Languages vary considerably in how they represent motion. One major source of variation (Talmy, 2000) depends on whether linguistic systems lexicalize path in the verb (verb-framed languages) or in satellites (satellite-framed languages). This typological difference involves more than different verb types in that it also affects elements outside the verb. The current study is concerned with the implications of such typological properties for second language learning, specifically studying speakers of a satellite-framed language (English) acquiring a verb-framed language (French). We hypothesize that typological differences between source and target languages should present some difficulties to learners. For English learners of French, an additional difficulty should result from the fact that French is not entirely consistent in its patterning, allowing English-like lexicalization patterns in some cases, but not in others. This requires the learners to discover the nature of the regularities from a target input that presents them with constrained variability.

**Keywords:** typology of space; motion events; boundary crossing; adult second language acquisition
to target language forms frequently fails to communicate the encompassed source language message appropriately. Understanding the developmental path of second language learners in the context of a specific functional domain (motion), while controlling the typological variables, can teach us what factors are likely to cause most problems in second language acquisition. It may also allow us to advise teaching programmes in order to enhance the learning experience and potential outcomes.

This article probes the linguistic factors influencing the acquisition of an L2, with particular attention to the influence of differences in typological characteristics in source and target languages on learners’ progress in the target language. We take up this question in the domain of motion for a number of reasons: (a) a clear typological framework (Talmy, 2000) has been developed in this domain over the last 40 years, (b) motion is closely linked to the perception of space, which is presumed to be embedded in our biological makeup and could therefore be universal (in contrast to its expression in language), and (c) the typological differences concerned (lexicalization patterns) are expressed in constructions that are thought to become entrenched over time during L1 acquisition, and are therefore expected to be hard to unlearn when acquiring an L2 (Slobin, 1996).

We examine specifically how English learners of French as an L2 express motion events. As will be shown, these learners’ source and target languages have been considered to be representative of different typological classes. In particular, English is satellite-framed and French verb-framed, which impacts the lexicalization of motion related to specific events (and in particular the expression of path). These properties should make the acquisition of path in French more challenging for English learners than, for example, it might be for Spanish learners of French (who speak a typologically similar verb-framed language). In addition, French presents some constrained variability in its lexicalization patterns and therefore presents additional difficulties for English learners.

In the following, we first briefly discuss Talmy’s view on motion events and his proposed typology. We follow this up with a more recent proposal to improve this typology. On this basis we formulate specific hypotheses for two databases concerning first, native speakers of English and French and second, English adult L2 learners of French. After a brief introduction of the methodology, we present results and conclusions.

THE EXPRESSION OF PATH IN MOTION EVENTS

Talmy’s Typology

In the last 40 years, a large number of cross-linguistic studies have concerned motion expression and language acquisition in child and adult learners (cf. Athanasopoulos et al., 2015; Bowerman & Choi, 2001; Brown, 2015; Bylund & Athanasopoulos, 2015; Cadierno, 2004, 2008; Cadierno & Lund, 2004; Choi & Bowerman, 1991; Filipovic & Vidakovic, 2010; Flecken et al., 2015; Hendriks & Hickmann, 2011; Hendriks, Hickmann, & Demagny, 2008; Hickmann, Bonnet, & Taranne, 2009; Navarro & Nicoladis, 2005; Stam, 2015; Tomczak & Ewert, 2015). Most of the research is based on Talmy’s typology.

Talmy (1978) proposes that any motion event comprises motion, a figure, a ground, and a path:

A Figure object is a moving or conceptually moveable point whose path or site is conceived as a variable, the particular value of which is the salient issue. The Ground object is a reference point, having a stationary setting within a reference frame, with respect to which the Figure’s Path or site receives characterization. (p. 627, italics added)

In addition to these four components, languages can also express two further types of information, namely manner of motion (the way in which the figure moves) and cause of motion (what makes the figure move).

According to Talmy (1985), one major source of variation in the expression of motion across languages depends on whether linguistic systems lexicalize path in the verb (verb-framed languages) as in French or in satellites (satellite-framed languages) as in English. Several researchers (Aske, 1989; Slobin & Hoiting, 1994) have argued that the typological difference proposed by Talmy is most important in cases that represent a change of location rather than a general location. Thus, in a comparison of Spanish (verb-framed) and English, Aske (1989) states that “the inability of Spanish to express path outside of the verb is limited to telic path phrases, i.e., path phrases which also predicate an end-of-path location of the moving object” (p. 11). He proposes that English basically has two types of path phrases: locative path phrases, which “add a location in which an activity takes place” (p. 11) as in (1), and which pose no problems for Spanish, French, and other verb-framed languages; and telic path phrases, which are “similar in form (in English), but act semantically as a type
of nonverbal predicate in that they predicate, besides the path of motion (the vector in Talmy’s terms), an end-of-path location state of the Figure” (p. 6) as in (2).

(1) She is running in the kitchen.
   Elle court dans la cuisine.

(2) He is running into the kitchen.
   Il entre dans la cuisine (en courant).

Telic path phrases are not the only elements to indicate bounded unidimensional regions; locative path phrases may also be bounded, as in (3). The telic path phrase, however, must predicate a resulting location of the argument, as in (4). Aske furthermore specifies that not all English satel- lies are necessarily telic path satellites (into, out of) or locative path satellites (along). Rather, some may or may not express end-point predicates in addition to path modifiers (around, over, up).

(3) The boy swam from the left hand side of the river to the right hand side.

(4) The ball rolled off the table.

A further problem with Talmy’s classification, as well as with Aske’s clarification, is that, according to some researchers, telic path expression is possible with satellites in verb-framed languages, as in the following examples:

(5) La palla è rimbalzata sopra il tavolo. (from Folli & Ramchand, 2005, p. 96)
   The ball bounced onto the table.

(6) […] camino otra vez al salón. (from Martínez Vázquez, 2001, p. 49)
   […] s/he walked again into the sitting room.

(7) Il a couru jusqu’à l’école.
   He ran all the way to school.

It has therefore been proposed (Fábregas, 2007; Folli & Ramchand, 2005) that languages such as Italian, Spanish, and French present a split system in which there is a subset of satellite-framed constructions (alongside their mostly verb-framed pattern) including unmarked satellite-framed constructions with run-type manner verbs, marked satellite-framed constructions with expressions of the type jusqu’à (‘up to’) and other prepositions, and constructions with past particles (Italian only).

Recent observations concerning language systems that do not fit the satellite-vs. verb-framed distinction have led researchers to reformulate the typology in scalar rather than dichotomous terms (cf. Pavlenko & Volynsky, 2013). Thus, some researchers call for an elaboration of Talmy’s typology that can include linguistic systems in which there is a less obvious distinction between expression in verb vs. satellites and/or that use further constructions to distribute path and other information across linguistic elements in the phrase (cf. Croft et al., 2010). Others propose that in all languages the choice of constructions may well be partly guided by pragmatic rules or by world knowledge as influenced by factors such as verb type, aspect, or transitivity (Nikitina, 2008), further leading to scales of possible lexicalization patterns within each language. The main points of these new proposals are summarized in what follows.

Choice of Clausal Constructions/Lexicalization Patterns

Serial verb constructions are problematic for Talmy’s typology as they seem to show a symmetric division of labor between verb and satellite (not a predicted possibility). In addition, Croft et al. (2010) observe further symmetric constructions such as compounding (in which two verb forms are morphologically bound and more tightly integrated than in the serial verb constructions) as is the case in Kiowa (Watkins, 1984, cited in Croft et al., 2010), coordination as in (8), and double framing constructions, as in (9) and (10):

(8) He ran and entered the house just before noon.
   Monter en haut. Go up (above)
   ‘I out-ran from house’
   I ran out of the house.

Having studied motion expressions with telic path (and resultative constructions) in five languages (English, Icelandic, Bulgarian, Japanese, and Dutch), Croft et al. suggest that there are implicational relations between the particular situation types to be expressed and the constructions available in languages to do so. They argue that the expanded classification “is best understood as forming a scale of possibilities beginning with satellite framing, moving to compounding and verb framing, and finally to biclusal (coordinate or ‘while’ complex sentences)” (p. 221) as in (11):

(11) Double framing, satellite framing < verb framing, compounding < coordination

The scale encodes the “degree of cohesiveness of the complex event, from most to least
integrated” (p. 221). Examining uses of these constructions on the basis of a small set of motion and resultative situations, they find some clear similarities across the five languages such that motion is more likely than change of state to be expressed with linguistic means that are situated toward the left of the scale; IN/OUT situations are more likely than ACROSS situations to be expressed with constructions toward the left, and, similarly, some processes seem to attract expressions leftward on the scale more than others. The scale is thus thought to allow predictions of the type: If ACROSS situations are expressed by satellite-framing constructions, then INTO situations will also be expressed in the same language by a satellite-framing expression, but not vice versa. Croft et al. admit that they have only looked at a very small array of situations and that their findings should be tested more widely, with additional languages and especially with different situations. They nonetheless tentatively conclude that variation within and across languages conforms to universal constraints, systematically resulting in the encoding of information in more or less highly integrated morphosyntactic structures, where degree of morphosyntactic integration is defined by the scale in (11).

In this article, we will be testing the scalar phenomena proposed by Croft et al. with our data. Nikitina (2008), looking at a phenomenon within one language (the use of in instead of into to express a telic path in English), proposes similar factors to explain the variation found in her study: The use of the directional in is more likely with some types of verbs than with others (depending on their temporal features and manner specificity) and with some grounds than with others. In other words, similar factors seem to influence variation in constructions used within and across languages.

In sum, although Talmy’s typology accounts for how particular complex events are encoded across languages, an extension, as proposed by Croft et al. and Nikitina, will allow for a more inclusive treatment of a larger set of languages. It may also account for variation within languages as reported in earlier studies, providing more accurate descriptions and explanations of the native speaker data overall, which will in turn lead to better predictions about the learner’s acquisition task, and provide better explanations of the attested path of acquisition.

Indeed, previous research studying the influence of typological differences on the expression of motion in an L2 has reported rather contradictory results (cf. also Pavlenko & Volynsky, 2015, for a discussion). Cadierno and Ruiz (2006), comparing Danish (satellite-framed) and Italian (verb-framed) learners of Spanish (verb-framed), concluded that L1 lexicalization and thinking-for-speaking patterns played a limited role in the acquisition of the L2 Spanish. Navarro and Nicoladis (2005), however, showed that even if Spanish learners of English adjusted to the English use of satellites, their verbs still showed L1 influence. Filipović and Vidaković (2010), in a study of English learners of Serbian (both satellite-framed), showed that even in these conditions learners produce structures that are neither source- nor target-like, while showing more influence of the source language at lower levels of proficiency than at more advanced levels. Finally, in an overview study in 2008, Cadierno concludes that acquiring motion lexicalization patterns of an L2 of a type that is different from one’s own language is difficult and tends not to occur until very advanced levels of proficiency. All these reported studies used Talmy’s framework, but without considering the scalar dimension discussed here, which might have (a) made more explicit the type of influence from the source language (shift left- or rightward on the scale proposed by Croft et al.), (b) identified what precise linguistic phenomena are consequently involved, and (c) ventured explanations for these phenomena.

In the following, we will examine data from French and English native speakers in order to determine whether they support the proposals by Croft et al. and Nikitina, and/or are better explained by them. We will also aim to show implications for second language acquisition, with particular attention to English learners of French. More specifically, we will look at the types of structures used across the two languages (verb-framed, satellite-framed, double-framed, types of coordination, locative versus telic path markers) to express change of location, and at their interaction with the properties of the events denoted in order to look for explanations for the patterns reported.

METHODOLOGY

Participants

Participants comprised adult native speakers of English and French (24 per language) and 36 adult English learners of French (at three proficiency levels, 12 learners per level). The native speakers were mostly university students or administrative personnel from the
University of Cambridge and from the University René Descartes, Paris 5. The L2 learners were students at the American University in Paris. All L2 participants had been assessed for their proficiency level at the beginning of the academic year through an in-house university test, and as a result were placed in three groups as follows: intermediate low, intermediate high, and advanced speakers (Low, High, and Adv in our figures). The participants at the lower proficiency level had typically not spent longer than 3 months in Paris, whereas the more advanced students had been there for up to 2 years. As they all started to acquire French when they arrived in Paris, they can be considered semi-guided learners of French, receiving input not only in the classroom, but also in real life.

Materials

Participants were asked to describe short cartoons (6–9 seconds) involving general and changes of locations (locative and telic path situations). The cartoons originated from previous experiments (Hendriks & Hickmann, 2011; Hendriks et al., 2008; Hickmann et al., 2009), aiming to examine the expression of voluntary and caused motion (see the Appendix for the full set of items used). The voluntary motion task involved six cartoons eliciting expressions of ACROSS events. All cartoons showed either animals moving in relatively natural ways (squirrels hopping, cats bouncing, etc.) or humans moving in ways either involving the use of an instrument or not (swimming, running, crawling [baby], sliding, cycling, and skating). The caused motion task involved eight ACROSS events and eight INTO events. In this experiment, objects were either pushed or pulled by an agent who accompanied the object along its path. The objects either rolled or slid, depending on their properties and contact with the ground.

When expressing a boundary crossing in relation to caused motion, speakers can express several more elements of information in the clause, that is, cause itself (agent affecting patient), agent action (pushing and pulling), the manner of motion of the object (rolling or sliding), and potentially the agent’s manner of motion (walking). Structuring information may therefore be less straightforward, and might invite constructions that one would not typically find in the two languages. Looking at the expressions elicited with both sets of stimuli is therefore of interest for this article, as the ease of expression may differ between voluntary motion and caused motion situations.

Procedure

Participants were seen individually in a quiet room. They were shown each cartoon individually and asked to narrate what happened to someone who did not have access to the cartoons, but needed to be able to understand what happened from their narration (no mutual knowledge situation). All participants also filled out a sociolinguistic questionnaire (asking about age of acquisition, other languages known/used, amount of use of languages, etc.) to allow for maximum control of the participant groupings. The results from the questionnaire mostly corresponded well with the proficiency test results.

NATIVE SPEAKERS OF FRENCH AND ENGLISH

Hypotheses

We first discuss native speakers’ descriptions, specifically examining how they refer to changes of location (ACROSS and INTO situations).

H1. These descriptions were expected to show maximal difference between the French verb-framed pattern and the English satellite-framed pattern.

H2. More specifically, we expected path to be expressed mainly in the verb in French and in satellites in English.

H3. Furthermore, deviations from the expected patterns should occur in similar contexts as proposed by Croft et al. (2010) and Nikitina (2008).

We seek an analysis of both target languages that best explains variation within and across them, and allows us to predict the type of challenges to be confronted by English learners of French when expressing motion.

Results: The Expression of ACROSS in Voluntary Motion

The first analysis examined verbs used to describe the six ACROSS events in the voluntary motion data. As can be seen in Figure 1, English and French native speakers behave in different ways, as predicted by Talmy’s typology: The English native speakers predominantly use manner verbs (90%), and the French natives mostly use path verbs (76%).
We further investigated cases where a manner verb was used, in order to establish how the boundary crossing was expressed in these cases. Figure 2 shows the results. In English, the majority of cases (83%) contained expressions marking boundary crossing, mostly across, as in (12) as well as occasionally from one side of x to the other side, as in (13), which is not a telic path expression according to Aske (1989), but still expresses the boundary crossing. The only other means used were locative path expressions (9%) not marking a boundary crossing, as in (14). In French, far fewer cases contained a manner verb (24%), and boundary crossings were expressed in 49% of those cases, mostly in the form of additional subordinate clauses as in (15) and occasionally in the same clause as in (16). Expressions representing a vector without boundary crossing were sometimes provided, as in (17) and occasional locative path expressions were also used (9%), as in (18). In 14% of the cases where the French native speakers used a manner verb, they did not add any information related to path, and as a result they did not express any boundary crossing at all.

(12) The baby crawls across the road.1
(13) The girl skates from one side of the frozen lake to the other.
(14) The girl is skating on the frozen pond in the woods.
(15) Le garçon nage pour traverser la rivière.
The boy swims in order to cross the river.
(16) Le garçon se fait glisser jusqu'à l'autre bout de la rivière.
The boy lets himself slide all the way to the other side of the river.
(17) Le garçon glisse tout le long de la rivière gelée.
The boy slides all along the frozen river.
(18) Il y a un garçon qui glisse sur la rivière glacée.
There is a boy who slides on the frozen river.

As can be seen in Figures 3a and b, the types of verbs chosen by English native speakers do not vary much across items. In contrast, the French native speaker data show clear variation in verb types for the different items: mainly traverser for the items CRAWL and RUN, but more manner verbs for SLIDE and SWIM items, and less so for the SKATE and BICYCLE items. The type of additional information provided with manner verbs was influenced by items as well, in that all locative path expressions in French were attracted by the SLIDE item, whereas in English these were found with

FIGURE 1
Type of Verb Used by Native Speakers in Description of ACROSS Voluntary Motion

FIGURE 2
Boundary Crossing With Manner Verb in Native Speakers

FIGURE 3
Effect of Item Type on Verb Type in Native Speakers
both SLIDE and SKATE items (very few cases). Examples of such cases can be found in (14) and (18) for English and French respectively.

Results: The Expression of ACROSS and INTO in Caused Motion

The first analysis of caused motion descriptions in ACROSS and INTO situations concerned verb types used. Recall that both situations were meant to elicit a boundary crossing. As mentioned previously, the caused motion task required at least one more element to be expressed, namely, causality (agent acting on patient), but with a possibility of adding more, such as agent action (pushing or pulling in our data), manner of object motion (roll or slide), and eventually even manner of agent motion (walk). The results, presented in Figures 4a and b, show that the English native speakers never expressed path in the main verb, but systematically used verbs expressing cause and agent action (PUSH or PULL) or cause and manner of the object (transitive ROLL and SLIDE) in both INTO (90%) and ACROSS (93%) situations as illustrated in (19) and (20) respectively. The French native speakers showed a less regular pattern, and tended to express cause and agent action or cause and manner of the object in the verb mainly (64%) for the INTO events as in (21), and a slightly more equal distribution of path (58%) and cause + agent action or manner of object (38%) in the main verb for ACROSS events (illustrated in [22] and [23]). Within-item analyses show that in both languages, ROLL items tend to attract most of the cause and manner of object encoding verbs, and these are more frequent in PUSH than in PULL situations. In sum, in English no boundary crossing information is expressed in verbs, as predicted by Talmy’s framework, but in French there is also a considerable number of cases where path is not expressed in the verb, a result not in keeping with Talmy’s predictions.

(19) He rolls the trolley into the cave.
(20) Hoppy pulls the baby carriage across the street.
(21) Popi pousse la table pour la faire entrer dans la grotte.
   Popi pushes the table in order to make it enter in the cave.
(22) Il traverse la route en tirant le cheval derrière lui.
   He crosses the road pulling the horse behind him.
(23) Il fait rouler la roue de droite à gauche en traversant la route.
   He makes the wheel roll from right to left while crossing the road.

FIGURE 4
Type of Verb Used by Native Speakers to Describe INTO and ACROSS Caused Motion

![Graphs showing verb use in English and French](image)

Note. CA = Cause and Agent Action; CM = Cause and Manner of Object

Figures 5a and b indicate whether and where additional boundary crossing information was expressed in English and in French for both INTO and ACROSS situations. As can be seen from the figures, English natives only use one position in the sentence to express boundary crossing information, namely, the satellite within the main clause, as shown in (19) and (20), thereby confirming our hypothesis. This is true for both INTO and ACROSS situations (89% in both cases). In a negligible number of cases this information occurs in a subordinate clause, or a location is expressed rather than a boundary (see examples 24 and 25). Descriptions in French show more positions in which boundary crossing is expressed. Thus, boundaries may be expressed in the main verb or in a prepositional phrase within the main clause as in (26). They may also be expressed in a subordinate clause, either as a verb, as in (23), or with the preposition jusqu’à. A considerable number of cases also shows boundary crossing expressed in ambiguous ways, through locative phrases that are neutral with respect to two possible meanings (locative or directional readings), such
as illustrated in (27) and (28). Finally, in some cases, the boundary crossing is actually represented in another sentence altogether (29). Apart from these general observations, it should also be clear from Figures 4a–b that the INTO and ACROSS situations are described in different ways in French: ACROSS events seem to attract boundary crossing expressions in subordinate clauses, or even in a separate (juxtaposed or coordinated) sentence as in (29) (most frequent with the PULL items), whereas INTO situations seem to attract locative phrases (ambiguously) expressing a change of location more frequently, as in (27) and (28), respectively.

(24) This time he’s pushing a table, sliding the table from right to left INTO a cave.
(25) He is pulling the pram BEHIND him.
(26) Il pousse le panier d’une côté de la rue à l’autre. He pushes the basket from one side of the road to the other.
(27) Il tire la chaise DANS la grotte. He pulls the chair IN the cave.
(28) Popi pousse le pneu à l’intérieur du garage en le faisant rouler. Popi pushes the wheel AT the interior of the garage making it roll.

(29) Alors Popi pousse le panier plein de pommes et traverse la route de campagne. So Popi pushes the basket full of apples and crosses the country road.

Discussion of English and French Native Speakers

As mentioned previously, updated versions of Talmy’s typology regarding the variation in motion expression in terms of within and across clause features and factors influencing the variation have recently been proposed. A suggestion was made (Croft et al., 2010) that certain situations involving specific types of processes or paths might be more likely to attract more integrated morphosyntactic structures (i.e., a satellite-framed structure) than others. We will examine these suggestions based on our data.

In English, a satellite-framed language positioned at the outer left on Croft’s scale, variation can only happen in one direction, that is, toward less highly integrated structures. Thus, variation could either consist of a main path verb, and no further information, or of path expressed in a subordinate clause, rather than in the main clause. In French, the pattern predicted by Talmy is that the boundary crossing is expressed in the main verb. The default expression in French is therefore in the middle of the scale and variation could occur in both directions. In other words, deviations could include the expression of manner in the verb, and expression of boundary crossing outside of it within the clause (a shift toward the left of Croft et al.’s [2010] scale toward a satellite-like framing) or the expression of the boundary in a subordinate clause (the latter consisting of a shift toward the right-hand side of the scale).

Our results show that in voluntary motion situations our hypothesis (i.e., Talmy’s hypothesis) that path is mainly expressed in the verb in French and in satellites in English is confirmed. Path verbs are very rare among English native speakers (only 4% of cases). They occurred only with items showing CRAWLING ACROSS, CYCLING ACROSS, and SWIMMING ACROSS. Given the negligible number of such cases, we feel that our data do not allow us to draw any conclusions regarding variations as predicted by Croft et al. The expression of boundary crossing information in a subordinate clause, or its absence and use of a locative phrase instead (the second type of deviation) again occurred very infrequently in the description of voluntary motion, only with SLIDING ACROSS and SKATING ACROSS. In other words, no noticeable deviation from the default
lexicalization patterns is identified in English in this data set. Similarly, deviations from the expected lexicalization patterns are equally infrequent in the French native speakers. When they do occur, we find them again with the sliding item.

In summary, across items in voluntary motion situations do not seem to elicit much variation in the expression of path. Overall, speakers use the most typical expression of motion for those situations in both languages. In contrast, deviations from the predicted pattern are more frequent in the caused motion data. However, most of these deviations occur in the French native data, not in the English data. English native speakers mostly continue to follow Talmy’s predictions concerning where path, manner, and cause are expressed, and hence again confirm our hypothesis for this language. In the French native speaker data, however, a large proportion of verbs do not express path but rather cause and agent action or cause and manner of the object. This deviation from the pattern is more pronounced with into than with across situations. When French native speakers do not use path verbs, they explore various possible means of expressing boundary crossing: outside the verb within the main clause (i.e., jusqu’à), by (ambiguous) locative phrases such as dans and à l’intérieur, in a subordinate clause, either in a subordinate verb or with the preposition jusqu’à, or in another sentence altogether. The first two possibilities correspond to a satellite-type framing, and are found on the far left side of Croft’s scale. The last possibility is a case of coordination, and the third possibility is somewhere in between on Croft’s scale. In other words, in the French native speakers we find shifts along the scale in both left- and rightward directions.

As previously noted, the satellite-framing constructions (both with jusqu’à and with locative phrases such as dans and à l’intérieur) occur mainly with into situations. Our data confirm the findings reported by Croft et al. (2010), in that the into situations attract expressions further leftward on the scale than across situations that seem to attract expressions rightward from the default.

In sum, the adult native speaker data show clear differences between the voluntary motion and the caused motion situations, particularly in terms of the variation they elicit. Most voluntary motion situations are expressed as predicted by Talmy’s typology and show very little variation. In contrast, although the caused motion situations do not elicit much variation in English either, they show more variation in French. The variation in this language follows the trends also found in Croft et al., that is, the into situations are more likely to be expressed with constructions further leftward on the scale than across situations. It is also obvious from our data that some languages are much more likely to choose expressions shifting along the scale than others, again confirming findings by Croft et al., who refer to Dutch as extremely systematic, with other languages showing more variation. In the situations presented to our participants, the English speakers did not seem to find any need to deviate from the verb + satellite pattern at all, whereas the French speakers showed considerable, even if clearly constrained, variation.

ENGLISH LEARNERS OF FRENCH

Hypotheses

Given the results obtained with the native speakers, we predicted that English learners would attempt to express boundary crossings in French as follows:

H4. We expected learners to learn the French pattern for voluntary motion more quickly than for caused motion, since the former is clearer and more systematic in the input, even though it differs completely from the target language pattern.

H5. When variation occurred, we expected to find it with the following items (similar to the native speaker data): sliding and skating, assuming that the occurring variation is guided by universal principles as proposed by Croft et al. and Nikitina, that is, level of manner specificity.

H6. As concerns the caused motion situations, we expected more variation, given a less clear pattern in the input and the need to express more information. We specifically expected such deviations in different directions on the scale for across and into items (across toward the right of the scale, into toward the left), based on the findings from Croft et al., and our own findings in the native speaker data. Given the two very different systems, the influence of the source language on the acquisition of the target language would furthermore predict that learners should deviate from the French pattern in a leftward direction on Croft’s scale, where the source language is situated, rather than in a rightward direction.
Results: The Expression of Across Situations in Voluntary Motion

As already established, English learners of French have to acquire very different systems of talking about boundary crossing events in their second language. In this section we examine how they adjust to the new system. As Figure 6 shows, learners overall use path verbs to express the boundary crossing in these circumstances at all levels: 65% (Intermediate Low), 50% (Intermediate High), and 62% (Advanced learners). They therefore seem to show acquisition of the French pattern, although they do not reach target-like choice of verbs even at the highest level of proficiency. Furthermore, there does not seem to be a clear increase of this pattern with proficiency.

As with native speakers, we examined whether the expression of boundary crossing varied across different experimental items. Results are displayed in Figures 7a–c. Similar to the French native speakers, the crawling item most clearly attracted the main verb traverser (or some idiosyncratic version of it, such as crosser for example). The cycling item also showed a strong preference for traverser as the main verb choice (unlike the French native speaker data). The running item showed different results at different levels of proficiency, such that with the advanced speakers it attracted the verb traverser, similar to the French native speakers, but this tendency was less clear in the intermediate low and high groups. Finally, similar to the French natives, the swimming item clearly attracted the fewest occurrences of boundary crossing path verbs. The intermediate high learners show similar tendencies in the distribution of boundary expressing verbs vs. other verbs as other groups, but these tendencies are less pronounced and more manner verbs are used for all items.

Analyses of boundary crossing information provided by learners outside the verb, as presented in Figure 8, show different strategies at different levels of proficiency. Thus, the learners at an intermediate high level tended to provide boundary crossing information in satellite-like expressions (30), but both intermediate low learners and advanced learners used a considerable amount of locative phrases to provide further spatial information as in (31) and (32), thereby failing to express the boundary crossing altogether. At all three proficiency levels, when path was not expressed in the verb, it was encoded equally frequently within the same clause in prepositional
constructions and in additional subordinate clauses, as in (33) and (34).

(30) *Un vrai home court à travers une route.*
(Intermediate High)
A real man runs *across* a road.

(31) *Le garçon a glissé heu... à la rivière gelé.*
(Intermediate Low)
The boy slid ahm... at the frozen river.

(32) *Un homme joue // nager dans le fleuve.*
(Advanced)
A man plays // swim *in* the river.

(33) *Un homme court pendant il traverse la route.*
(Intermediate Low)
A man runs while he *crosses* the road.

(34) *Là un petit garçon qui nage jusqu’à le autre côté de le lac.* (Intermediate High)
There a little boy who swims all the way to the other side of the lake.

Additional information regarding boundary crossing also showed an item effect in that the exclusive use of locative expressions (not expressing the actual boundary crossing) was mainly found with the *swimming* and *skating* items (at all levels of proficiency) and in the intermediate low and advanced learners also with the *sliding* item. Note that with the notable exception of *jusqu’à* (‘up to’), it is impossible to encode boundary crossing explicitly in satellite-type expressions in French, available prepositional phrases being ambiguous with respect to their reading (locative or directional). As a result, learners had to revert to idiosyncratic forms as in (35) (see also Hendriks & Hickmann, 2011). Most of the expressions of boundary crossing in subordinate clauses were found for two items, *running across* (intermediate low) and *swimming across* (intermediate high and advanced learners).

(35) *Une homme a courir à croisé une le autoroute.*
(Low)
A man has run ‘across’ a the highway.

**Results: The Expression of *across* and *into* in Caused Motion Situations**

A first analysis concerned the choice of verbs used to describe the caused motion events. As shown in Figures 9a–c, English learners of French continue to provide the information in an English pattern systematically, in that they use many verbs expressing cause and agent action or cause and manner.

**FIGURE 9**
Effect of Item Type on Verb Type in Learners’ Productions
manner of object for these events at all levels of proficiency (cause and manner of object verbs occurring mainly with roll situations in push rather than pull contexts, as also found in the native speakers). As a result, very few verbs express the crossing of spatial boundaries, and all boundary-crossing information must be provided elsewhere in the sentence. As can be seen from the figures, contrary to the French data, the learner data are not influenced by the items described. Thus, percentages for into and across events are very similar at all levels of proficiency.

The follow-up analysis examined all cases in which no boundary crossing information had been provided in the verb, to determine whether speakers provided this information elsewhere. The results are shown in Figures 10a–c. Boundary crossing with into situations was expressed in the majority of cases in ambiguous ways by locative phrases such as dans and à l’intérieur as in (36) and (37). This is overwhelmingly the case for the intermediate low learners. At intermediate high and advanced levels, learners also start expressing boundaries with other means. For example, where most French boundary crossing means within the main clause concern the preposition jusqu’à, the English learners of French tended to use expressions such as entre (which in form and use is ambiguous between the verb entrer ‘enter’ and the preposition entre ‘between,’ misinterpreted by the learners (as a result of its formal similarity with the verb) as ‘into’ as in (38) (cf. Hendriks et al., 2008). Most of the information concerning into occurs in the main clause at intermediate low level. With proficiency, information also occurs in unambiguously marked subordinate clauses with the verb entrer.

With across events, the expression of boundary crossing also shows development in terms of where the information is expressed. In the intermediate low learners, much of the boundary crossing information is added in additional juxtaposed or coordinated sentences. Other ways of expressing this information consists of expressions in the main clause such as à travers or à croisé, that are clearly non-target-like, as well as subordinate clauses. The use of such expressions is even more pronounced in the intermediate high learners, whereas learners at the advanced levels have started using the target-like expression jusqu’à l’autre côté de la rue (‘up to the other side of the street’). By that time, learners are also less reliant on additional sentences for boundary crossing, rather using subordinate clauses with the appropriate verbs (even if often in idiosyncratic constructions as in [39]). Finally, the intermediate low and high learners sometimes use the preposition sur (‘on’) in the sense of ‘onto the road’ in order to attempt to indicate a change of location, as for example in il pousse le panier sur la route (‘he pushes the basket on the road’). One could argue that a change of location is expressed in that in the first instance the basket is not on the road, whereas in the second it is (‘onto’ reading). However, the full crossing of the road is not explicitly expressed by sur in French, which normally expresses locative path (or is at best ambiguous between locative and directional readings through inferencing), and native speakers correspondingly never use this preposition in this context.

FIGURE 10
Boundary Crossing With Manner Verb in Learners’ Productions

Note. Tbo = Boundary crossing expression; Same = Main clause; Subord = Subordinate clause; Loc (amb) = ambiguous locative phrase
Within-item effects were minimal, especially at the intermediate low level, and at intermediate high and advanced levels only showed a trend for ambiguous locative phrases (mainly found with INTO situations) to occur with PULL rather than PUSH events.

Discussion of English Learners of French

The results for English learners of French confirm our hypothesis in showing, first, that they use the more typical verb-framed French structure (i.e., expressing boundary crossing in the verb) for voluntary motion events, whereas they seem to move toward the left of the scale when expressing caused motion, thereby using the more typical English satellite-framing structure. Three points deserve to be noted: First, the fact that both French native speakers and learners show such a shift with caused motion events could result from the more complex nature of these events that call for attention to more elements present to be expressed. Second, with caused motion, the very high percentage of verbs expressing cause and agent action or manner of the object and path with or without boundary crossing in the satellite could also result from the lexicalization patterns in the learners’ source language (cf. Hendriks et al., 2008). Third, however, item effects cannot be explained by these causes. Rather, these effects again follow those found by Croft et al. in their study. Thus, INTO situations are more likely than ACROSS situations to be expressed in a verb + satellite-like structure. As French does not actually have proper boundary-marking satellites (except for the preposition jusqu’à), learners use locative phrases that are often ambiguous in these cases. However, since the structures are used by French native speakers as well, even if infrequently, they are clearly possible ways of marking boundary crossing. In contrast, ACROSS situations are described with the boundary crossing information in an additional sentence (intermediate low), in idiosyncratic satellite-like forms (intermediate low and high), or with jusqu’à and subordinate clauses by the advanced learners. This seems to indicate that INTO situations may induce a shift toward the left of the scale, and ACROSS situations a shift toward the right, thereby again confirming our hypotheses. In addition, within ACROSS and INTO situations, further item effects were observed. For example, some voluntary motion items attracted more path verbs than others (CRAWL/CYCLE vs. SWIM), some (SWIM/SKATE ACROSS) attracted more locative phrases without any clear boundary crossing meaning, and some attracted more subordinate clauses (SWIM/GLIDE). Similarly, for caused motion events, INTO items attracted more cause and manner of object verbs for PUSHING and ROLLING situations. Note that similar qualitative differences were also found in the native speaker data, thereby showing a more general trend. These item effects could also point to explanations beyond those offered by Croft et al. and Nikitina, to be discussed in the conclusion.

In sum, although the English learners of French do not manage to acquire the French pattern even at advanced proficiency levels, particularly with caused motion, their productions are systematic in a number of ways. When they diverge from the standard pattern of French, the variation seems to follow deviational tendencies also found in the French native speaker data in that satellite-framed constructions are more frequent in caused motion than in voluntary motion situations, and more frequent with INTO than with ACROSS items. ACROSS items also show deviation from the typical verb-framed pattern in caused motion situations in that they occasionally show a shift on the scale to the right, with the boundary crossing expressed in a separate (juxtaposed or coordinated) sentence or in subordinate clauses (again corresponding to deviational patterns in the French native speakers). This latter encoding of information only develops slowly over time and is found mainly in the advanced learners, whereas the satellite-type framing is found earlier, indicating an influence of the source language as was previously hypothesized.

GENERAL DISCUSSION

Our original predictions were that English learners of French might struggle to express boundary crossings with target-like linguistic means, because (a) the two languages are typologically different according to Talmy’s
framework (satellite-framed and verb-framed respectively), and (b) French input shows some constrained variability that learners will have to acquire with time, in that it is not systematically verb-framed in its organization across all different types of events (contrary to English, which is satellite-framed across all event types). Detailed analyses of the native speaker data based on proposals revisiting Talmy’s framework in scalar rather than dichotomous terms (Croft et al., 2010; Nikitina, 2008) show that it is possible to find the systematicity in much of the variation observed in the French native data, as also reported for other languages (e.g., Croft et al., 2010; Nikitina, 2008). Furthermore, if such systematicity is indeed universal, it may well facilitate acquisition for the English learner of French.

Croft et al. proposed several factors such as those listed in (a) to (c) to explain their results. According to their proposal, some events, paths, and processes lead to results that are more natural or typical than others, and the more typical/natural they are, the more likely they are to be encoded with constructions further to the left on the scale.

(a). Type of event: motion (self- or externally caused) vs. change of state
(b). Typicality/naturalness of the path: in/out vs. across vs. following
(c). Typicality/naturalness of the process leading to the result: run into vs. float into; run across the street vs. talk one’s way across the street.

In support of these proposals, our data show specifically the following results in both native and learner data: (a) overall greater variation in expression for caused motion than for voluntary motion, (b) different motion expressions for INTO and ACROSS situations, and (c) a greater likelihood for some processes to attract deviations from the expected lexicalization patterns as compared to others. However, granting that some such scale might indeed underlie observed variation, the question remains how best to explain its existence, nature, and implications. Thus, what is meant by natural and typical is not defined by Croft et al. and some conceptual and/or linguistic criteria are necessary to determine why some manners and some paths should be more or less natural/typical than others. Assuming that these terms should cover cognitively relevant notions, it is unclear, for example, why INTO situations should be more typical/natural than ACROSS situations. Similarly, it is unclear why processes such as SWIMMING, SLIDING, or SKATING should lead less naturally/typically to a boundary crossing result than CYCLING or RUNNING, yet they are treated differently by the French native speakers in our data. Although one could certainly argue on the basis of world knowledge that humans are most likely to walk when moving, multiple factors presumably come into play in defining a gradient of naturalness/typicality along which to place other manners of moving, including the nature of the figure (man, kangaroo, bottle), the nature of the ground (mountain ridge, street in town, space in low cave), and the use of an instrument (bicycle, skates), to name just a few.

Other explanations can also be invoked to account for the systematic variation observed in our data and in the literature, the first being the complexity of denoted events. In particular, the number and nature of possible semantic components to be expressed across situations in our experiment could account for observed differences in descriptions of voluntary vs. caused motion. In this respect, languages differ in how they can accommodate varied types of information in descriptions of complex caused motion events. As shown earlier, the English verb can easily conflate cause with different types of manner information, such as manner of agent action (e.g., push/pull) or manner of object motion (e.g., transitive roll/slide), while other elements add path, including boundary crossing (e.g., push/roll something into/across). In contrast, for the same types of complex situations, French requires more decomposition of expressed information. If the verb encodes cause and agent action (pousser/tirer ‘to push/pull’) or cause and manner of object motion ([faire] rouler/glisser ‘to [make] roll/slide’), then either ambiguous prepositional expressions are frequently used within the clause (e.g., pousser/[faire]rouler dans ‘to push/roll in[to]’) or path is expressed in a subordinate clause (e.g., pousser en entrant ‘to push while entering’) or in a separate clause (e.g., pousser et entrer ‘to push and to enter’). Conversely, if the verb encodes path (e.g., entrer/traverse ‘to enter/cross’), cause and manner must be expressed outside of the main verb, typically by means of a subordinate clause (entrer en poussoir/en faisant rouler ‘to enter while pushing/making roll’) or of separate clauses (entrer et pousser/faire rouler ‘to enter and to push/make roll’).

Furthermore, speakers might perceive events differently as a function of complex features such as transitivity (also proposed by Nikitina, 2008). Following Hopper and Thompson (1980), transitivity is a relative notion defined by a continuum
resulting from the multidimensional contribution of various factors, including for example animacy (itself defined in terms of a scale, i.e., ranging from [+ human] to [+ animate, − human] to [− animate]), degree of affectedness (caused > voluntary motion), and durativity ([+ punctual] > [− punctual]). Thus, all other things being equal, causative events involve a higher degree of goal-directedness than noncausative ones by virtue of the fact that a patient is affected by an agent. This factor might coalesce with complexity to explain observed differences in how speakers describe voluntary and caused motion. In addition, as also suggested by Nikitina, our perception of events might depend on the inherent lexical content of predicates, and particularly on their temporal structure (lexical aspect), thereby contributing to explaining the existence of proposed scales. For example, according to this view, punctual events such as entering a room (crossing an OUT/IN boundary) may be perceived as a more typical exemplar of boundary crossing than durative events such as crossing a street (crossing a double boundary defined by the two sides of the street). Note that it is not crossing per se that is less typical of boundary crossing than entering, but more precisely the particular features of grounds with which it is combined, namely whether it involves double boundaries and therefore a transition phase from the beginning to end of the process (e.g., crossing a street/road, as was the case in our stimuli) as opposed to a single boundary (e.g., crossing a line).

It should also be noted that each language presents some idiosyncrasies that might explain some system-internal variation. In French, for example, some processes lend themselves better for compact motion expression by means of path verbs than others. Thus, a baby crawling across a street, a woman cycling across train tracks, and a boy swimming across a river can all be expressed with the path verb traverser followed by adverbial phrases within the clause (‘à quatre pattes’ ‘on all fours,’ en vélo ‘by bike,’ à la nage ‘by a swim’). In contrast, a man running across a road would typically be expressed with a subordinate verb (traverser en courant ‘to cross by running’), since available relevant adverbial phrases are more marked (au pas de cours ‘by a running step’) and/or express only speed but no specific manner in relation to the body (à toute vitesse ‘at all speed’). Although such language-specific system-internal variation does not seem to influence the native speaker data presented previously, it could explain some of the learner data. Native speakers may well primarily organize their information in a verb-framed way, and concentrate on the expression of path first and foremost. In contrast, learners who come from a language in which both manner and path tend to be expressed as frequently and together (cf. Hickmann et al., 2009; and Slobin, 2004, on manner-oriented languages) may attempt to find possible ways to express both path and manner. Given the particular idiosyncrasies described previously for French, they may find it easier to use an adverbial phrase when available than a gerundive construction, both because the former resembles the English constructions more and because producing gerunds entails the acquisition of more advanced morphology. More generally, it remains to be seen whether similar observations can be systematically found to hold across many different languages possibly explaining how at least some events attract similar shifts along the scale.

Finally, it also cannot be excluded that our particular stimuli may have played a role in some of our observations and that different event types might result in more or less variation within and across languages. As an illustration, note that the same voluntary motion item, which elicited the most manner verbs in the productions of French native speakers, is unusual and indeed perhaps not natural or typical, in that it represented a boy moving in a sliding manner on his shoes (without a sliding instrument such as skates), which may have led speakers to pay more attention to manner in this case (cf. also Nikitina [2008] on nature of the manner). Such a result was in fact observed with both adults and children (4 to 10 years) during L1 acquisition (Hickmann et al., 2009).

In sum, it is likely that a single explanation will not suffice to account for the results and that multiple factors presumably coalesce in similar ways within and across languages to determine together shifts along the scale in any given language. Since shifts along the scale are thought to be guided by universal principles, it makes sense that learners would be sensitive to them relatively successfully over time, despite the initial impression of variability in the input with which they are confronted in French L2. Their source language (English, satellite-framed) is situated at the very left-hand side of the scale and shows very little shift along the scale with either voluntary or caused motion situations (as also attested for some other satellite-framed languages such as Dutch). In contrast, typical motion expression in the target language (French, verb-framed) is located in the middle of the scale and can therefore potentially shift to the left and to the
right, depending on situation types (hence constrained variability). If learners are influenced by their source language, they might tend at first to move toward the left of the scale, irrespective of denoted situations. Slobin (1996) predicted this influence from the source language, proposing that lexicalization patterns become highly entrenched during first language acquisition, resulting in a particular way of organizing information when engaged in language use (Thinking for Speaking) that might be difficult to unlearn during second language acquisition. Nonetheless, L2 learners might be more inclined to proceed with this unlearning process in cases where the L2 input is relatively regular and systematic than in cases where it shows more deviations. They may also be more inclined to unlearn L1 entrenchment with some types of motion events, if the range of events to be potentially denoted indeed involves universally more typical manners and/or paths than others, whatever the reason for this gradient may be.

Our results seem to support this hypothesis. For both voluntary and caused motion, learners rely much more often on satellite-framing to express boundary crossing than speakers of the target language, thereby keeping a flavor of their source language in their target language productions. However, in voluntary motion situations, they are sensitive to the fact that French is a verb-framed language, using frequent path verbs for the expression of boundary crossings (over 50%) and resisting their L1 satellite-framing pattern as much as possible. In contrast, they rely more on satellite-framing when they have to express boundary crossings in caused motion situations. Moreover, they tend to follow the tendencies found for French native speakers, in that they use more satellite-type expressions with INTO events than with ACROSS events. With the latter type of events, they actually show an initial shift to the right in that they start by expressing the boundary crossing in a separate sentence (intermediate low > intermediate high), then attempt to express this information within the same clause but by idiosyncratic means (intermediate high) thereby shifting all the way to the left, and finally learn to spread the information over a main and subordinate clause in a pattern that is more typical for verb-framed languages (and at least for a number of events in French). Even advanced learners of French have by no means reached the target: Although they are already quite proficient and show some shifting in the right direction overall, their productions still display an influence of the source language, possibly because of the entrenchment of source language patterns, thus corresponding to results also reported in other studies as discussed previously.

The fine-grained systematic patterns of variation in our data indicate how important it is for research in this area to examine a wide variety of situations in order to account for how languages typically express motion and for how learners might acquire the means to do so during second language acquisition. With respect to the types of events examined in the present paper, given sufficient data, a scalar view of motion expression may allow for a better understanding of variation in the marking of boundaries within and across languages of the world, as well as a more accurate account of the challenges to be confronted and resolved by learners during second language acquisition.

This leads us finally to issues regarding possible implications and applications of such results for language teaching and learning. All too often, language teaching involves the learning of lexical items either presented in lists or introduced through texts. When confronted with the verb *enter* ‘enter’ or *traverser* ‘cross,’ an English learner will quickly understand what these verbs mean (there is an equivalent in the source language). Similarly, they will quickly learn the meaning of French items *marcher* ‘walk’ and *dancer* ‘dance’ or the prepositions *dans* ‘in,’ *sur* ‘on,’ and *jusqu’à* ‘all the way to.’ However, acquiring these lexical items individually does not tell them that they are used in very different frequencies in the target language and that they are guided by a different set of structural constraints or lexicalization patterns. Similarly, it does not tell the learners that one cannot use French *marcher* ‘walk’ in the same ways and in the same constructions as English *walk.* As a result, we still find attempts, even by advanced learners, to lexicalize the information according to source language patterns. For the learner to understand the differences in the French versus English lexicalization of motion, they have to be taught the conditions under which one can use a manner verb + preposition and what this means in terms of motion expression and conceptualization. Similarly, they have to learn the conditions under which one needs to use a path verb and what the implications of such uses are for the expression of location versus directionality. Only an understanding of the underlying organization of information and meaning, and an understanding of the specific form–function mappings will allow the learner to move more efficiently from source language structures to target language structures.
Determining the differences in lexicalization patterns and underlying organization of information across languages by means of a scalar version of the Talmyan typology should contribute to the more precise knowledge that is necessary to help language students understand the actual meanings of individual lexical items and the constructions in which they are found, and hence should contribute to more successful learning outcomes.

ACKNOWLEDGMENTS

This research was carried out as part of the project LANGACROSS financed by the French and German national funding agencies (Agence Nationale pour la Recherche, ANR and Deutsche Forschungsgemeinschaft, DFG). We are grateful to Rebekah Rast and to the American University of Paris for providing access to learners. Thanks also go to the co-editors of this volume and to anonymous reviewers who contributed to improving an earlier version of this paper.

NOTES

1 In all following examples and their translations, the path expression will be underlined.

2 Some French verbs can also encode cause and different aspects of motion in transitive constructions encoding path (\textit{monter la valise} ‘to ascend/transitive the suitcase’) or in complex causative constructions (e.g. \textit{faire entrer [quelqu’un] ‘to make [somebody] enter’}, although each type of construction is highly constrained by a number of semantic and pragmatic features (e.g. \textit{faire entrer/monter ‘to make enter/ascend’ would normally only apply to a human patient}).

REFERENCES


Bowerman, M., & Choi, S. (2001). Shaping meanings for \textit{faire entrer/monter} by a number of semantic and pragmatic features (e.g. although each type of construction is highly constrained in bilingual construal of manner in speech and gesture in Mandarin, Japanese, and English. Modern Language Journal, 99, Supplement 2015, 66–82.


(Eds.), *Language and bilingual cognition* (pp. 315–339). New York: Psychology Press.


**APPENDIX**

Voluntary motion items: **ACROSS**

RUN: A man runs to a country road, runs across the road, and runs away.

CYCLE: A girl cycles to some railroad tracks on a bicycle, cycles across the tracks, and cycles away.

CRAWL: A baby crawls to a street, crawls across the street, and crawls away.

SWIM: A boy walks to a river, swims across the river, and walks away.

SLIDE: A boy walks to a frozen river, slides across the river on his shoes, and walks away.

SKATE: A girl walks to a frozen lake with skates on, skates across the lake, and walks away.

Caused motion items: **INTO**

Hoppy pulls a pram across a street / across a road.

Hoppy pushes a wooden horse across a street / across a road.

Hoppy pushes a cartwheel across a street / across a road.

Hoppy pushes an apple basket across a street / across a road.