a bird's nest, drops an egg off the nest, climbs down backwards, stops at the bottom of a tree, licks the egg and runs away.

[1]Four letters indicate the item code, with the first letter specifying the type of item (experimental=X, control=C) and the following three standing for the agent or activity portrayed (French abbreviation).

4. **XORS**
   A bear walks to a tree, climbs up to a beehive, takes some honey out of the hive with its paw, climbs down backwards, licks the honey off its paws and walks away.

5. **XECU**
   A squirrel runs to a tree, runs up the tree into a hole, comes out of the hole, runs down head first and runs away.

6. **XSIN**
   A monkey walks to a palm tree, stops at the bottom to look up, climbs up the tree, takes a banana, climbs down backwards and walks away with the banana.

A.1.3 *Across*-target items

1. **XBEB**
   A baby crawls on the pavement to a street, crawls across the street to the other side and crawls away.

2. **XCOU**
   A man runs to a road, runs across the road and runs away.

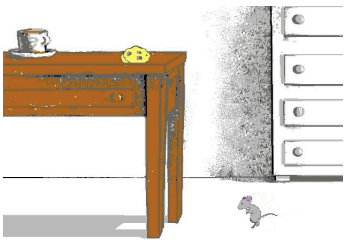
3. **XGLI**
   A boy runs to a frozen river, slides across the river on his feet and runs away.

4. **XNAG**
   A boy walks to a river, swims across the river and walks away.

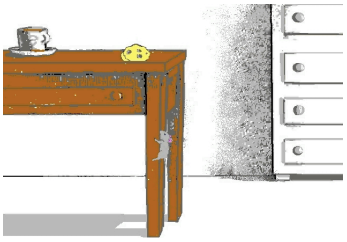
5. **XPAT**
   A girl wearing skates walks to a frozen lake, skates across the lake and walks away.

6. **XVEL**
   A lady on a bike cycles to some train tracks, cycles across the tracks and cycles off.

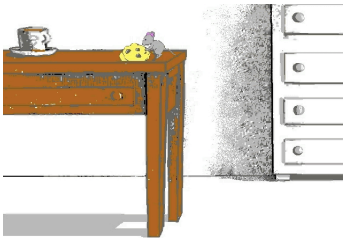
A.1.4 Example of *up*/*down*-target item



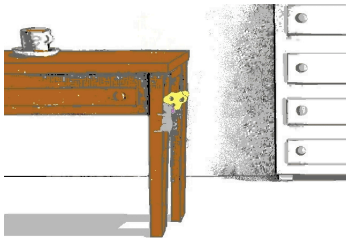
A mouse tiptoes to a table, …



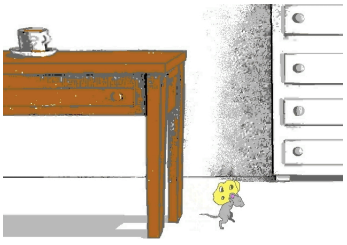
…climbs up a table leg …



…grabs a piece of cheese …



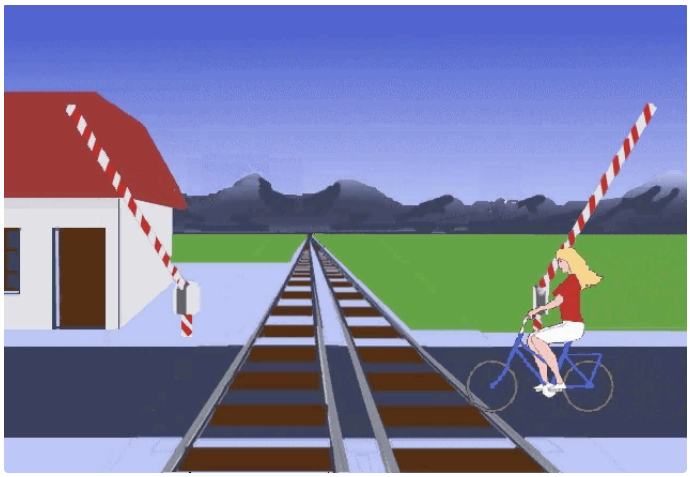
…slides down backwards …



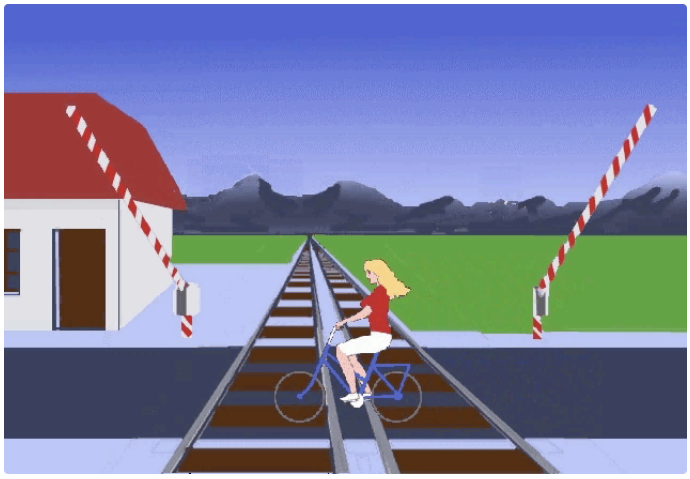
…and tiptoes away.

Figure A.1: Stills of voluntary motion *up*/*down*-item (XSOU)

A.1.5 Example of *across*-target item



A lady on a bike cycles to some train tracks …



…and cycles across the tracks.

Figure A.2: Stills of voluntary motion *across*-item (XVEL)

A.2 Experimental items: Caused Motion

A.2.1 Training item

0. **prt_meuche**[2]
   Hoppy pushes/rolls a hay bale across the road.

A.2.2 *Up*-target items

1. **pgm_paqtoi**
   Hoppy pushes a present up the roof.

2. **trm_voitoi**
   Hoppy pulls a toy car up the roof.

3. **tgm_sactoi**
   Hoppy pulls a bag up the roof.

4. **prm_boutoi**
   Hoppy pushes a rubber ring up the roof.

5. **pgm_paqdun**
   Hoppy pushes a parcel up the sand dune.

6. **trm_voidun**
   Hoppy pulls a toy car up the sand dune.

7. **tgm_sacdun**
   Hoppy pulls a bag up the sand dune.

8. **prm_boudun**
   Hoppy pushes a rubber ring up the sand dune.

[2]The first three letters of the item code refer to the combination of Manner(s) and Path portrayed and stand for **p**(ousser) 'push' vs. **t**(irer) 'pull', **g**(lisser) 'slide' vs. **r**(ouler) 'roll', and **m**(onter) 'up', **d**(escendre) 'down', **t**(raverser) 'across', **e**(ntrer) 'into'. The last six letters identify the Figure and Ground entities shown.

A.2.3 *Down*-target items

1. **prd_balcol**
   Hoppy pushes a ball down the hill.
2. **pgd_valcol**
   Hoppy pushes a suitcase down the hill.
3. **trd_brocol**
   Hoppy pulls a wheelbarrow down the hill.
4. **tgd_malcol**
   Hoppy pulls a chest down the hill.
5. **prd_balnei**
   Hoppy pushes a ball down the snowy hill.
6. **pgd_valnei**
   Hoppy pushes a suitcase down the hill.
7. **trd_bronei**
   Hoppy pulls a wheelbarrow down the snowy hill.
8. **tgd_malnei**
   Hoppy pulls a chest down the snowy hill.

A.2.4 *Across*-target items

1. **trt_pourue**
   Hoppy pulls a pushchair across the road.
2. **tgt_cherue**
   Hoppy pulls a wooden toy horse across the road.
3. **prt_rourue**
   Hoppy pushes a cartwheel across the road.
4. **pgt_panrue**
   Hoppy pushes a basket of apples across the road.

5. **trt_pourou**
   Hoppy pulls a pushchair across the road.

6. **tgt_cherou**
   Hoppy pulls a wooden toy horse across the road.

7. **prt_rourou**
   Hoppy pushes a cartwheel across the road.

8. **pgt_panrou**
   Hoppy pushes a basket of apples across the road.

A.2.5 *Into*-target items

1. **tge_chagro**
   Hoppy pulls a chair into the cave.

2. **pre_pnegro**
   Hoppy pushes a tyre into the cave.

3. **pge_tabgro**
   Hoppy pushes a table into the cave.

4. **tre_cadgro**
   Hoppy pulls a shopping cart into the cave.

5. **tge_chamai**
   Hoppy pulls a chair into the barn.

6. **tre_cadmai**
   Hoppy pulls a shopping cart into the barn.

7. **pre_pnemai**
   Hoppy pushes a tyre into the barn.

8. **pge_tabmai**
   Hoppy pushes a table into the barn.

A.2.6 Example of *up*-target item

Hoppy pulls a bag up the roof.

Figure A.3: Stills of caused motion *up*-item (tgm_sactoi)

A.2.7 Example of *into*-target item

Hoppy pushes/rolls a tyre into the barn.

Figure A.4: Stills of caused motion *into*-item (pre_pnemai)

Appendix B

Participants

	Monolinguals				Bilinguals			
Age Group	Range	Mean	Males	Females	Range	Mean	Males	Females
4	3;11–4;10	4;5	6	6	4;2–5;11	4;10	4	8
6	5;10–6;10	6;6	6	6	6;1–7;9	6;9	7	5
8	7;6–8;5	8;0	5	7	8;2–9;3	8;6	6	6
10	9;6–10;6	10;0	7	5	9;1–10;8	10;2	7	5

Table B.1: **English** participant groups

	Monolinguals				Bilinguals			
Age Group	Range	Mean	Males	Females	Range	Mean	Males	Females
4	3;10–4;10	4;4	6	6	3;11–5;11	4;9	8	4
6	5;9–6;9	6;3	6	6	6;1–6;9	6;7	6	6
8	7;9–8;8	8;2	6	6	8;1–9;11	8;8	6	6
10	9;8–11;8	10;3	6	6	9;8–10;9	10;5	4	8

Table B.2: **French** participant groups

Appendix C

Questionnaire

Helen Engemann
PhD Student

UNIVERSITY OF CAMBRIDGE

Research Centre for English and Applied Linguistics

Faculty of English Building
Cambridge CB3 9DP

French-English bilingualism in children

QUESTIONNAIRE

First name of your child: .....

Birthday, country of birth: .....

School + grade attended (English/French/international school):

.....

Family situation (does you child see each parent on a daily basis? If not, how regularly?):

.....

Year of arrival in this country: .....

1. Siblings

How many, sex, age: .....

Languages spoken by siblings:

(for each sibling, please specify the languages and evaluate fluency: very fluent, fluent, understands only, a few words, etc):

.....

.....

.....

2. Intended length of your stay in this country:

.....

.....

3. Do other members of your (French) family or close friends reside in this country?:

.....

.....

4. Intensity of your child's exposure to French through the media:

(for each language please specify: very frequent, frequent, infrequent, never):

Book reading: .....

Television: .....

Radio: .....

Films: .....

Music: .....

Other: .....

LANGUAGES

5. Native language of mother: .....

6. Other languages spoken by mother (in what contexts?): .....

.....

7. Native language of father: .....

8. Other languages spoken by father (in what contexts?): .....

.....

9. Language of nanny: .....

10. Language spoken by parents together (if relevant, specify in what contexts...):

.....

.....

11. Languages spoken by child:

with mother: .....

with father: .....

with nanny: .....

with siblings: .....

with teachers at school: .....

with friends at school: .....

with other people outside of school (family, friends, etc.): .....

.....

.....

12. Language switching

Does your child switch language (for example, he/she responds in English when answering a question in French and/or spontaneously mixes words or constructions from the two languages)?

.....

.....

13. Fluency

Can you subjectively evaluate on a scale from 1 (poor) to 10 (native-like fluency) your child's level of fluency in French and English and your own level of fluency (mother and father):

(a) your child's level of fluency

Spoken French	1	2	3	4	5	6	7	8	9	10
Written French	1	2	3	4	5	6	7	8	9	10
Spoken English	1	2	3	4	5	6	7	8	9	10
Written English	1	2	3	4	5	6	7	8	9	10

(b) mother's level of fluency:

Spoken French	1	2	3	4	5	6	7	8	9	10
Written French	1	2	3	4	5	6	7	8	9	10
Spoken English	1	2	3	4	5	6	7	8	9	10
Written English	1	2	3	4	5	6	7	8	9	10

c) father's level of fluency:

Spoken French	1	2	3	4	5	6	7	8	9	10
Written French	1	2	3	4	5	6	7	8	9	10
Spoken English	1	2	3	4	5	6	7	8	9	10
Written English	1	2	3	4	5	6	7	8	9	10

PREVIOUS EXPERIENCES RELATED TO LANGUAGE:

14. Previous residences with your child in other countries (specify cities and duration of stay):

.....

.....

.....

.....

15. Previous schooling of your child in different countries:

(for each country and city, please specify grade or level of schooling): .....

.....

.....

16. Child's exposure to any other languages:

(for each language, please specify duration of exposure, contexts of use, including written and spoken uses, school and home, and evaluate fluency: very fluent, fluent, understands only, a few words, etc.):

.....

.....

.....

.....

OTHER INFORMATION

17. Any difficulties encountered by your child:

.....

.....

.....

.....

18. Please specify any other information that seems relevant concerning your child or family situation:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Thank you very much for your cooperation! MERCI BEAUCOUP!

Appendix D

Coding

D.1 Basic Coding

D.1.1 Example of basic coding line[1]

*SUJ: He's pushing the tyre into the barn [c].

```
%cod: $ :CIB0:LG01: SD :VMP#+Cse+Mac|push:PRG:DAC:EP1/1&+Tbo|into+NP:
 (1)|(2)| (3) |(4) |(5) |          (6)   |(7)|(8)|        (9)

EZ2/1&|:EZ3/1&|:EZ4/1&|:EZ5/1&|: PM0 :Fig|tyre:Grd|barn: {  }
 (10)  | (11)  |  (12) | (13)  | (14)|  (15)  |  (16)  | (17)
```

D.1.2 Annotation of basic coding fields[2]

(1) Specification of type of coding line: **%cod** for *basic*, **%sum** for *synthetic*

(2) *Field 1:* Introduction of coding line

(3) *Field 2:* Identification of **item component**: The clause corresponding to the target item component is identified by a code starting with **CI** (=

[1]Colons function as delimiters of coding fields. No spaces appear in the actual coding lines, but are introduced here for legibility of annotation.

[2]For more detailed descriptions of all coding fields and examples, the reader is referred to the full coding manual (Hickmann *et al.* 2011).

cible 'target'), followed by a letter specifying whether the clause is the only target component (**CIB**) or whether there are other utterance elements referring to the target scene (coded as **MI** + additions). For voluntary motion, the fourth letter identifies the component corresponding to upward (**CIBM**), downward (**CIBD**) and across motion (**CIB0**).

(4) *Field 3:* **Response type**: **LR** for spontaneous responses (no prompting by experimenter), **LG** for responses elicited by a general question ('What happened?'), **LS** if elicited by specific question (e.g. 'How did it move?'). LS-coded responses are excluded from the analysis.

(5) *Field 4:* **Situation type**: **SS** for static and **SD** for dynamic situations.

(6) *Field 5:* **Verb**: identifies the type of verb (e.g., **VMP** for dynamic caused motion verbs, **VMM** for dynamic (voluntary) motion verbs), semantic information type(s) encoded (e.g., **C** for 'Cause', **Mac** for 'Manner of causing action'), followed by the infinitival form of the verb used and, if applicable, other elements directly dependent on the predicate that contribute to its semantic content (e.g., 'to go *skiing*': **VMM#+Mmv|go-skiing**).

(7) *Field 6:* **Verbal inflection**: specifies morphologically realised temporal, aspectual and modal information. Codes are language-specific (e.g., **PRG** in English for 'present progressive').

(8) *Field 7:* **Voice**: **DAC** for *active* and **DPA** for *passive* voice.

(9) – (13) *Fields 8–12:* **Satellites**: Indication of spatial information encoded by all devices except the verb (see *field 5*), followed by the form used. Codes distinguish different types of satellites: prepositions (**EP**), particles (**EL**), nominals (**EN**: e.g., *a runner*) and other non-spatial expressions relevant to motion (**EO**: e.g., *slowly*). Five fields are provided, following the order in which satellites are produced in the utterance with an indication of the total number of satellites produced (e.g., **EP1/1** signifies 'the first satellite (prepositional) produced out of a total of 1').

(14) *Field 13:* **Periphery**: Specifies the type of clause: **PMS** for main clauses, **PS** for subordinates (with specification of clause type: e.g., gerunds, relative clauses), **PM0** for independent clauses without embedding.

(15) *Field 14:* **Figure**: Indication of referent corresponding to Figure entity, with specification of realisation: explicit (full nominal or pronominal form), implicit (**imp**), or not applicable/relevant (**0**).

(16) *Field 15:* **Ground**: Indication of referent corresponding to Ground entity with specification of realisation (see *Field 14*).

(17) *Field 16:* **Comments**: Optional comments indicating idiosyncrasies and errors (e.g. specific to learner populations), self-corrections, repetitions and other phenomena not covered by other fields.

D.2 Synthetic Coding

D.2.1 Example of synthetic coding line

*SUJ: Une fille a traversé le lac [c] en patinant [c].
A girl has crossed the lake [c] by ice-skating [c].
'A girl ice-skated across the lake.'

```
%sum:$0 :XPAT:GTC2:CB2:T&M#traverser-lac§-en-patinant:
(1) |(2)|(3) |(4) |(5)|                    (6)

MZ :zi#zm:MZ : zi#zm: MZ :zi#zm
(7)| (8) |(9)| (10) |(11)| (12)
```

D.2.2 Annotation of synthetic coding fields

(1) Specification of type of coding line: **%cod** for *basic*, **%sum** for *synthetic*

(2) *Field 1:* Introduction of coding line by **$**, followed by a code identifying the corresponding motion scene: **M** for upwards, **D** for downwards and **0** for across and caused motion items.

(3) *Field 2:* **Item identification**: Item code

(4) *Field 3:* **Global response architecture**: specifies relative complexity and compactness: code starts with **G** (for 'global'), followed by 2-letter code specifying compactness (**T** 'tight' vs. **L** 'loose') and complexity (**S** 'simple' vs. **C** 'complex'), followed by the total number of clauses produced, including the target response (CI) and all other relevant utterance components (MI).

(5) – (12) *Fields 4–11:* **Response type (5)** (**C** 'target' vs. **M** 'potential target', see %cod-lines) and **semantic information (6)** encoded in verbs and satellites (e.g., **T** for Path, **M** for Manner) and lexical forms used (verb, satellite, figure, ground). Four fields are provided following the order in which clauses are produced.

Appendix E

Voluntary Motion Results

E.1 Information Packaging by Event Type

E.1.1 English

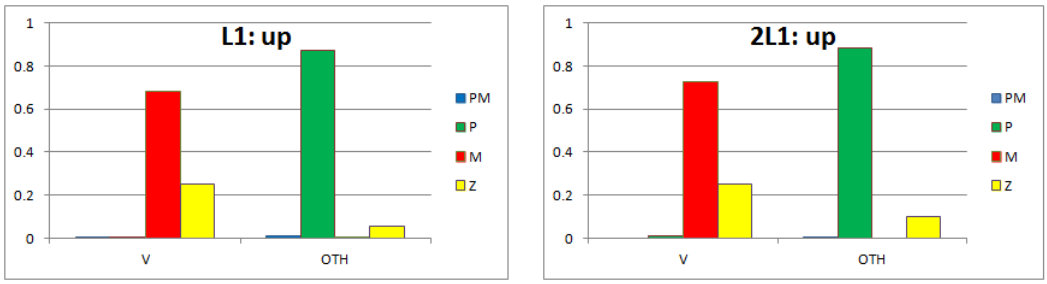


Figure E.1: L1 and 2L1 English Information Packaging for *up*-events

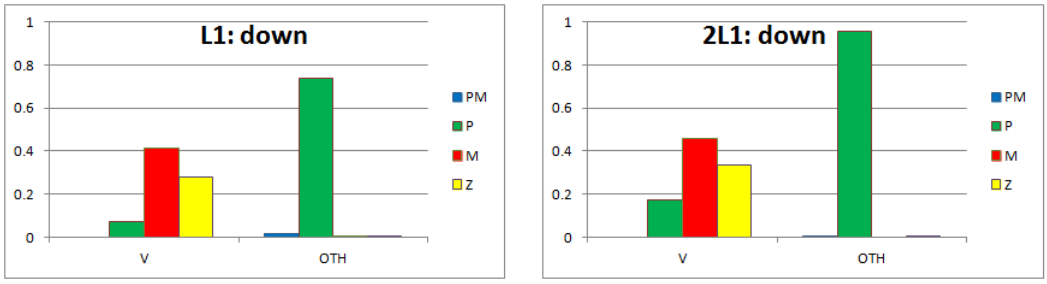


Figure E.2: L1 and 2L1 English Information Packaging for *down*-events

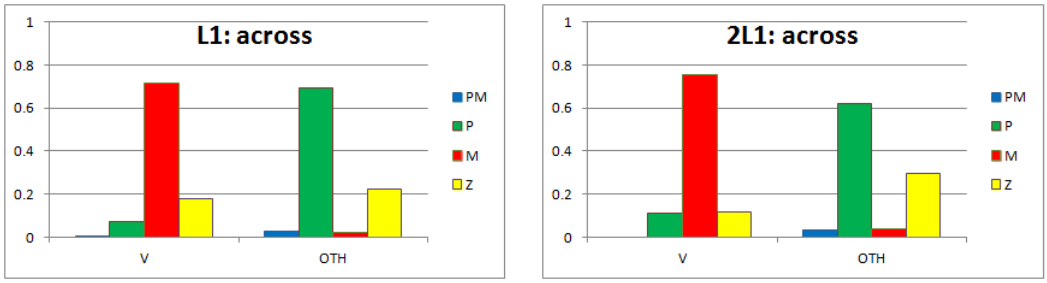
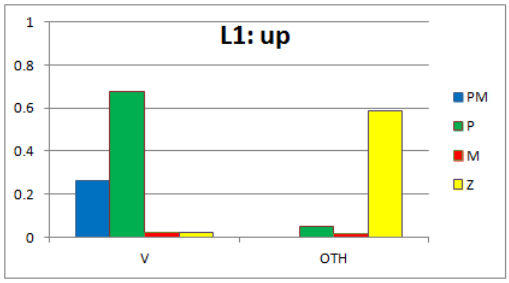


Figure E.3: L1 and 2L1 English Information Packaging for *across*-events

E.1.2 French



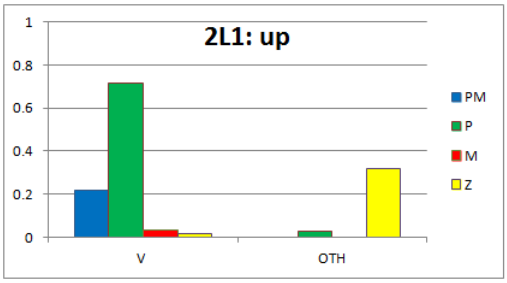
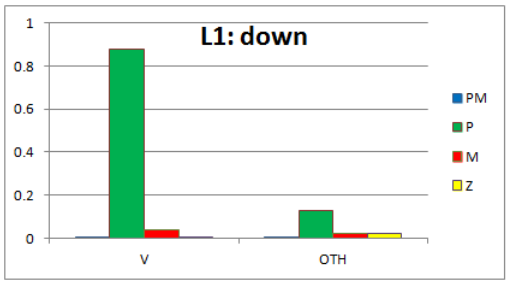


Figure E.4: L1 and 2L1 French Information Packaging for *up*-events



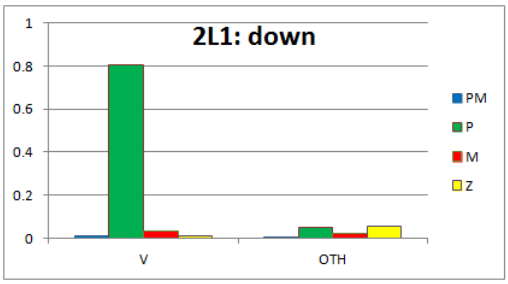
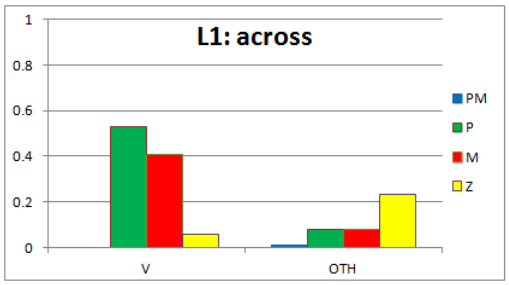


Figure E.5: L1 and 2L1 French Information Packaging for *down*-events



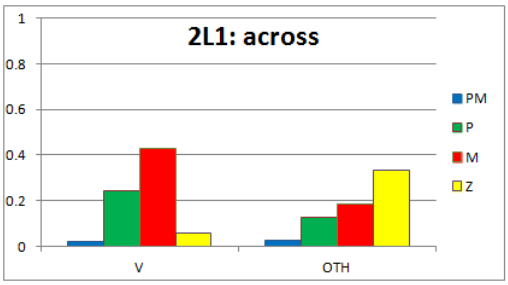


Figure E.6: L1 and 2L1 French Information Packaging for *across*-events

E.2 Semantic Density by Event Type

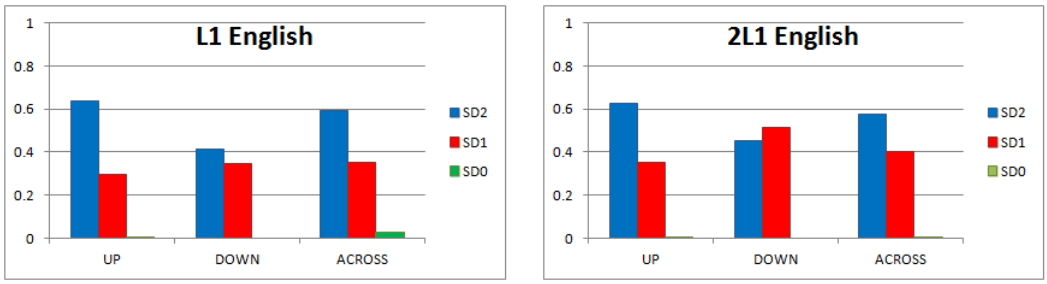


Figure E.7: L1 and 2L1 English Semantic Density by Event Type

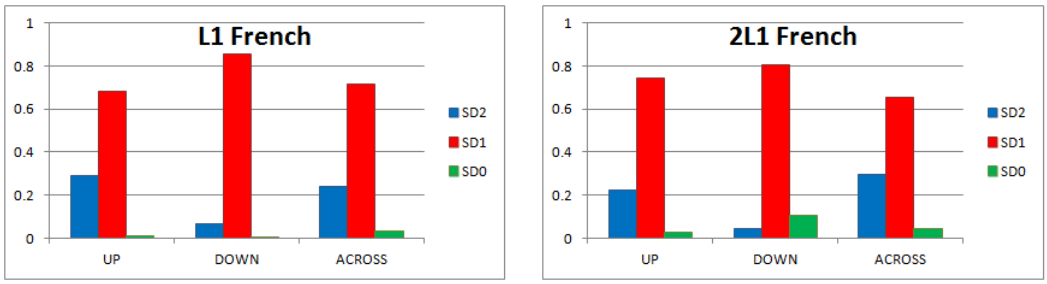


Figure E.8: L1 and 2L1 French Semantic Density by Event Type

E.3 Utterance Architecture by Age

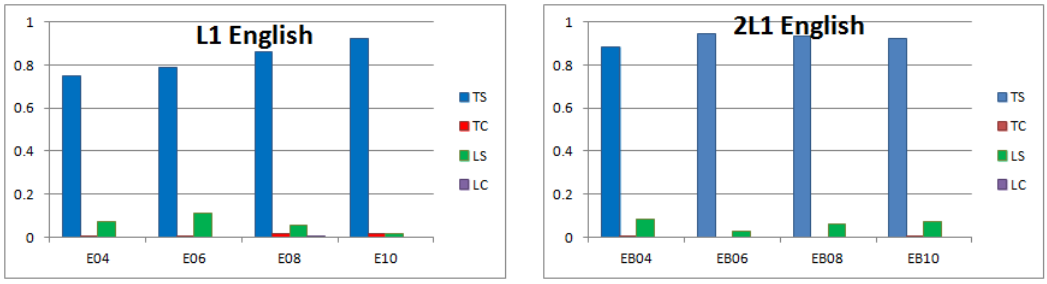


Figure E.9: L1 and 2L1 English Utterance Architecture by Age

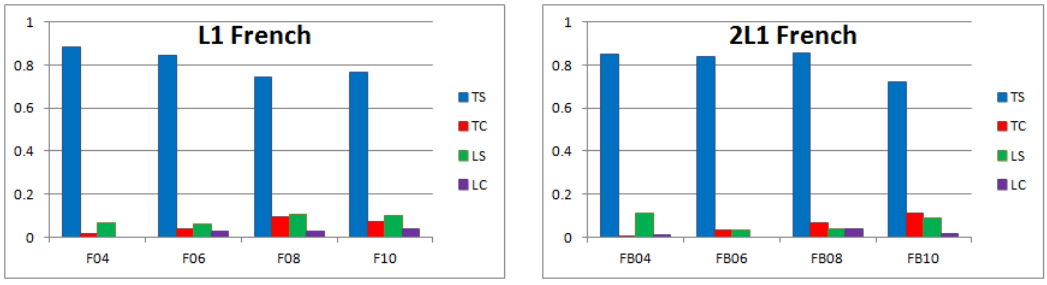


Figure E.10: L1 and 2L1 English Utterance Architecture by Age

E.4 Utterance Architecture by Event Type

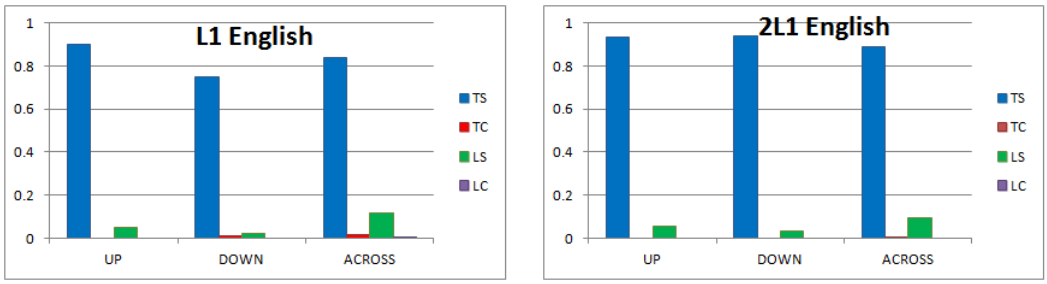


Figure E.11: L1 and 2L1 English Utterance Architecture by Event Type

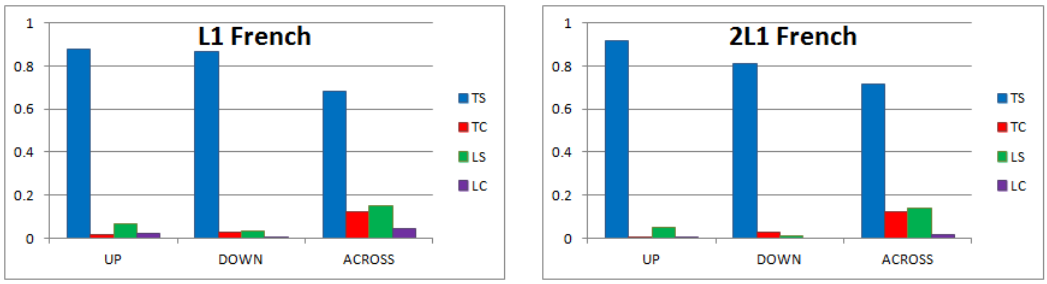


Figure E.12: L1 and 2L1 English Utterance Architecture by Event Type