Linguistic encoding of motion events in English and French

Typological constraints on second language acquisition and agrammatic aphasia

Efstathia Soroli, Halima Sahraoui, Carol Sacchett
Laboratoire Structures Formelles du Langage, CNRS & Université de Paris 8 / Laboratoire Octogone-Jacques Lordat, Université de Toulouse II-Le Mirail / Department of Language and Communication, Division of Psychology & Language Sciences, University College London

Languages show differences in how they encode motion in discourse: *Verb-framed* languages lexicalize *Path* in the verb, leaving *Manner* peripheral or implicit; *Satellite-framed* languages lexicalize *Manner* together with *Path* adjuncts. The present study investigates: 1) the extent to which such typological constraints affect the verbalizations of second language learners (English learners of French) and of aphasic speakers (English and French speakers with agrammatism) — who typically show dissociations between lexical and syntactic knowledge — in comparison to controls (English and French native speakers); as well as 2) the role of language-independent factors (level of acquisition, syndrome type). Despite some similarities between learners and speakers with aphasia due to language-independent factors, the findings suggest typologically constrained verbalizations in all groups, as well as diverging strategies that may reflect distinct underlying conceptualization processes.

Keywords: spatial language, second language acquisition, agrammatism, typological constraints, compensatory (language-specific/language-neutral) strategies

1. Introduction

Spatial language is fundamental to every aspect of human life, for example to localize objects in a house, to find one's way across town, or to give directions (Levinson 2003). Spatial cognition has traditionally been viewed as an independent

Language, Interaction and Acquisition 3:2 (2012), **261–287**. DOI 10.1075/lia.3.2.05sor
ISSN 1879–7865 / E-ISSN 1879–7873 © John Benjamins Publishing Company

domain-specific system, intuitive to all humans (Chomsky 1965). This general conception led some researchers to consider variations in spatial language and its links to cognition as impossible (Morton 1979; Fodor 1983), unlikely (Spelke 2003), or superfluous (Papafragou et al. 2002). Contemporary linguistic theory has been mainly preoccupied with accounting for fully fluent ('ideal') adult speakers in order to look for *universals* that guide the language faculty and linguistic performance, and by extending these findings to inquiries about second language acquisition and language loss. Current psycholinguistic work, however, recognizes some interface between spatial cognition and the linguistic system (e.g. Landau & Jackendoff 1993). Furthermore, an increasing body of research underlines the importance of taking *linguistic diversity* into account in various disciplines of cognitive science (Evans & Levinson 2009), pointing to the need for a cross-linguistic perspective in order to examine the possible effects of language variation on cognition. Slobin highlighted the cognitive implications of lexicalization patterns in languages and formulated the *Thinking for Speaking* hypothesis — according to which language particulars influence how speakers organize their thinking when they speak or prepare to speak by "[selecting] those characteristics that (a) fit some conceptualization of the event, and (b) are readily encodable in the language" (1996:76). As he defines it (Slobin 2000: 107), his theory is a "modified form of linguistic relativity" that differs from earlier views according to which languages determine drastically different cultural patterns and world views (cf. also see Lucy's 1992 discussion of Boas, Sapir and Whorf), proposing rather that language particulars produce "'ripple effects' of habitual attention to linguistically-encoded event characteristics" (Slobin 2003: 3). Thus, when communicating, speakers construe situations in terms of those particular features that are linguistically available and privileged in their own language. In the domain of motion events, speakers of different languages do not attend to all aspects of motion to an equal degree (e.g., Manner, Path, Endpoints) because languages do not make these facets of motion equally salient."

By extension, when learning a second language or re-learning an L1, the speaker is required to re-acquire the ability to *think* (or *re-think*) *for speaking* in order to re-organize his/her linguistic expression in a particular way. This also accounts for some of the considerable difficulties reported by learners as well as by people whose access to their native language patterns is impaired as a result of brain lesions — an issue which is of growing interest in the literature (see Black & Chiat 2000; Dipper, Black & Bryan 2005; Marshall 2009; Marshall & Cairns 2005). In this view, *learning* or *re-learning* spatial language imply parallel or similar patterns for the acquisition of new linguistic means, as well as a specific way of re-thinking for the purposes of communication in both normal and pathological contexts.

A large body of literature is concerned with the search for influences of particular language systems on language acquisition, language use and non-linguistic

© 2012. John Benjamins Publishing Company
All rights reserved

cognitive processes. Numerous studies in this area reveal an extensive scope of variation across languages, which has considerable implications for how spatial thought, spatial conceptualization and spatial language usage emerge in humans in the context of first language (L1) acquisition (Bowerman & Choi 2001; Hickmann et al. 2009 among many others). This increasing pace of research on L1 has provided an interesting context in which to pursue questioning about the impact of linguistic properties on conceptualization processes during second language (L2) acquisition (Cadierno & Lund 2004; Carroll et al. 2000; Flecken 2011; Hendriks, Hickmann, & Demagny 2008; von Stutterheim & Lambert 2005 among others), and to open new perspectives for re-conceptualization processes as activated during L1 *de-* and/or *re-acquistion* (Soroli 2011).

The present paper aims to identify the encoding processes that evolve as speakers *learn* or *re-learn* to express motion and/or *think* or *re-think for speaking* about motion. It focuses on whether *learning* implies the development of parallel or similar strategies between second language learners (L2L) and speakers with agrammatism (SWA), as well as the activation or re-activation of linguistic patterns for the expression of motion, opening new questions concerning processes of event re-conceptualization that might be involved. It compares the productions of adult L2L who are confronted with typologically different languages (English L1, French L2) and those of adult SWA who demonstrate dissociations between lexical and grammatical knowledge in their native language (English/French L1). This comparison can inform us about the different starting points of learners and 're-learners', their impact on production performance, and the common or divergent characteristics of the compensatory strategies they develop. While L2L may have to adopt a new focus on events when using a foreign language, SWA may have difficulties adopting the typical focus of their own native language, given their impaired access to it, particularly to verbs (see Cairns et al. 2007).

1.1 Spatial language and typological variation

From a typological viewpoint, motion events have received more attention than almost any other type of event. The reason is undoubtedly Talmy's (2000) pioneering proposal that languages fall into two types depending on their *lexicalization patterns*, according to the general view that "particular meaning components are regularly associated with particular morphemes in different languages" (2000, Vol. 2: 24). This view has led to a 'conflational' *event integration* typology in linguistics, which emphasizes one particular spatial semantic category, *Path*, and the investigation of the morphosyntactic categories that are responsible for its realization. Such a *function-to-form* approach demonstrates that languages characteristically realize *Path* either in the verb root or in a preposition (which Talmy generalizes

© 2012. John Benjamins Publishing Company
All rights reserved

to any adnominal category) and/or in a Satellite (a grammatical category of any constituent other than a noun-phrase or prepositional phrase complement that is in a sister relation to the verb root). More specifically, following this *event integration* criterion, Talmy proposes a distinction between two types of languages: *satellite-framed* and *verb-framed* languages (Germanic vs. Romance languages). This framework points out specific lexicalization constructions for describing motion events that are classified according to whether they realize *Path* in a verb or in a satellite (or even in both loci): "Path appears in the verb root in *Verb-framed* languages" such as French, "and it appears in the satellite in *satellite-framed* languages such as English […]." (Talmy 2000: 117–8).[1] Consequently, for the languages studied in this paper, a *satellite-framed* language such as English lexicalizes the *Manner* of motion in the verb (e.g. *to run, to crawl*) and uses other means (e.g., prepositions such as *into*, particles such as *across*) to express *Path* information within one compact structure, as illustrated in (1):[2]

(1) a. [He is running **into** the house]. /English *S-framed* pattern/
Manner **Path**

b. [The baby crawled **across** the street, **all the way** **to the other side**].
Manner **Path** **Path** **Path**

In contrast, a *verb-framed* language such as French, lexicalizes *Path* in the verb, leaving *Manner* information implicit or placing it at the periphery of the sentence, for instance by means of gerunds or of adverbials, as illustrated in (2):

(2) a. [*Il* ***entre*** *dans la maison*] (*en courant*). /French *V-framed* pattern/
('He is entering at the house by running.')
Path Manner

b. [*Le bébé* ***traverse*** *la rue à quatre pattes*].
('The baby is crossing the street on all fours.')
Path Manner

Slobin (1996) further probed the cognitive implications of such differences and put forward his *Thinking for Speaking* hypothesis, according to which speakers of different languages attend to different components of motion events (*Path, Manner*, *Figure*, *Ground*) because their languages do not make these components equally salient. He further underlines that speakers differentially attend to two

1. Note that not all languages can be easily classified accordingly to this typology. Some languages seem to show more complex systems of conflation, possibly indicating the need for more than two categories or for a continuum (e.g., Italian, Greek, Mandarin Chinese).

2. In all examples, main or independent clauses are indicated with brackets [ ] and subordinated clauses with parentheses ( ).

© 2012. John Benjamins Publishing Company
All rights reserved

types of components: (a) those that can be perceived and are *objectively* always present in the event (e.g., *Path*), that have consequences for dealing with the external world; and (b) those that are linguistically *subjective* and relevant to the event, but cannot be interpreted as easily from the perceived event (e.g., distinctions pertaining to *Manner*, *Aspect*, *Definiteness*). Thus, although Talmy's classification concerns first and foremost the expression of *Path* (as the most objective/universal component) that provides the *locus* of the entity (the 'Where'), Slobin focuses on other relevant components, such as the *Manner* of motion that provides the 'What' of the event and that seems to have a great impact on how the information is packaged within surface elements across languages. In French, for example, *Path* is mainly expressed in the verb while *Manner* may not be expressed at all, or, when expressed, it may be frequently placed outside the main clause in subordinate constructions, as in (2a). In contrast, in English *Path* is expressed typically in satellites, so that the verb remains available for the expression of *Manner*, privileging the packaging of multiple components in one single and compact structure, as in (1b).

In summary, variation may reflect not only the *lexicalization* or *Path integration pattern* of a particular language, but also other features that will be examined in this paper, such as: the *locus* where semantic components (*Path* and *Manner*) are realized, the ease with which multiple types of spatial information can be expressed simultaneously (the semantic *density* of the information), as well as the stacking (the *architecture*) of such information in simple, complex, main or subordinate clauses.

1.2 Variation and implications for L1/L2 language acquisition and re-conceptualization

Recent experimental research suggests that language-specific properties constrain not only how speakers express motion components in discourse (Hickmann et al. 2009; Slobin 1996; Talmy 2000), but also the *conceptualization* processes that underlie this linguistic encoding. Such findings raise new questions concerning speech production processes. According to Levelt's well acknowledged model of speech production (1989), *speaking* involves three main levels of activity: (a) the *conceptualization level*, concerned with the decision about what to say; (b) the *formulation level* involving decisions about how to say it; and (c) the *articulation level*, the procedure of actually articulating the message. From a cross-linguistic point of view, one question to be addressed is whether language particulars might influence the *conceptualization* level: if this were the case, then language-specific properties should also influence subsequent levels of speech production so that speakers of different languages should not encode spatial information in similar ways.

© 2012. John Benjamins Publishing Company
All rights reserved

With respect to first language acquisition, some evidence does indeed show that children have extensive knowledge about space very early on in life, well before they start producing language (Mandler 1998), and that children follow a very similar developmental course, for example when acquiring spatial prepositions, irrespective of their language (Johnston & Slobin 1979). However, some experimental evidence reveals cross-linguistic differences already during the pre-linguistic period (Bowerman & Choi 2001 among others). Although these findings are controversial (Hespos & Spelke 2004), they have opened a fundamental debate around the question of whether children's perceptual and cognitive behaviors are influenced by their surrounding language from early on.

With respect to second language acquisition, numerous studies have investigated the domain of motion events in order to gain insights into whether language-specific properties (of the L1 or the L2) affect the level of conceptualization during production in the target language. This question is particularly relevant when applied to L2 learners since they may be confronted with different properties of their L1 and/or their L2 so that acquisition may require re-conceptualization processes in order for them to gain a native-like mastery of the target language. Acquiring a second language not only involves learning different linguistic spatial means but also a different way of organizing information, that may or may not reflect an impact of specific language properties (of the L1, of the L2 or of both).

Although it seems obvious that such interference may be involved in L2 acquisition processes, transfer, interference and other similar phenomena have mainly been measured in isolation and at particular levels of language analysis (i.e., syntax, semantics, lexicon). Current research has focused on a more systematic investigation of the possible impact of L1 typological constraints on L2 and vice versa, underlining how language learning may imply deep processes of conceptualization and of re-conceptualization beyond the mere use of linguistic forms (Giacobbe 1992; Carroll & von Stutterheim 1997 among others). Researchers further look to identify traces of coexistence of target-like patterns (among two or more L1 or among L1, L2, L3 etc.), patterns of transfer, convergence, internalization, restructuration or attrition, and to identify the factors that may (co-)occur in such acquisitional contexts (cf. Bylund & Jarvis 2011; Jarvis & Pavlenko 2008; Köpke & Schmid 2011). More specifically, experimental studies based on event elicitation tasks show great variability in the performance of second language users. On one hand, studies by Cadierno (2008) show that Italian and Danish learners of Spanish produce target-like patterns in their verbal descriptions of motion events. Other studies (Hendriks, Hickmann & Demagny 2008; Hendriks & Hickmann 2010) report that English learners of French at different proficiency levels have less difficulty reaching target-like patterns when describing voluntary motion as compared to caused motion. Schmiedtová and Sahonenko (2008) found that very

© 2012. John Benjamins Publishing Company
All rights reserved

advanced Czech and Russian learners of German produced non-target like patterns in their descriptions of goal-oriented motion events. Similarly, in studies by von Stutterheim and Carroll (2006) English learners of German and German learners of English did not construe goal-oriented events in a target-like way, however, German learners of English were found to mention fewer endpoints than their homologue monolingual German speakers. These findings suggest: a) that second language users retain to some extent their native patterns in construing motion events, at least with respect to endpoints; and b) the beginning of some kind of restructuring procedure in L2 acquisition. Within this same framework, evidence from co-verbal gestures also suggest bi-directional linguistic impact and transfer with respect to the *Path* and *Manner* components, as expressed in both spatial language and gestures (Brown & Gullberg 2010), as well as the gradual development of full co-expressivity between the verbal and gestural modalities during children's first language acquisition (Hickmann, Hendriks & Gullberg 2011).

1.3 Agrammatic language and typological constraints

The interest in applying linguistic and acquisitional theory to aphasia research started with Jakobson's pioneering work (1941), in which he discussed the parallels between child language acquisition and *linguistic knowledge loss* in aphasia. He made the distinction between *similarity* (anomic) and *contiguity* (agrammatic) *disorders*, further suggesting that agrammatic language involves the loss of grammatical formatives that relate content words, their substitution by unmarked nominative case nouns, the frequent use of nominalizations, and the use of verb infinitives. Luria (1947) and other aphasiologists (e.g. Goodglass et al. 1972) accepted Jakobson's views on aphasia and opened a new perspective on aphasiology studies. Overall, linguistic theories of agrammatic aphasia have been mostly based either on Jakobson's and Luria's early traditional structuralism or more recently on generative theories that also propose specific explanations for the different patterns of omissions and substitutions of grammatical elements in this syndrome (Fromkin 1995; Grodzinsky 1990). Recent experimental research underlines the importance of accounting for language-specific properties as an additional factor that constrains how speakers (i.e. native monolinguals, learners, speakers with aphasia) represent information in discourse, and further affects the symptomatology of SWA who typically show asymmetries between lexical and grammatical components when using language (cf. Nespoulous 1999; Obler 1988).

Until recently, studies on aphasia dealt with simple verb/noun retrieval or functional word use, in order to establish some kind of *form-to-function* relation between the cortical structures and grammar of the aphasic speaker, often limited to a single language. For many years, researchers claimed that in aphasia, and

© 2012. John Benjamins Publishing Company
All rights reserved

more particularly in agrammatism, speakers have a general syntactic impairment (cf. among others Berndt & Caramazza 1980; Caplan 1985). The CLAS-project (Menn & Obler 1990) was the first to suggest that syntactic deficits in agrammatism may be dependent on language-specific properties. However, for at least another decade agrammatism continued to be treated as a global impairment of all functional elements (Grodzinsky 2006) with little interest shown in the conceptualization processes of agrammatic speakers. However, a growing body of recent empirical evidence on agrammatic aphasia has shown that the deficit is much more fine-grained than had been thought, and that not all functional elements or grammatical structures are impaired in agrammatic speech.

It is only with systematic cross-linguistic studies that aphasiologists started taking typological factors into account (Bates et al. 1991; Slobin 1991). Recent cross-linguistic evidence in agrammatism has shown, for example, that the structure of one's native language determines what types of errors, omissions and/or substitutions may occur (Paradis 2001). Moreover, verbal morphology is selectively vulnerable amongst brain-damaged speakers and, despite the many language-independent factors (e.g. syndrome-related) that can influence spared or impaired performance, language-specific properties seem to play an important role in this domain. Given the fact that agrammatism is broadly characterized by the reduced use of free and bound inflectional morphology, lack of grammatical agreement, decrease in complex structures, and use of telegraphic speech (Thompson, Shapiro, & Roberts 1993), one may expect that some of these manifestations will be more or less evident in production data depending on the structural properties of specific languages. Speakers of typologically different languages have indeed been found to exhibit symptoms that vary according to the parametric differences of their native system. For instance, evidence from SWA productions in Farsi and English (Nilipour & Paradis 1995) has shown that the structures of Farsi may be quantitatively more vulnerable with respect to verbal morphology compared with English speakers' productions. Other studies on aphasic discourse show that SWA tend to resort to whatever devices are available in their language, producing oversimplified utterances in order to deal with structural complexity (Jarema 1985) and using forms that occasionally resemble those of infants (Laka & Erriondo Korostola 2001) or of second language users (Ahlsén 2005).

Although some SWA have difficulties with grammatical information, they remain sensitive to semantic information (Schneider & Thompson 2003). Such information is found to be more easily available and resistant depending on the extent to which it is present in the structure of each language, as well as on its frequency of use (Centeno & Obler 2001). Specific studies on semantically complex verbs that specify arguments report individuals with agrammatic aphasia who have particular difficulties producing motion verbs when naming and generating

© 2012. John Benjamins Publishing Company
All rights reserved

sentences (Miceli, Silveri, Villa & Caramazza 1984). In comparison, when verbs are actually produced, SWA tend to over-rely on semantically light/neutral verbs taking nominal complements (Thompson, Lange, Schneider & Shapiro 1997), rather than on semantically rich ones (i.e., unergatives/unaccusatives).

Few previous studies of agrammatism have systematically examined verbalizations about spatial information, and more specifically encoding patterns in agrammatic production from a cross-linguistic perspective (apart from work by Soroli 2011; Soroli, Sahraoui & Sacchett 2011). Research to date on aphasic speakers' production has provided no clues as to how speakers of typologically different languages organize and encode different types of information in event description (e.g., *Manner*, *Path*, *Location*). One question to be addressed in the current study is the extent to which agrammatic speakers' event construals are constrained by language-specific properties. In particular, cross-linguistic comparisons aim to determine whether SWA's difficulties in retrieving motion verbs may reflect a general production disorder that includes processes at the conceptualization level (Levelt, Roelofs & Meyer 1999) and/or merely a difficulty in retrieving the lexical-semantic representations and forms of the verbs at the formulation level. More specifically, SWA's problems in verb retrieval and event description have been attributed to a difficulty in construing events in a language-relevant manner (Cairns, Marshall, Cairns & Dipper 2007; Dean & Black 2005; Marshall, Pring & Chiat 1993; Sacchett & Black 2011). Moreover, some recent studies that investigate the encoding strategies of agrammatic and anomic speakers of typologically different languages (English and French) as compared to homologue control groups from both a cross-language and a cross-syndrome perspective (Soroli, Hickmann & Sahraoui 2011) show that syndrome-related factors may be the source of similarities in the verbalizations of motion events within specific types of aphasia. However, speakers with different syndromes also show similarities in their lexicalization patterns, following to a large extent the properties of their native language. Thus, such deficits are especially problematic for people who present dissociations at the lexical and syntactic levels, and are highly relevant in relation to the linguistic specificity of conceptualization processes.

1.4 Experimental design and hypotheses

The design of the present study involved a *language production task*, in which participants had to verbally describe what had happened in a series of visual stimuli depicting voluntary motion events. The aim was to investigate how *thinking* about spatial relations or events in preparation for speaking and *developing strategies of encoding* may be influenced by specific linguistic properties when talking about motion. More specifically, the goal was to determine the respective role of

© 2012. John Benjamins Publishing Company
All rights reserved

typological (language-specific) vs. language-independent factors (e.g., level of acquisition for L2L, syndrome-related factors for SWA) in accounting for similarities and differences in verbalizations during second language acquisition and following language impairment.

Starting with the assumption that *Thinking for Speaking* is an integral part of language production, the central questions addressed here are two-fold: a) whether learning a typologically different L2 leads L2L to learn a new way of *Thinking for Speaking*, and b) whether re-learning to use their L1 after they have lost access to it preserves SWA's L1-specific event construal or leads them to construe events in a more language-neutral way. When speakers learn a second language in which space is not organized in the same way as in their first language, are conceptualizations based on the specific properties of the native language system or on the properties of the (newly acquired) linguistic environment to which they are exposed? Do learners conceptualize in one and the same 'crystallized' way or do they adopt target-like encoding strategies, easily adapting their *Thinking for Speaking* while learning a new system? Likewise, what happens when speakers lose the acquired L1 pattern in which space was organized in a specific way? Do SWA have problems with *Thinking for Speaking* in general or with only some features of their native language? We note here that Black & Chiat (2003), also refer to this problem as the 'spiral of impairment' where problems with *Thinking for Speaking* may lead to an impaired ability to focus on language-relevant aspects of events and thus to a failure in accessing relevant linguistic forms (especially verbs) in agrammatism. At the same time an impaired access to linguistic forms available in one's language may have an important impact on the ability to focus on relevant aspects of events, impairing somehow the *Thinking for Speaking* process (see also Dipper et al., 2005 for a similar view).[3] Does the symptomatology of SWA reflect the properties of their language or of a specific syndrome-like (i.e. agrammatic) way of *Thinking for Speaking*?

According to a first 'language-neutral' hypothesis, no major language effects should be found in the performance of either population and their productions should only reflect a way of construing reference to space that is not related to language-specific factors but rather to their syndrome (for SWA) or to their proficiency level (for L2 learners) (i.e., morpheme omissions/substitutions and nominalizations). In contrast, according to the 'thinking-for-speaking' hypothesis, speakers' performance should be strongly influenced by specific linguistic factors and thus follow distinct verbalization patterns according to the language systems they use (their L1 for SWA, L1 and/or L2 for learners).

3. This issue can be best tested using nonverbal methods investigating whether aphasia involves a primary event conceptualization deficit (cf. Soroli 2011).

© 2012. John Benjamins Publishing Company
All rights reserved

2. Method

2.1 Participants

Four different groups of speakers and two case studies were involved in the present research: 24 English and French monolingual control speakers (CS) (12 per language); 24 English learners of French (13 low-intermediate and 11 advanced); and two monolingual speakers with agrammatism (SWA) of English and French. All participants were asked to read an *information sheet*, fill out a *Sociolinguistic Questionnaire* and sign a *consent form* with the help of the investigator.[4] The general inclusion criteria for monolingual participants were the following: (1) native, monolingual speakers of English or French; (2) right-handed; (3) above 18 years of age; (4) with no known developmental disorder or deficit (other than agrammatism for SWA). They all had been exposed to only one language since birth and had not learned any foreign language before at least age 10 (only compulsory teaching at school). None had lived in a foreign country for more than six months. The two aphasic speakers were both pre-morbidly right-handed, and they reported no other known disorders or deficits before stroke. All participants, with or without agrammatism, had normal or corrected-to-normal vision and hearing.

Participants with agrammatism were identified using a diagnostic battery prior to testing, administered by a speech and language therapist. Classical language tests most commonly used for assessment in each country were the following: in France tests included the *Boston Diagnostic Aphasia Examination* (BDAE, French version, Mazaux & Orgogozo, 1982), the *Montreal-Toulouse Test for Aphasia* (MT86, Nespoulous, et al., 1986), and the *Oral Denomination Test* (DO80, Deloche & Hannequin, 1997); in the United Kingdom they were the BDAE (English version, Goodglass & Kaplan, 1972), the *Western Aphasia Battery* (WAB, Kertesz, 1982), and the *Verb and Sentence Test* (VAST, Bastiaanse, Edwards & Rispens, 2002). Eligibility criteria for participants with agrammatism were: (1) a stroke-caused aphasia with a left hemisphere lesion; (2) at least six months post-stroke. The two participants reported here presented good comprehension skills and non-fluent expressive aphasia, characterized by specific difficulties encoding syntax and morphology and limited 'telegraphic' speech.

All participants were recruited through contacts with universities in France and the United Kingdom. The two groups of (mostly American) English learners of French were people who had been studying and living in Paris for a period ranging approximately between two months and two years. They were all enrolled in the American University of Paris, and were learning French as a second language

4. The documents provided to the agrammatic participants were in an aphasia-friendly format.

© 2012. John Benjamins Publishing Company
All rights reserved

in that context (semi-guided learners). At the time of the testing, the learners were at two levels of proficiency: Low-Intermediate and Advanced.[5]

2.2 Experimental procedure and material

All speakers were asked to describe a set of 24 stimuli depicting voluntary motion events.[6] The stimuli consisted of short animated cartoons (see Figure 1), showing characters (humans and animals in diverse settings) performing displacements in different Manners (e.g., walking, swimming, climbing) along three types of Paths (up, down, across) (cf. Hickmann et al. 2009). Stimuli were shown on a 18,4" monitor on a laptop. Participants watched the cartoons and described what had happened after each stimulus. Participants' productions were audio-recorded and transcribed. The analyses examined what information (*Path*, *Manner*) was expressed in the utterances produced by the speakers, by what verbal means (verbs, adjuncts), and in what kinds of structures (simple, complex, main, subordinate clauses).

Figure 1. Examples of 'across' and 'upward' stimuli

2.3 Data coding procedure and analysis

The data were transcribed in CHAT format (MacWhinney 1995) and coded for semantic information, parts of speech, and utterance type. Each response was coded with respect to information *density* (the number of information components expressed), semantic *focus* (types of information expressed as identified in all parts of speech), semantic *locus* (whether information was expressed in main verbs or by other linguistic means), and global *architecture* (subordination, number of clauses, and distribution of semantic information within and across responses).

5. Levels of proficiency were determined on the basis of an independent in-house language test administered by the American University of Paris. With respect to European reference levels Low-intermediate users corresponded to A1/A2 levels and Advanced users to C1/C2 levels.

6. Some of these stimuli were control items not discussed in the present paper.

© 2012. John Benjamins Publishing Company
All rights reserved

With respect to the types of information expressed, responses taken as a whole were of four types depending on whether they encoded Manner, Path, both, or neither. For the *density* analysis, responses were scored as 2 (both *Manner* and *Path* expressed within the utterance), as 1 (only one type of information, either only *Manner* or only *Path*, but not both), and as 0 (neither Manner nor Path was expressed). On the basis of previous studies, and given the typological status of these languages, we expected control native speakers of English to produce utterances of higher density than French native speakers.

The locus and architecture analyses focused on the particular linguistic devices and syntactic structures used to encode spatial information. It was expected that English speakers should use compact main or independent clauses expressing Manner in the verb and *Path* outside of the verb, while French speakers should use Path verbs together with more frequent subordination to express Manner. Our main interest was to investigate whether findings for native monolingual controls followed expectations based on the literature and whether these patterns had an impact on the productions of learners of French and of SWA.

3. Results

3.1 Information focus and density

The results concerning control speakers show significantly greater semantic density in English than in French (Density 2 = 83% in English vs. 42% in French; $F(1,20) = 65.50$, $p < 0.0001$), as expected.[7] English speakers produced almost twice as many utterances with maximal density, expressing both *Manner* and *Path* (example (3)), as compared to French speakers, who frequently expressed only one component, mostly *Path* and only rarely *Manner* (example (4a)). Note that typically, when both *Manner* and *Path* were expressed in French utterances, speakers often did so using subordinate clauses (4b).

(3) [The boy <u>swam</u> **across** the river]. /English CS/
<u>Manner</u> **Path** **Density=2 (Manner + Path)**
Global focus: PM

7. For the statistical analysis we performed a mixed-design ANOVA on raw PM-scores (corresponding to maximal Density of 2), examining the effect of language as between-subject factor (English, French) and event type as within-subject factor (up, down, across). For the purposes of the present paper we only discuss the language factor results (see more details in Soroli 2011). The analysis showed no significant effect of gender ($p > 0.05$), and therefore this factor was disregarded in subsequent analyses.

© 2012. John Benjamins Publishing Company
All rights reserved

(4) a. [*La chenille* ***monte jusqu'****en haut de la tige*]. /French CS/
('The caterpillar ascends till the top of the stem'.) **Density=1 (Path)**
Figure **Path** **Path-goal** Location **Global focus: P**

b. [*Le bébé* ***traverse*** *la route*] (*en marchant à quatre pattes*).
('The baby crosses the street walking on all fours'.) **Density=2 (Path + Manner)**
Figure **Path** Ground Manner Manner **Global focus: PM**

Both groups of learners expressed overall less information than monolingual controls. More specifically, L2 learners produced idiosyncratic morphology and non-target-like structures (i.e., coordinated clauses in order to express both *Manner* and *Path*), although they did so to a lesser degree as proficiency advanced, showing some influence of their L1, as illustrated in examples (5a) and (5b). Nevertheless, learners respected to some degree the typical pattern of the target language (French), in which *Path* is more prominent than *Manner*, but did so by using non-target-like syntactic structures.

(5) a. […] [*il faire du jogging*] [*et* ***traverser*** *une rue*]. /Low-Intermediate/
('… he to.jog and to.cross a road'.)
Manner **Path**
Density 1 — Focus: M **Density 1 — Focus: P**

b. […] [*elle* ***traverse*** *un lac gelé*] [*et elle fait d(e) le patinage*] /Advanced/
('… she crosses a frozen lake and she does skating'.)
Density 1 — Focus: P **Density 1 — Focus: M**

The aphasia data also show responses of lesser density in comparison to controls. The French SWA produced frequent utterances of low density (61%), with a main preference for Path, as illustrated in (6), a substantial number of zero-density utterances (28%), and only few utterances of higher density (*Path+Manner* conflation: 11%). Statistical tests[8] revealed no significant differences in the focus/density of their responses as compared to French controls. For the English SWA the information focus/density pattern resembled more closely the French control pattern than the English one. This SWA produced significantly more responses expressing

8. Because participants with agrammatism were case studies, statistical analyses of their scores used the method proposed by Crawford and Howell (1998) that treats the statistics of the analogous control group as sample statistics (see also Crawford & Garthwaite 2002). This method, based on Sokal and Rohlf (1995), uses the *t*-distribution (with $n-1$ degrees of freedom), rather than the standard normal distribution, in order to estimate the *abnormality* of each participant's score and in order to test whether it was significantly lower than those of the control sample. When this test is applied, the *p* value obtained is used to test significance, but it also provides a way to estimate the *abnormality* of the participant's score on the basis of the proportion of the control population that would obtain a lower score.

© 2012. John Benjamins Publishing Company
All rights reserved

only one spatial component (78%) as compared to English controls ($p = 0.02$), surprisingly focusing mainly on *Path* information, as in (7). He produced only few utterances with no semantic (spatial) components at all (6%), yet retained to some extent some double *Path+Manner* conflation (16%).

(6) [*C'est une porte et euh… la fille*] (*qui va faire* ***en avant***). /French SWA/
('It's a door and the girl who is going to do forward.')
Density 1 — Focus P

(7) [**Cross** a tracks]. /English SWA/
Density 1 — Focus: P

3.2 Information locus

Further analyses examined *information locus* in order to determine the specific linguistic devices that were used to encode relevant semantic components of motion (*Manner* and *Path*). These analyses distinguished information that was expressed in the verb roots (hereafter "Verb") vs. in other devices including particles, adverbials, PPs, and other relevant subordinate clauses (hereafter "Other").

Figure 2 shows the conflation types expressed in the verb and in other linguistic devices by the French and English speakers.[9] As predicted, French monolingual controls followed the typical Verb-framed pattern of their language and primarily encoded *Path* (P) in the verb (74%), as compared to rare P lexicalization in English (6%). The mixed ANOVAs performed to examine the effects of language as between-subject factor (English vs. French) and locus (verb vs. other linguistic devices) as within-subject factor showed significant main effects of both factors for each type of conflation (*Path*, *Manner*, *Path+Manner*). More specifically, in French other linguistic devices were rarely used, but when they occurred, they typically encoded *Path* (P: 33%) or *Manner* (M: 13%), rather than the two semantic components simultaneously (PM: 5%). However, the data show significantly greater PM-conflation in the verbs (18%) in French, than in English (0%) (PM: $F(1,20) = 48.70$, $p = 0.001$). In contrast, following the typical satellite-framed pattern, the English control speakers used compact syntactic structures, systematically encoding *Manner* in the verb stem (78% vs. 7% in French — M: $F(1,20) = 68{,}06$, $p = 0.000$) and *Path* by other linguistic devices in the periphery (88% vs. 32% in French — P: $F(1,20) = 29.32$, $p = 0.000$).

With respect to the learners' productions, the data revealed encoding systems that were variable for each type of conflation and locus (see Figure 3) but overall

9. In the graphs non-significant comparisons are indicated with "ns" and significant differences with "*" ($p \leq 0.05$).

© 2012. John Benjamins Publishing Company
All rights reserved

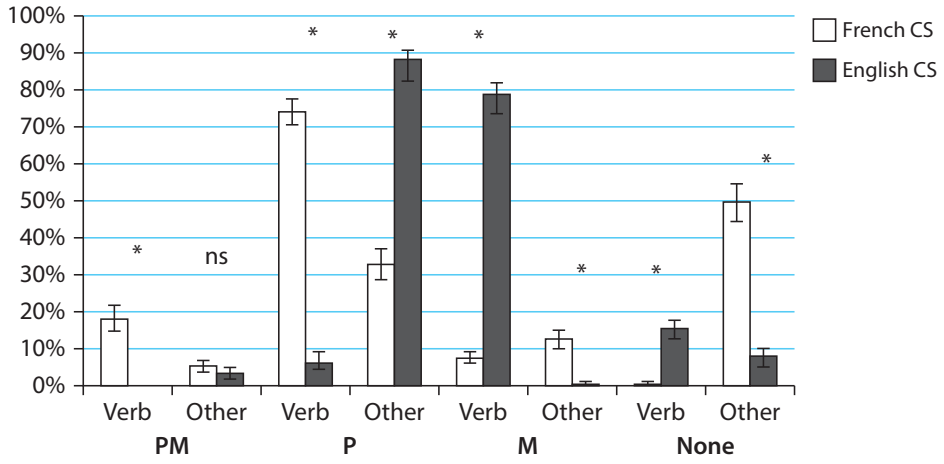

Figure 2. Information locus and conflation types in English and French native controls

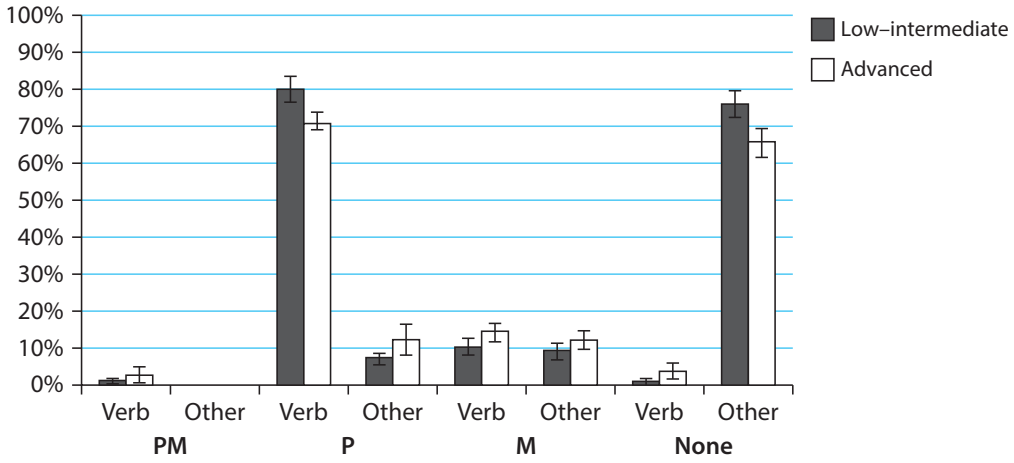

Figure 3. Information locus and conflation types in Low and Advanced English learners of French

no significant differences across levels of competence. English learners of French mainly lexicalized *Path* information in verbs, irrespective of competence levels (low-intermediate: 80%; advanced: 70%), adopting the typical pattern of the target language (French: 74%). However, learners of both levels used significantly fewer verbs encoding *Path+Manner* information (1% and 2% respectively), even if such PM-conflations are quite frequent in French (18%) with specific verbs (i.e., particularly *grimper* 'to climb.up' frequent with upwards motion). Additionally, only 10% (low-intermediate) and 14% (advanced) of the verbs encoded *Manner* alone (typical in the native language of the learners: 79%). Semantic encoding of spatial components in other linguistic devices was even less frequent, with rare occurrences of utterances combining both *Path* and *Manner* information.

A closer look at the structural properties of their utterances showed that low-level learners mainly provided *Manner* information in a prepositional phrase,

© 2012. John Benjamins Publishing Company
All rights reserved

intending to indicate instruments but making non-target-like errors, as in example (8). In some cases, they encoded *Manner* using non-target-like subordinating constructions, as illustrated in (9). At the advanced level, more target-like subordinate clauses were used, as well as prepositional phrases introducing objects as instruments with the use of target-like prepositions. In most of these cases, *Path* preceded *Manner* as the verb typically precedes prepositional phrases in French. Interestingly, however, in some cases learners pre-posed *Manner* information in a rather native-like (English) way when speaking French, as in example (10).

(8) [*Le femme* ***traverse*** *les rails* *dans le bicyclette*].
('The woman crosses the tracks in a bicycle.')

(9) [*Il* ***traverse*** *le rivière*] (*par glisser sur le glace*).
('He crosses the river by sliding on the ice.')

(10) [*Une femme* *dans un vélo* ***a crossé*** *des rails du train*].
('A woman in a bike crossed the tracks of the train.')

As shown in Figure 4, the French SWA overall followed the native pattern of his language, mostly preferring to express *Path* information mainly in verbs (67%), as did controls (74%). However, he expressed significantly less *Path* information in peripheral devices (6%) than controls (33%) ($p = 0.05$) and clearly made important semantic omissions both in verbs (6%) and in other devices (94%) as compared to French CS (0% and 50%; $p < 0.01$ and $p = 0.01$ respectively). Additionally, he often omitted verb morphology, opting for infinitive forms, simple future constructions, and light-verbs (see example (6) above).

As for the English SWA, as shown in Figure 5, he followed overall the pattern of his native language with 44% *Manner* verbs and 50% *Path* adjuncts. He

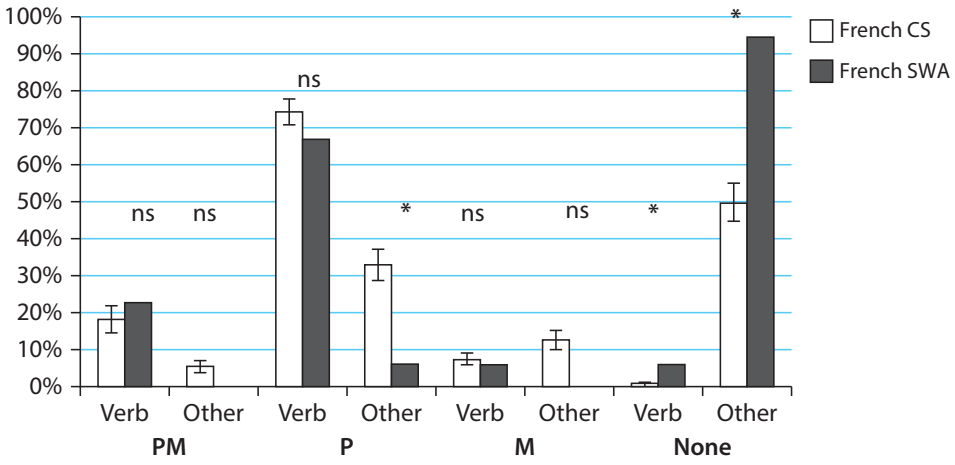

Figure 4. Information locus and conflation types in the French speaker with agrammatism and in controls

© 2012. John Benjamins Publishing Company
All rights reserved

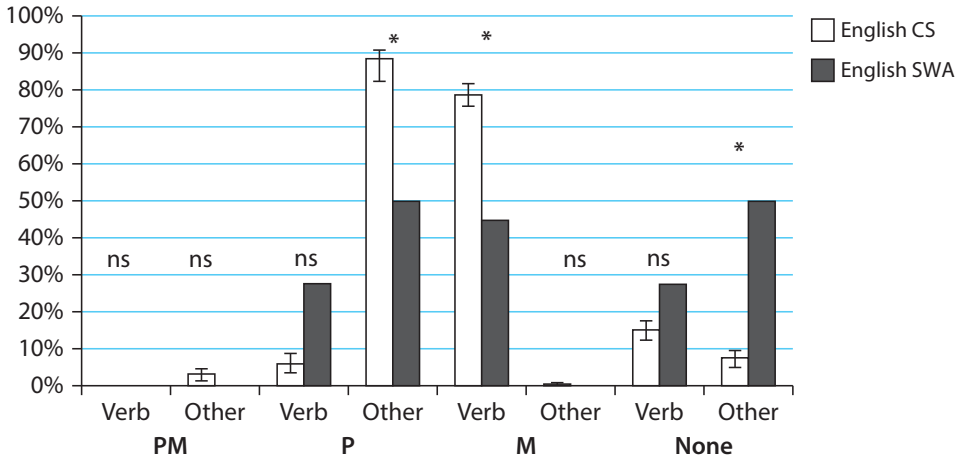

Figure 5. Information locus and conflation types in the English speaker with agrammatism and in controls

encoded both motion components in a systematic way, as the native CS group did (79% and 88% respectively), although he did so to a significantly lesser extent than controls ($p < 0.0001$ for both loci), showing a more general distribution of spatial information in his utterances as well as significantly more semantic omissions in peripheral devices (50%) than controls (8%) ($p < 0.001$).

Finally, specific comparisons between L2 learners and SWA revealed striking similarities between them. Overall, all of these speakers showed a strong preference to lexicalize Path in verbs and rarely expressed any other information in verbs or in other devices. The only significant differences were found with respect to the expression of PM and the omission of peripheral devices. More specifically, while the French SWA preferred to express *Path* information in his utterances (67%), as did learners, he used significantly more verbs expressing both *Path+Manner* (PM: 22%) than the groups of learners who systematically avoided this type of conflation (1% and 3% respectively) ($p = 0.01$). Finally, differences were also found with respect to the omissions of semantic information, in that the French SWA systematically avoided the expression of any spatial information in peripheral devices (94%) and did so significantly more often than the two groups of learners (76% and 66% respectively, $p = 0.05$).

Further qualitative analyses showed that, despite some limited differences in the compensatory strategies used by L2 learners and SWA, similarities emerged in participants' productions. Firstly, L2 learners relied mostly on a "disjoint" distribution of information across separate clauses, as illustrated in example (5) above, together with some attempts to subordinate some spatial information by means of different subordinate markers (9) in order to reproduce the target-like French pattern (e.g., *pour V* 'in order to V'; *pendant que V* 'while Ving'; *en V-ant* 'V-ing'). This resulted in some idiosyncratic productions, as in (11), where their native language

© 2012. John Benjamins Publishing Company
All rights reserved

(English) invited them to follow a *Manner*-first order for encoding information, whereas French speakers typically rely on a Path-first order. In contrast, the two SWA relied more on adjuncts to replace their extensive verbal omissions, which in turn depended on the language properties of their native language and their specific difficulty in accessing lexicalized information (*Path* in French, *Manner* in English) as illustrated in (12a) and (12b). Secondly, L2 learners' productions involved target-like expressions of motion, with satellites such as *jusqu'à* 'until/up to' and *d'un côté à l'autre* 'from one side to the other', as in (13), apparently very similar to the French SWA's idiosyncratic constructions, as in examples (12a) and (14).

(11) [*Il nage*] (***en traversant** le… la fleuve*). /Advanced learners/
('He swims crossing the river.')
instead of: *traverser en nageant* 'to cross by swimming'

(12) a. [*C'est un homme*] (*qui… c' est euh **droite gauche***). /French SWA/
('It's a man who… it's right left.')
instead of: *traverser* 'to cross'
b. [**Down** … caterpillar] /English SWA/
instead of: to *crawl down*

(13) [*La fille patine **de le côte droite à le côté gauche***]. /Low-level learners/
('The girl skates from the right side to the left side.')
instead of: *traverser en faisant du patin* 'to cross by skating'

(14) [Il va … faire euh **dans le chemin extérieur**]. /French SWA/
('He is going … to do in the exterior path.') instead of: *sortir* 'to exit'

4. Discussion

The study tested a 'language-neutral' and a 'thinking-for-speaking' hypothesis. According to the first, no major language-specific impact was expected in the performance of either population. Participants' productions were expected to reflect only general characteristics related to syndrome (for SWA) or to proficiency-level (for L2 learners) factors. In contrast, according to the second hypothesis, speakers' performance was expected to be strongly influenced by specific linguistic factors and thus to follow distinct verbalization patterns according to the language systems speakers use (their L1 for SWA, L1 and/or L2 for learners). The findings show some similarities as well as interesting variations in the ways spatial information is organized across populations.

Overall, the encoding patterns of the tested speakers confirmed previous typological literature according to which typologically different languages (here

© 2012. John Benjamins Publishing Company
All rights reserved

English and French) show significantly distinct lexicalization patterns in normal native contexts. More specifically, the English and French control native speakers we tested did indeed express motion in significantly different ways. The dominant pattern in English consisted in expressing *Manner* in the verb and *Path* in satellites within syntactically compact and semantically dense structures, as compared to the French pattern that privileged the lexicalization of *Path*, leaving reference to Manner implicit or expressing it by peripheral means including subordination.

With respect to the verbal behavior of L2 learners' and agrammatic speakers, the data reveal commonalities but also some variability depending on the language. Following our predictions, English learners of French as well as French and English re-learners (SWA) are faced with a number of challenges, due to having learnt a specific *Thinking for Speaking* in their native language. Representing motion in a language minimally requires a lexicon to express a variety of *Manners* and *Paths*. In French, for instance, our L2 learners and SWA clearly had insufficient and/or restricted access to lexical items which would allow them to express *Path* information with verbs such as *traverser/sortir* 'to cross/exit' (see examples (11)–(14)), *Manner* information such as with verbs equivalent to *riding a bicycle* (cf. examples (8) and (10) above) or simultaneously conflate *Path+Manner* with verbs such as *grimper* ('to climb.up'). Additionally, French CS most frequently resorted to a complex system of clauses in order to express both *Path* and *Manner* information (*Path* in main clauses and *Manner* in subordinates). Such constructions involve the acquisition of appropriate markings of subordination, (e.g., gerunds, use of appropriate verbal forms and connectives). Choosing between an inflected and an infinitival form or selecting the appropriate connective (*pour, par, en, qui*) is not an obvious task for the L2 learner (e.g., il court **par* glisser vs. *pour* glisser) or for the French SWA (e.g., *c'est un homme…c'est droite gauche* vs. *c'est un homme qui traverse*). As for the English SWA, from a 'language-independence' view, one would expect that his verbalizations should only reflect syndrome-related impacts and thus should be similar to the one adopted by the French SWA. However, similarities were only found with respect to the focus/density analysis where both SWA, as well as L2L, produced utterances of low semantic density and with strong focus on *Path*. The more detailed *locus* analysis further showed that the English SWA followed the pattern of the native English control group, expressing *Manner* information in verbs and *Path* in peripheral devices, although to a lesser extent and within coordinated clauses.

The general impoverished productions identified in the L2 learners' and SWA's data, as well as their preference for expressing *Path* information, probably result from their tendency to focus on the most basic and universal component of motion (Path) — the 'core schema' (Talmy 2000) — which becomes the most efficient and economical way to describe motion, irrespective of language, especially when

© 2012. John Benjamins Publishing Company
All rights reserved

access to other lexical resources is limited. However, the locus analysis showed that when L2 learners and SWA expressed *Path*, the former encoded this information mainly in verbs, but the latter in adjuncts. Thus, depending on the native language, the realization of this component varied. For instance, English learners of French had a tendency to put *Manner-first*, when they expressed *Manner* information together with *Path* in French (coordinate clauses). On the other hand, the French SWA relied on the only semantic information lexicalized in his language, *Path* — which is also the more semantically universal among all components. Likewise, the English SWA also preferred to focus on what is universally encoded in all languages (*Path*), however, expressing it mainly in peripheral devices, as imposed by his native pattern.

These results lead us to a rather mixed conclusion. *Thinking for Speaking* is neither entirely "imposed" by one's native or second language properties nor entirely "dependent" on acquisitional (competence level) or de-acquisitional (syndrome-related) factors. Language-neutral factors provide the basis for compensation (the criteria for choosing to *focus* on one component) when acquiring or re-acquiring a linguistic system. However, specific linguistic properties provide the learner and the re-learner with an additional array of organizational options from which to choose in order to represent and distribute spatial components in different discourse *loci* privileging some strategies more than others. For example, similarities between the learners and aphasic speakers' productions (i.e. morpho-syntactic simplifications) may be due to universal strategies that emerge from the need to compensate for a difficulty in retrieving specific linguistic information (i.e. accessing morphemes) at the formulation level or from a deeper impairment at the conceptualization level (see also Klein & Perdue, 1997; Kolk 2006; Sahraoui & Nespoulous 2012), but it is difficult to tease these two levels of processing apart. Differences in compensation (e.g., Path lexicalization in French vs. grammaticalization in English) rather reflect the strong impact of language on encoding processes irrespective of competence or syndromes. Languages introduce a great deal of variation in terms of available and typical linguistic means for spatial descriptions, which, together with other acquisitional and/or syndrome-related factors influence the relative salience of incoming information, as well as the relative weight (universal/language-specific) of the produced information.

5. Concluding remarks

The present study contributes to the exploration of the encoding processes from a cross-linguistic perspective in typical and atypical populations. The aim was to test various hypotheses concerning the presence or absence (and strength) of language

© 2012. John Benjamins Publishing Company
All rights reserved

effects on how speakers (monolingual native speakers with and without agrammatism and second language learners) organize and encode spatial language in discourse, investigating the factors (language-neutral or language-specific) that influence spatial language conceptualization and formulation. The answer is not straightforward.

The analysis of the production data focused on different types of measures in order to cover a large range of response types (information focus, semantic density, semantic locus and syntactic architecture of the utterances). The findings that emerge from this research do not support any single hypothesis. The interface of syntactic, semantic and pragmatic spatial knowledge constitutes a complex picture for second language acquisition and language pathology. Describing spatial motion events is clearly not an easy task for people who learn or re-learn a linguistic system. Learners and SWA are both arguably in a 'acquisitional' situation where universal and typological properties jointly constrain speakers' *Thinking for Speaking*. Similarities and differences between second language learners and native monolingual speakers with agrammatism lie in an incomplete awareness of the implications of certain aspects of the grammar for the entire syntactic and semantic structure of the target systems. This means that, although they are not always aware of the implications of the grammatical features they are learning or re-learning, and although they are not always successful in organizing spatial information (universal preferences for omissions/substitutions), learners and SWA do develop diverging compensatory strategies, re-organizing their spatial conceptual universe in a rather language-specific way in order to achieve communication successfully. However, the aphasia literature acknowledges that it remains to be determined whether impairment in lexical access or in *Thinking for Speaking* is the cause vs. the effect. Most researchers argue for a reciprocal relationship between the language impairment in aphasia and possible additional problems with event conceptualization, but it is by no means suggested that all people with agrammatism have difficulties with *Thinking for Speaking*. The results of the two participants with agrammatism studied in this paper would argue more for impaired access to language, potentially leading to effects on conceptualization, rather than vice versa, but additional non-verbal evidence is clearly necessary to further investigate this question.

More generally, the results presented in this paper open new perspectives for the study of the interactions between spatial language and spatial conceptualization in normal and pathological contexts. It particularly allows us to reconsider more generally (re)acquisition issues with respect to interfering typological factors that influence how speakers of different languages attend to different features of the world, organize incoming information, and encode it in discourse, all of which depend partially on the specific filters of the language(s) acquired. Nonetheless, we

© 2012. John Benjamins Publishing Company
All rights reserved

undoubtedly all perceive information from our environment in a comparable way because of similar innate perception mechanisms. This line of reasoning should encourage researchers to counterbalance views, to objectively consider processes of schematization, conceptualization, and lexicalization in different acquisitional contexts, and to formulate more precise and subtle views that take into consideration the respective weight of both language-neutral and language-specific factors when studying the complex mechanisms of spatial encoding.

References

Ahlsén, E. (2005). Argumentation with restricted linguistic ability: Performing a role play with aphasia or in a second language. *Clinical Linguistic Phonology* 19(5), 433–551.

Bastiaanse, R., Edwards, S. & Rispens, J. (2002). *The verb and sentence test (VAST)*. Bury St. Edmonds: Thames Valley Test Company.

Bates, E., Wulfeck, B. & MacWhinney, B. (1991). Cross-linguistic research in aphasia: An overview. *Brain and language* 41(2), 123–148.

Berndt, R.S. & Caramazza, A. (1980). A redefinition of the syndrome of broca's aphasia: Implications for a neuropsychological model of language. *Applied Psycholinguistics* 1, 225–278.

Black, M. & Chiat, S. (2000). Putting thoughts into verbs: developmental and acquired impairments. In W. Best, K. Bryan, & J. Maxim (eds.), *Semantic processing: Theory and practice* (5-–79). London: Whurr Publishers.

Bowerman, M. & Choi, S. (2001). Shaping meanings for language: Universal and language-specific in the acquisition of spatial semantic categories. In M. Bowerman & S. Levinson (eds.), *Language acquisition and conceptual Development* (475–511). Cambridge: Cambridge University Press.

Brown, A. & Gullberg, M. (2010). Bidirectional cross-linguistic influence in event conceptualization? Expressions of path among Japanese learners of English. *Bilingualism: Language and Cognition*. Advance online publication. doi:10.1017/S1366728910000064

Bylund, E. & Jarvis, S. (2011). L2 effects on L1 event conceptualization. *Bilingualism: Language and Cognition* 14(1), 47–59.

Cadierno, T. (2008). Learning to talk about motion in a foreign language. In P. Robinson & N. Ellis (eds.), *Handbook of cognitive linguistics and second language acquisition* (239–275). New York: Spon press.

Cadierno, T. & Lund, K. (2004). Cognitive linguistics and second language acquisition: motion events in a typological framework. In B. van Patten, J. Williams, S. Rott, & M. Overstreet (eds.), *Form-meaning connections in second language acquisition* (139–154). Mahwah, N.J.: Lawrence Erlbaum.

Cairns, D., Marshall, J., Cairns, P. & Dipper, L. (2007). Event processing through naming: Investigating event focus in two people with aphasia. *Language and Cognitive Processes* 22(2), 201–233.

Caplan, D. (1985). Syntactic and semantic structures in agrammatism. In M.L. Kean (ed.), *Agrammatism* (125–152). Orlando: Academic Press.

© 2012. John Benjamins Publishing Company
All rights reserved

Carroll, M., Murcia-Serra, J., Watorek, M. & Bendiscioli, A. (2000). The relevance of information organization to second language studies: The descriptive discourse of advanced learners of German. *Studies in Second Language Acquisition* 22(3), 441–466.

Carroll, M. & von Stutterheim, C. (1997). Relations entre grammaticalisation et conceptualisation et implications sur l'acquisition d'une langue étrangère. *Acquisition et Interaction en Langue Étrangère* 9, 83–116.

Centeno, J.È. & Obler, L.K. (2001). Agrammatic verb errors in Spanish speakers and their normal discourse correlates. *Journal of Neurolinguistics* 14(2–4), 349–363.

Crawford, J.R. & Garthwaite, P.H. (2002). Investigation of the single case in neuropsychology: Confidence limits on the abnormality of test scores and test score differences. *Neuropsychologia* 40, 1196–1208.

Crawford, J.R. & Howell, D.C. (1998). Comparing an individual's test score against norms derived from small samples. *The Clinical Neuropsychologist* 12, 482–486.

Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: The MIT press.

Dean, M. & Black, M. (2005). Exploring event processing and description in people with aphasia. *Aphasiology* 19, 521–544.

Deloche, G. & Hannequin, D. (1997). *DO 80 : Test de Dénomination Orale d'Images*. Issy-les-Moulineaux: Editions ECPA.

Dietrich, R., Klein, W. & Noyau, C. (1995). *The acquisition of temporality in a second language*. Amsterdam: John Benjamins.

Dipper, L., Black, M. & Bryan, K. (2005). Thinking for speaking and thinking for listening: The interaction of thought and language in typical and non-fluent comprehension and production. *Language and Cognitive Processes* 20(3), 417–444.

Evans, N. & Levinson, S.C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences* 32(5), 429–448.

Flecken, M. (2011). Event conceptualization by early bilinguals: Insights from linguistic as well as eye tracking data. *Bilingualism: Language & Cognition*, 14(1), 61–77.

Fodor, J.A. (1983). *The modularity of mind: an essay on faculty psychology*. Boston: The MIT Press.

Fromkin, V.A. (ed.) (1995). Linguistic representational and processing analyses of agrammatism. *Brain & Language, Special Issue* 50(1, 2, 3), 252.

Giacobbe, J. (1992). A cognitive view of the role of the L1 in the L2 acquisition process. *Second Language Research* 8, 232–250.

Goodglass, H. & Kaplan, E. (1972). *The assessment of aphasia and related disorders*. Philadelphia, PA: Lea & Febiger.

Grodzinsky, Y. (1990). *Theoretical perspectives on language deficits*. Cambridge, MA: MIT Press.

Grodzinsky, Y. (2006). A blueprint for a brain map of syntax. In Y. Grodzinsky & K. Amunts (eds.), *Broca's Region* (83–108). New York: Oxford University Press.

Hendriks, H. & Hickmann, M. (2011). Expressing voluntary motion in a second language: English learners of French. In V. Cook & B. Bassetti (eds.), *Language and bilingual cognition* (315–340). New York, NY: Psychology Press.

Hendriks, H., Hickmann, M. & Demagny, A.C. (2008). How adult English learners of French express caused motion: A comparison with English and French natives. *Acquisition et Interaction en Langue Etrangère* 27, 15–41.

Hespos, S.J. & Spelke, E.S. (2004). Conceptual precursors to language. *Nature* 430, 453–456.

© 2012. John Benjamins Publishing Company
All rights reserved

Hickmann, M., Hendriks, H. & Gullberg, M. (2011). How to talk and gesture about motion in French and English: Cross-linguistic and developmental perspectives. Langage, Interaction et Acquisition 2(1), 129–156.

Hickmann, M., Taranne, P. & Bonnet, Ph. (2009). Motion in first language acquisition: Manner and path in French and in English. *Journal of Child Language* 36(4), 705–741.

Jakobson, R. (1941). *Kindersprache, Aphasie and allgemeine Lautgesetze*., Uppsala: Almqvist u. Wilsells. Reprinted as *Child Language, Aphasia, and Phonological Universals* 1968. Mouton, The Hague.

Jarema, G. (1985). Is "agrammatic speech" Agrammatical? *Papers in Linguistics* 18, 223–238.

Jarvis, S. & Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. London: Routledge.

Johnston, J. & Slobin, D. (1979). The development of locative expressions in English, Italian, Serbo- Croatian and Turkish. *Journal of Child Language* 6, 531–547.

Kertesz, A. (1982) *The western aphasia battery*. New York: Harcourt, Brace, Jovanovich.

Kolk, H.H.J. (2006). How language adapts to the brain: an analysis of agrammatic aphasia. In L. Progovac, K. Paesani, E. Casielles, & E. Barton (eds.), *The syntax of non-sententials: Multidisciplinary perspectives* (229–258). Amsterdam: John Benjamins.

Köpke, B. & Schmid, M.S. (2011). L'attrition de la première langue en tant que phénomène psycholinguistique. *Language, Interaction & Acquisition* 2(2), 197–220.

Klein, W. & Perdue, C. (1997). The basic variety (or: Couldn't natural languages be much simpler?). *Second Language Research* 13(4), 301–347.

Laka, I. & Erriondo Korostola, L. (2001). Aphasia manifestations in Basque. *Journal of Neurolingusitics* 14(2–4), 133–157.

Landau, B. & Jackendoff, R. (1993). What and where in spatial language and spatial cognition. *Behavioral and Brain Sciences* 16(2), 217–238.

Levelt, W.J.M. (1989). *Speaking: from intention to articulation*. Cambridge, MA: The MIT Press.

Levelt, W.J.M., Roelof, A. & Meyer, A.S. (1999). A theory of lexical access in speech production. *Behavioural and Brain Science* 22, 1–75.

Levinson, S.C. (2003). Language and mind: let's get the issue straight! In D. Gentner & S. Goldin-Meadow (eds.), *Language in mind. Advances in the study of language and thought* (25–46). Cambridge, MA: MIT Press.

Lucy, J.A. (1992). *Language diversity and thought*. Cambridge: Cambridge University Press.

Luria, A.R. (1947). *Traumatic aphasia*. Mouton: The Hague reprinted in translation 1970.

MacWhinney, B. (1995). *The CHILDES project: tools for analyzing talk*. Hillsdale, N.J.: Erlbaum.

Mandler, J.M. (1998). Representation. In W. Damon, D. Kuhn, & R.S. Siegler (eds.), *Handbook of child psychology* (Vol. 2: 255–308). New York: Wiley.

Marshall, J. (2009). Framing ideas in aphasia: The need for thinking therapy. *International Journal of Language and Communication Disorders* 44(1), 1–14.

Marshall, J. & Cairns, D. (2005). Therapy for sentence processing problems in aphasia: Working on thinking for speaking. *Aphasiology* 19(10/11), 1009–1020.

Marshall, J., Pring, T. & Chiat, S. (1993). Sentence processing therapy: Working at the level of the event. *Aphasiology* 7, 177–200.

Mazaux, J.-M., Orgogozo, J.-M. (1982). *Échelle d'évaluation de l'aphasie d'après : Boston Diagnostic Aphasia Examination* (adapted from Goodglass & Kaplan, 1972). Issy les Moulineaux: ECPA.

Miceli, G., Silveri, C., Villa, G. & Caramazza, A. (1984). On the basis for the agrammatic difficulty in producing main verbs. *Cortex* 20, 207–220.

© 2012. John Benjamins Publishing Company
All rights reserved

Morton, J. (1979). Facilitation in word recognition: Experiments causing change in the logogen model. *Processing of Visible Language* 1, 259–268.

Nespoulous J-L. (1999). Universal vs language-specific constraints in agrammatic aphasia. In C. Fuchs & S. Robert (eds.), *Language diversity and cognitive representation* (195–207). Amsterdam: John Benjamins.

Nespoulous, J.-L., Lecours, A.R., Lafond, D., Lemay, A., Puel, M., Joanette, Y., Cot, F. & Rascol, A. (1986). *Protocole Montréal-Toulouse d'Examen Linguistique de l'Aphasie*. Montréal.

Nilipour, R. & Paradis, M. (1995). Breakdown of functional categories in 3 Farsi-English bilingual aphasic patients. In M. Paradis (ed.), *Aspects of bilingual aphasia* (123–138). Oxford: Pergamon Press.

Obler, L. (1988). Neurolinguistics and parameter setting. In S. Flynn & W. O'Neil (eds.), *Linguistic theory in second language acquisition* (117–125). Dordrecht: Kluwer Academic Publishers.

Papafragou, A., Massey, C. & Gleitman, L. (2002). Shake, rattle, 'n' roll: The representation of motion in language and cognition. *Cognition* 84, 189–219.

Paradis, M. (2001). The need for awareness of aphasia symptoms in different languages. *Journal of Neurolinguistics* 14(2–4), 85–91.

Perdue, C. (ed.) (1993). *Adult language acquisition: cross-linguistic perspectives*. Vol. 1: *Field methods*; Vol.2: *The results*. Cambridge: Cambridge University Press.

Sacchett, C. & Black, M. (2011). Drawing as a window to event conceptualisation: Evidence from two people with aphasia. *Aphasiology* 25(1), 3–26.

Saffran, E.M., Schwartz, M.F. & Marin, O.S.M. (1980). The word order problem in agrammatism: II. Production. *Brain and Language* 10(2), 263–280.

Sahraoui, H. & Nespoulous, J.-L. (2012). Accross-task variability in agrammatic performance. *Aphasiology* 26(6), 785–810.

Schmiedtová, B. & Sahonenko, N. (2008). Die Rolle des grammatischen Aspekts in Ereignis-Enkodierung. Ein Vergleich zwischen Tschechischen und Russischen Lernern des Deutschen. In P. Gommes & M. Walter (eds.), *Fortgeschrittene Lernervarietäten: Korpuslinguistik und Zweitspracherwerbforschung* (45–71). Tübingen: Niemeyer.

Schneider, S.L. & Thompson, C.K. (2003). Verb production in agrammatic aphasia: The influence of semantic class and argument structure properties on generalisation. *Aphasiology* 17(3), 213–241.

Slobin, D.I. (1991). Aphasia in Turkish: Speech production in Broca's and Wernicke's patients. *Brain and Language* 41, 149–164.

Slobin, D.I. (1996). From "thought and language" to "thinking to speaking". In J.J. Gumperz & S.C. Levinson (eds.), *Rethinking linguistic relativity* (70–96). Cambridge: Cambridge University Press.

Slobin, D.I. (2000). Verbalized events: a dynamic approach to linguistic relativity and determinism. In S. Niemeier & R. Dirven (eds.), *Evidence for linguistic relativity* (107–138). Amsterdam: John Benjamins.

Slobin, D.I. (2003). Language and thought online: cognitive consequences of linguistic relativity. In D. Gentner & S. Goldin-Meadow (eds.), *Language in mind: Advances in the study of language and thought* (157–192). Cambridge, M.A.: MIT Press.

Sokal, R.R. & Rohlf, J.F. (1995). *Biometry* (3rd ed.). San Francisco: W.H. Freeman.

Soroli, E. (2011). *Language and Spatial Cognition in French and in English: Crosslinguistic Perspectives in Aphasia*. Unpublished Ph.D. dissertation, University of Paris 8, France.

© 2012. John Benjamins Publishing Company
All rights reserved

Soroli, E., Hickmann, M. & Sahraoui, H. (2011). Encoding and decoding motion events in English and French: Comparative case-studies in agrammatism and anomia. *Elsevier Procedia in Social and Behavioral Sciences* 23, 49–50.

Soroli, E., Sahraoui, H. & Sacchett, C. (2011). Encoding motion events across languages: typological constraints in bilingual agrammatism. In *Science of aphasia XII proceedings* (155–158). Barcelona: Universitat Autonoma de Barcelona.

Spelke, E.S. (2003). What makes us smart? Core knowledge and natural language. In D. Gentner, S. & S. Goldin-Meadow (eds.), *Language in mind: Advances in the study of language and thought*, (277–311). Cambridge, MA: MIT Press.

von Stutterheim, C. & Carroll, M. (2006). The impact of grammatical temporal categories on ultimate attainment in L2 learning. In H. Byrnes, H. Weger-Guntharp & K. Sprang (eds.), *Educating for advanced foreign language capacities* (40–53). Georgetown: GUP.

von Stutterheim, C. & Lambert, M. (2005). Cross-linguistic analyses of temporal perspectives in text production. In H. Hendriks (ed.), *The structure of learner varieties* (203–230). Berlin: Mouton de Gruyter.

Talmy, L. (2000). *Toward a cognitive semantics*. Cambridge, MA: MIT Press.

Thompson, C.K., Lange, K.L., Schneider, S.L. & Shapiro, L.P. (1997). Agrammatic and non-brain-damaged subjects' verb and verb argument structure production. *Aphasiology* 11, 473–490.

Thompson, C.K., Shapiro, L.P. & Roberts, M. (1993). Treatement of sentence production deficits in aphasia: A linguistic-specific approach to wh-interrogative training and generation. *Aphasiology* 7, 11–133.

Résumé

Les langues présentent des variations considérables quant à la façon dont elles lexicalisent ou grammaticalisent l'information relative au mouvement. Les langues à *cadrage satellitaire* lexicalisent la Manière du mouvement dans la racine verbale et expriment la Trajectoire dans des satellites; en revanche, les langues *à cadrage verbal* lexicalisent la Trajectoire et laissent la Manière implicite ou périphérique. La présente étude examine l'impact des propriétés générales (contraintes d'acquisition/syndrome) et spécifiques aux deux langues (contraintes typologiques), l'anglais et le français, sur les processus d'encodage verbal d'apprenants d'une langue seconde (locuteurs anglophones apprenants le français) et de locuteurs aphasiques présentant une dissociation entre les capacités de traitement lexical et syntaxique (agrammatiques), en comparaison avec des locuteurs contrôles. Les résultats montrent que malgré des similarités notables dues à des facteurs universels, les propriétés typologiques des langues ont un impact sur les processus de (re)structuration du langage spatial ainsi que sur les processus de (re)conceptualisation sous-jacents.

© 2012. John Benjamins Publishing Company
All rights reserved