Children's Structuring of Motion Events: Syntactic Universals and Lexical Variation

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1 Introduction

The proposal of a narrow typology in some aspect of grammar raises the question of whether a parameter may be operational in first language acquisition. In Talmy's (1991; 2000) binary typology, 'verb (V)-framed' languages such as Japanese, French and Arabic systematically encode PATH (or 'direction') in verbs, e.g. {'*cross the river swimming*' / '*enter the house running*'}, whilst 'satellite (S)-framed' languages such as English, Russian and Chinese generally do so in adpositions, e.g. {*swim across the river* / *run in(to) the house*}. Although this dichotomy has been thoroughly investigated in the cognitive linguistics tradition in terms of preferred rhetorical styles (e.g. Berman and Slobin, 1994; Strömqvist and Verhoeven, 2004), the present approach addresses distinct issues of concern in the tradition of generative grammar, such as speakers' knowledge of what is possible or impossible in respect of path predication in their particular language, and what crosslinguistic similarities there may be in the lexical and syntactic encoding of motion events. Although the assumption that this dichotomy may be subject to formalization is quite prevalent (e.g. Jackendoff, 1990; Snyder, 1995; Inagaki, 2002), the above issues remain in need of detailed investigation. In order to bring acquisitional evidence to bear on the issue, an elicited production experiment was conducted with English, Japanese and French children aged 3-7 years old and adults, the results of which strongly favour a non-parameterized, lexicalist account of PATH

predication. In Section 2, I illustrate the general phenomenon by means of examples from each language, and briefly discuss how the notion of formalizing the distinction has occasionally surfaced in generative research. An alternative approach is posited, in which variation within a single language and variation between languages are considered as one and the same. Section 3 provides details of the experimental methodology, and selected results bearing specifically on the typology are given in Section 4. Section 5 begins by adopting a lexicalist account of variation, and examines how in several key aspects of the syntax of motion events, these three languages exhibit convergence. Trajectories are expressed using the same syntactic categories and semantic features, which are combined in accordance with arguably universal syntactic principles. Children's knowledge of the relevant aspects of syntax shows itself to be present from the outset, and mostly likely part of the 'initial state'. The task of acquiring syntactically-relevant specifications of particular predicates remains, thus tying the variation in question to the learning of the lexicon.

2 Paths to formalization

2.1 Talmy's typology and the question of grammaticality

The two lexicalization patterns underlying Talmy's (1991; 2000) generalization are exemplified below in English, French and Japanese, respectively, with PATH predicates in italics.[1]

(1) a. Chihiro danced *into* the house.
b. Chihiro danced *up* the stairs.
c. Chihiro danced *across* the street.

(2) a. Chihiro est *entré* dans la maison en dansant.
Chihiro AUX entered in the house by dancing
'Chihiro danced into the house.'

b. Chihiro a *monté* l'escalier en dansant.
Chihiro AUX went.up the stairs by dancing
'Chihiro danced up the stairs.'

c. Chihiro a *traversé* la rue en dansant.
Chihiro AUX crossed the street by dancing
'Chihiro danced across the street.'

(3) a. Chihiro wa uchi ni odotte *haitta.*
Chihiro TOP house P_{LOC} dancing entered
'Chihiro danced into the house.'

b. Chihiro wa kaidan o odotte *nobotta.*
Chihiro TOP stairs ACC dancing climbed
'Chihiro danced up the stairs.'

c. Chihro wa michi o odotte *yokogitta.*
Chihiro TOP street ACC dancing crossed
'Chihiro danced across the street.'

The fact that neither French nor Japanese allows the equivalents of 'dance' to function as the main verb in such cases, with PATH expressed in counterparts of *into*, *up* and *across*, has led several researchers to the assumption that this dichotomy concerns more than 'characteristic expression', and might be stated in terms of either a principle or constraint operative at the whole-language level. Thus Jackendoff (1990: 223-225) suggests that non-directional motion verbs such as *wiggle*, *spin* and *bounce* are always underlyingly adjuncts in directed motion events, such that the semantic structure of (1a) may be paraphrased as *Chihiro went into the house by dancing*. On this account, English has a 'GO-Adjunct rule', which allows the expression of the semantic adjunct as the main syntactic predicate in a directed motion event. The reason that the examples in (1) are grammatical in English, but not so when literally translated

into French or Japanese, is because the latter languages lack this rule (Jackendoff, 1990: 225). Other accounts which have sought to make the same distinction at the whole–language level include Levin and Rapoport's (1988) principle of 'lexcial subordination', and Snyder's (1995) positing of a null telic morpheme in this type of English structure, linked to a more general 'compounding parameter'. However, very often it is simply assumed that some constraint is operational, and the validity of the distinction is taken as read (e.g. Inagaki, 2002; Randall, van Hout, Weissenborn and Baayen, 2004). Whilst previous accounts have focused on verb-types or more general event semantics, they have often failed to take into consideration the fact that the semantics of adpositions is of equal importance in construing examples for crosslinguistic comparison. The fact that French and Japanese lack lexical equivalents of *into*, *up* and *across* goes a long way toward accounting for the failure of literal translation of the examples in (1). Indeed, if these English PPs are headed by locative prepositions such as *in (the house)*, *on (the stairs)*, or *underneath (the street)*, the meaning is strictly locational when they are merged with the verb *dance*. Alternatively, the expression of MANNER in the main predicate in French and Japanese does support directional interpretation in some cases, depending on the interplay of V and P, as we shall see.

2.2 Two hypotheses

The various interpretations of Talmy's typology as a principle, rule, or constraint at the whole-language level may be viewed as supporting some form of the following hypothesis:

(4) *The Path Parameter Hypothesis (PPH)*. A language must select either (i) V or (ii) P as the canonical predicate-type for the expression of PATH in motion events.

The PPH neatly fits in with mainstream tendencies in generative crosslinguistic research, which is predominantly parameter-based. However, it rests on the assumption that exceptions such as English *cross (the bridge)*, French *(danser) vers* '(dance) towards' and Japanese *kara (tobu)* '(jump) from' might be explained independently. The lexicalist alternative might be stated as follows:

(5) *The Lexicalist Path Hypothesis (LPH)*. Variation in PATH predication, both across languages and within languages, is determined by the inherent and contextual properties of lexical items (LIs).[2]

The LPH implies that any whole-language characterization is merely a statement of tendency. In this case, the details of crosslinguistic variation might be characterized in the same way as variation within a single language, and the phenomena of path predication are placed in the more general lexical-syntactic realm of predicate-argument structure. The natural object of study from this second perspective is not the syntactic settings of the language as a whole, but the representations of lexical entries. If the lexicon proves to be the locus of variation, this raises the possibility that the relevant syntactic principles in the predication of PATH might be constant across languages.

2.3 Perspectives and predictions

The perspective of first language acquisition provides an intriguing approach to the question of PATH lexicalization as a possible parameter. Anecdotal evidence from various sources in the 1980s and 1990s indicated that child speakers of V-framed languages allow S-framed constructions, apparently in contradiction with adult norms. Clark (1985: 746-747) pointed out that despite the lack of detailed investigation into how young children learn to express motion, direction and manner in Romance languages, 'some observations suggest that children acquiring Spanish seem to begin by trying to

combine motion and manner in the verb and expressing direction with a locative adverb...'. Prior to this investigation, I had observed the spontaneous production by children of French utterances such as *Il a couru dans la salle* – he AUX ran in the room - 'He ran into the room', and Japanese utterances such as *Gakko ni hashitta* – school P_{LOC} ran – 'He ran to school', both constructions of the opposite lexicalization type, which French and Japanese grammarians tend to frown upon. On the basis of previous research and standard grammaticality judgements in the literature, the expectation was that differences would be found between the utterances of younger and older children, although whether there would be an abrupt or gradual shift in lexicalization patterns was not apparent.

It was considered that the LPH would be supported and the PPH rendered less likely (i) if both types of PATH predication exist *in a single language* in such as way that the language cannot be characterized as S-framed or V-framed; (ii) if *all three languages* admit such internal variation (to any degree); (iii) if PATH verb syntax is not homogenous, but varies from predicate to predicate, making a supra-lexical account more elusive;[3] (iv) if acquisition proceeds verb by verb, or adposition by adposition, rather than by a language-wide triggering mechanism; and (v) if syntactic possibilities in predication do not vary by language type, such that there is a common syntax in all three languages.

3 Experimentation: A Monkey, a Parrot and a Banana

3.1 Methodology

A total of 95 English, French and Japanese monolingual test subjects successfully participated in this experiment.[4] In each language, the children were divided into 5 age groups from 3 to 7 years, and there was a sixth group with adult test subjects. There were on average 5 participants in each age group (2 groups of 4 subjects, 12 groups of 5, 1 group of 6, and 3 groups of 7). The elicitation task was carried out in a quiet room at school, in the presence of one experimenter and one research assistant known to the child (school teachers in

England and France; a school teacher and a school teaching assistant in Japan). Adults were tested under the same experimental conditions, but with just the experimenter present.

Utterances with directional predicates were elicited using a purpose-designed picture-story, illustrating events with both MANNER and PATH. The narrative runs as follows: a monkey sits in a tree-house about to eat his banana; a parrot swoops in, steals the banana, and flies off. The monkey chases the parrot, determined to retrieve his banana. Their chase takes the monkey through several different spatial environments. On each page relevant to the analysis, he follows a particular trajectory (e.g. 'down', 'under', 'over', etc.), varying with the obstacles he encounters, and he exhibits a particular manner of motion (e.g. he 'slides' down a tree-trunk, 'runs' under a bridge, 'jumps' over a rock etc.). The monkey follows the parrot into a cave, where they encounter a lion. The lion chases them out of the cave, after which the parrot drops the banana and flies away. The monkey recovers it, then retraces his steps back home as fast as he can, going through all the motions a second time, before eating his banana in peace.

The experiment made use of a simple and relatively straightforward elicitation procedure. The experimenter introduced each page by describing the location, in order to encourage subjects to focus on trajectory rather than locational setting.[5] Subjects were then asked to describe the monkey's actions. For example, the scene in which the monkey jumps over a rock was introduced in English as follows:

> 'and now look, he's running along, and there's a rock in the middle of the path. So what does the little monkey do?'

If subjects did not describe the path followed by the monkey, but rather described the MANNER ('he jumps') or commented on the monkey's emotions

('he's very cross'), a prompting strategy was adopted to elicit appropriate responses; the use of directional predicates of any type was scrupulously avoided in the prompts. This technique was a major departure from previous 'narrative-oriented' research on motion events (e.g. the papers in Berman and Slobin, 1994; Strömqvist and Verhoeven, 2004). Such a strategy would be disastrous for the investigation of rhetorical styles, because of frequent interruptions in the storytelling, and the discounting of first responses in such instances. However, this form of elicitation made possible the systematic targeting of particular lexical and syntactic types, so that each pictorial stimulus produced at least one example of PATH predication from each test subject.

Each experiment was recorded on micro-cassette, all responses related to the materials were transcribed, and 1608 examples of PATH predication were selected for analysis.

3.2 Some issues in the coding of utterances

In selecting and coding utterances, several choices were made to facilitate the ensuing analysis, which require clarification at the outset. First, I characterized predicates which obligatorially encode direction (e.g. *to*), static location (e.g. *above*), or which allow both interpretations (e.g. *under*) as respectively carrying the semantic features PATH, PLACE and LOC ('location'), as in Emonds (2000). However, this analysis is not dependent on such notation, and may be easily recast in alternative frameworks.

Second, a distinction was made throughout between 'deictic' PATH verbs (e.g. *come* and *go*) and 'geometric' PATH verbs (e.g. *enter*, *cross*). The focus of this investigation was the latter, and their PP equivalents. Utterances without geometric specification were all discounted, even if simple directional predication was attested, as was occasionally the case with deictic PATH verbs (e.g. *here he comes*) or directional MANNER verbs (e.g. *he's running*).

Third, clauses with directional interpretation, rather than utterances containing PATH predicates, were the basis for all calculations. Thus an example such as 'He jumps in, and crosses the river, then crawls on top of the grassy bank' is one utterance, but three instances of PATH predication: (a) [*jumps in*] - MANNER in V and geometric PATH in P; (b) [*crosses* DP] - MANNER in V; (c) [*crawls on top of* DP] - MANNER in V, trajectory in a PP with a locative P, *on*, and a locative N, *top*.

Fourth, calculations specifically relevant to Talmy's typology were based on *instances of* PP_{PATH} *in the absence of geometric* V_{PATH}, as this most unambiguously reveals examples of the 'S-framed type'. The principal alternative, 'PATH in V', subsumes V + direct object (e.g. *cross the river*), V + PP (e.g. *cross to the other side of the river*), compound V with both PATH and MANNER (e.g. French *dégringoler* 'tumble-down'), and other variations.

Fifth, one type of non-V-framed utterance was allowed to slip through the net: namely, when a MANNER verb assigns accusative case to the GROUND object, with PATH interpretation (e.g. Japanese *hashi no shita o hashiteru* - bridge GEN underneath ACC run-PROG - 'He's running under the bridge'). Thus one cannot assume that if a certain percentage of utterances are classified as S-framed, the remaining utterances are all V-framed.

Finally, it was not the case that all supposedly equivalent verbs were assigned identical codings. For example, Japanese *noboru* and French *grimper* (both 'climb') necessarily involve upward motion, and were treated as geometric PATH verbs, but English *climb* supports various trajectories, and was not so characterized. Japanese *ochiru*, French *tomber* + PP, and English *fall* + PP were all treated as 'equivalent' expressions of PATH, but Japanese *korobu*, French *tomber* without PP (both 'fall / fall over'), and English *fall over* were not considered expressions of directed motion (see Stringer, in prep., for discussion).

4. Results

4.1 Japanese results

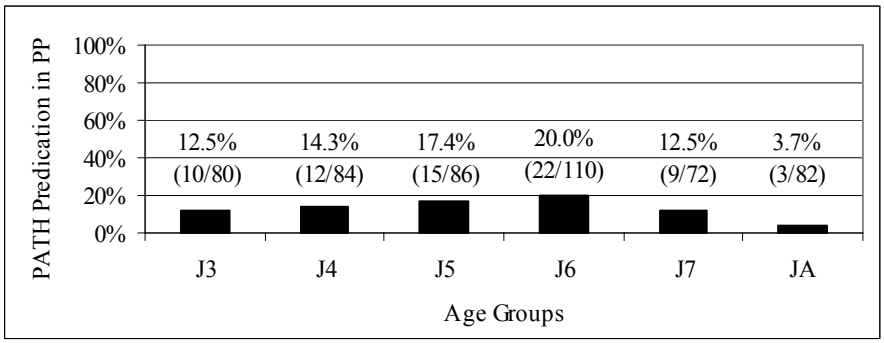

Figure 1. *Japanese responses by age group. Mean for each age group of instances of* PP_{PATH} *in the absence of geometric* V_{PATH} *, over the total number of instances of PATH predication. Actual numbers are shown in parentheses.*

Test subject groupings are coded by language group (J, F, E) and age (3-7, Adults), and individuals are identified by means of an additional lower case letter. Thus J3a is Japanese, 3 years old, and the youngest in the group. As can be clearly seen from Figure 1, there was no significant development in preferences for the expression of PATH in PP from the 3-year-olds to the 7-year-olds. In fact the youngest and the oldest group of children had exactly the same proportion of instances of PP_{PATH} in the absence of geometric V_{PATH}: both 12.5% (10/80 examples in Group J3, and 9/72 examples in Group J7). The adults had a markedly lower number of such utterances: only 3.7% (3/82). However, it is important to note that the 68 examples of this type found in the child data were all considered fully grammatical by adult informants in this particular respect (although they did contain other types of error, such as lack of topic marking, vocabulary errors, and substitution of *de* (P_{LOC}) for *ni* (P_{LOC})). It is likely that the low instance of this lexicalization pattern in the adult responses was at least in part due to the fact that their speech was much less colloquial than that of the children under the same experimental conditions. The use of a geometric V_{PATH}

to express trajectory is considered stylistically superior to spelling out the spatial geometry only in PP. In other words, the adult figures are a reflection of rhetorical style rather than grammaticality.

The overall results of the Japanese data confirm that Japanese speakers exhibit an overwhelming tendency to encode PATH in V. In fact, one 3-year-old (J3c) and two adults (JAb, JAd) produced geometric V_{PATH} in *all* their responses (with one exception conforming to neither type).[6] The individuals with the highest numbers of PP_{PATH} in the absence of geometric V_{PATH} were two 5-year-olds, J5a and J5c (both at 27.8%), closely followed by three 6-year-olds (J6f at 26.7%, J6c and J6g both at 25%). The mean average of instances of PP_{PATH} in the absence of geometric V_{PATH} across the Japanese children was 15.7% (68/432). The remainder of instances of PATH predication were almost invariably cases of geometric V_{PATH}, with few exceptions.

A very important caveat to this observation of V-framed preference is that the Japanese examples characterized as such reveal a great deal of lexical and syntactic variation. Perhaps surprisingly, such variation was attested in all age groups, to varying degrees. Utterances were subject to general division into three general structural types: (i) only in V_{PATH} (subsuming intransitive V, transitive V, geometric V + deictic V, conflation of both PATH and MANNER in V, and V-V compounds); (ii) in both V_{PATH} and PP_{PATH} (subsuming PPs both with a simple P, e.g. *dōkutsu ni* – cave P_{LOC} –'into the cave', and those with locative NPs, e.g. *dōkutsu no naka ni* – cave GEN inside P_{LOC} –'into the cave'); and finally (iii) only in PP_{PATH}. Due to restrictions of space, I restrict exemplification to the latter, supposedly atypical pattern, which although prescriptively dispreferred, is colloquially acceptable.

(6) <J3d: *soto e hashitta*>
outside to ran
'He ran outside.'

(7) <J6d: *yama no ue kara korogatta*>
mountain GEN top from rolled
'He rolled from the top of the mountain.'

(8) <J5d: *ishi no ue ni jampu shi-yō to shiteru no*>
stone GEN top P_{LOC} jump do-INT COMP do.TE.PROG PART
''He's trying to jump onto the rock.'

(9) <J7b: *o-saru-san wa oyoide mukō-gishi made itta* >
HON-monkey-TITLE TOP swimming other-side until went
'The monkey went swimming to the other side.'

4.2 French Results

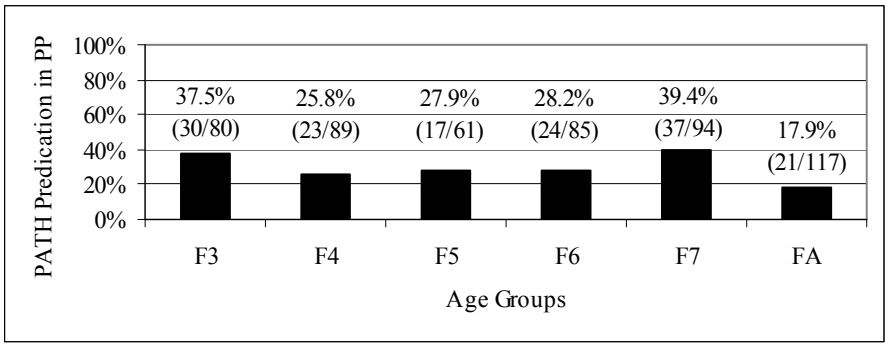

Figure 2. *French responses by age group. Mean for each age group of instances of PP_{PATH} in the absence of geometric V_{PATH} , over the total number of instances of PATH predication. Actual numbers are shown in parentheses.*

Just as in the case of the Japanese results, the average preference levels of the French 3-year-olds and 7-year-olds were almost identical: 35.7% (30/80) and 39.4% (37/94), respectively. Again, the adults produced a lower number of such utterances (17.9%: 21/117). Given that, just as in the Japanese case, French adult informants judged the children's utterances to be grammatical in this respect, this adult-child difference can be said to be one of style rather than grammar, the adults adopting a more formal register and adhering to more prescriptive

standards under the same experimental conditions. In terms of what constitutes a possible expression, there appears to be continuity between children and adults.

However, the typological prediction holds only if interpreted very loosely (i.e. most French speakers encode trajectories in geometric V_{PATH} most of the time). PP_{PATH} in the absence of geometric V_{PATH} was significantly more common in French than in Japanese responses, as discussed below. There was also considerable variation in the sets of individual responses. The individuals with the lowest proportions of PP_{PATH} in the absence of geometric V_{PATH} were J5b at 0%, and F6e and FAa both at 11.8%, whilst those with the highest proportions were F3c at 44.4%, and F5a and F7e, both at 50%. The mean average of instances of PP_{PATH} in the absence of geometric V_{PATH} across the French children was 32.2% (131/407).

There was also considerable lexical and syntactic variation in all age groups. Whilst verbal predication is much less complex in French than in Japanese in respect of argument structure (no compounding, no complex predicates with deictics, no V_{MANNER} assigning accusative case to GROUND objects, nor onomatopoeia carried on light verbs assigning case to GROUND objects), PP structure exhibits more variation in French than in Japanese (co-occurrence of P_{PATH} and P_{LOC} above the GROUND object, N_{LOC} used with or without the definite article, and intransitive Ps). As with Japanese, it was possible to divide the utterances into three general structural types: expression of PATH (i) only in V_{PATH} (subsuming intransitive V, transitive V, and conflation of both PATH and MANNER in V); (ii) in both V_{PATH} and PP_{PATH} (with more elaborate trajectories than in Japanese); and (iii) only in PP_{PATH}. Again, I restrict exemplification to the latter, supposedly atypical pattern.

(10) <FAb: *il a roulé en bas de la montagne*>
he AUX rolled P_{LOC} bottom of the mountain
'He rolled down the mountain.'

(11) <F7c: *il continue à le poursuivre, il court dans la caverne*>
he continues to him pursue, he runs in the cave
'He keeps chasing him, he runs into the cave.'

(12) <F7d: *il nage de l'autre côté*>
he swims P_{LOC} the other side
'He swims across.'

(13) <F7e: *il va dedans et il ressort*>
he goes inside and he again.leaves
'He goes inside and he comes out again.'

4.3 English results

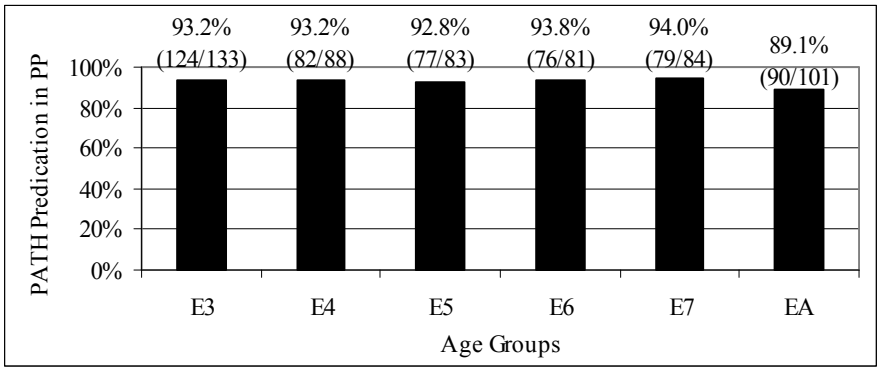

Figure 3. *English responses by age group. Mean for each age group of instances of PP_{PATH} in the absence of geometric V_{PATH} , over the total number of instances of PATH predication. Actual numbers are shown in parentheses.*

Echoing the lack of developmental change in the previous two studies with respect to lexicalization preferences, the English results show near-identical levels of preference for PP_{PATH} in the absence of geometric V_{PATH} in all age groups. As shown in Figure 3, the range of averages by age group was very tight indeed, from 89.1% (90/101) in Group EA to 94% (79/84) in Group E7.

As such, these results overwhelmingly confirm Talmy's (1985; 1991; 2000b) typological predictions for English. The range of individual variation was also relatively narrow, so much so that each individual speaker's rhetorical style could plausibly be assigned the label 'S-framed'. The individuals with the lowest proportions of PP_{PATH} in the absence of geometric V_{PATH} were EAf at 76.5% (13/17) and E5b at 77.8% (14/18), whilst those with the highest proportions were E3b, E3d, E4b, E4e, E5c, E5d, E5e, E6c, E6e, E7d, EAc and EAd, all at 100%. The mean average of instances of PP_{PATH} in the absence of geometric V_{PATH} across the English children was 93.4% (438/469).

The same three general structural types were used for analysis of the English data: the expression of PATH: (i) only in V_{PATH} (transitive V, in this case); (ii) in both V_{PATH} and PP_{PATH} (especially conflation of MANNER and PATH, e.g. *fall*, *topple*, *tumble*); and (iii) only in PP_{PATH} (subsuming V_{MANNER} + intransitive P, V_{MANNER} + transitive P, deictic V_{PATH} + PP, complex predicates with deictics + PP, e.g. *come running out*, and onomatopoeia + PP, e.g. *splash into*). Although verbs such as *cross*, *enter* and *pass* exist in English, the pattern of transitive geometric V_{PATH}, relatively common in Japanese and French, was virtually unattested in the English data. Only one verb, *cross*, was used in this way, and in only 1/54 of the child responses to the river scene.

(14) <E5b: *he crosses the river*>

4.4 Comparative results

The difference between Japanese and English in terms of Talmy's typological predictions is truly striking. As shown in Figure 4, the Japanese children encoded trajectories in PP_{PATH} in the absence of geometric V_{PATH} in only 15.7% (68/432) of all instances of PATH predication, whilst the English children did so in 93.4% (438/469) of cases.

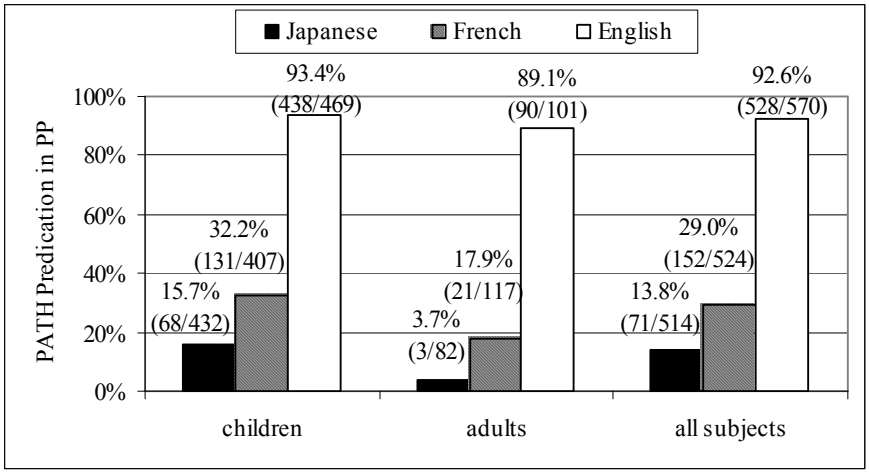

Figure 4. *Responses by language group. Mean for each language group of utterances with PP [PATH] in the absence of geometric V [PATH], over the total number of PATH utterances.*

The Japanese adults performed even more strictly in accordance with predictions, following the 'S-framed' pattern in only 3.7% (3/82) of cases, whilst the English adults did so in 89.1% (90/101) of cases. PP_{PATH} in the absence of geometric V_{PATH} accounted for 13.8% (71/514) of all Japanese responses, and 92.6% (528/570) of all English responses.

However, perhaps the most interesting results were those of the French speakers. A perfunctory glance at the chart might give the impression that these results corroborate the claim that French may be characterized as a V-framed language: most speakers encode trajectories in geometric V_{PATH} most of the time. Nevertheless, it is difficult to characterize French as having the same rhetorical characteristics as Japanese in this regard. Intriguingly, the Japanese and French child groups have discrete response ranges: the average group responses of the Japanese children range from 12.5% to 20%, whilst the average group responses of the French children range from 25.8% to 39.4%, and the confidence intervals (CIs) on the means are non-overlapping: Japanese CI = 0.157 ± 0.034; French CI = 0.322 ± 0.045; English CI = 0.934 ± 0.022 (Wald's approximation). In this

light, the possibility of restating the typology in terms of a binary parameter seems more remote.

5 Commonalities in syntax and the spatial lexicon

5.1 Beyond the binary typology

In Section 2.3, five criteria were set out to enable selection between the Path Parameter Hypothesis and the Lexicalist Path Hypothesis. Analysis of the transcripts leads to the following conclusions. First, French children and adults allow both types of PATH predication *in a single language* to the extent that this language cannot be adequately classified as S-framed or V-framed in anything but the most informal of characterizations. Second, *all three languages* admit such internal variation (albeit to different degrees). Third, the syntax of argument structure of PATH predicates is not uniform, but varies from item to item (e.g. some V_{PATH} must select a GROUND object, some may select an N [LOC] direct object, some select a particular P, some select a particular type of P). Fourth, acquisition of the knowledge underlying PATH predication appears to be piecemeal rather than the turning on of a supra-lexical switch. There is no evidence that a PATH parameter is set at the whole language level during the age range tested. Given the prevalence of the idea of Very Early Parameter Setting (VEPS) in current theory (Wexler, 1998), it must be said that this could be due to the choice of investigating children beyond the two-word stage; however, the more important point remains that despite the occasional fulminations of prescriptive grammarians, speakers *do* continue to accept examples of the supposedly 'opposite' lexicalization pattern in each language, right into adulthood. The expected break in grammaticality judgements never occurred (although the Japanese and French data revealed clear differences in stylistic preferences). Thus far the findings bring us closer to the conclusion that Talmy's (1991) original formulation of the typology was accurate in term of its descriptive perspective: these are indeed 'lexicalization patterns', no more, no

less. It is highly unlikely that such expressions of typological tendency could be formalized in terms of parameter theory, and a lexicalist account is required in order to explain the possibilities of combining the various types of V, P and N. However, consideration of the fifth criterion leads to a conclusion of arguably more theoretical significance. Thus far the focus has been on differences between languages, rather than what they have in common. One observation is so evident that it is easy to miss. All three languages canonically express trajectories using the same set of elements, which at first glance appear to be combined in the same way in each language. This suggests that while variation may be accounted for in terms of the inherent and selectional properties of LIs, certain aspects of grammar may be invariant. The new perspective on motion events advanced here is of lexical variation and a shared syntax.

In the course of the more-in-depth investigation from which the present study is drawn, I have tentatively identified eight shared aspects of syntax in the predication of PATH (Stringer, in prep.: Ch.6). Here two such commonalities are highlighted for discussion: the role of locative nouns, and the universal hierarchy of PP.

5.2 Locative N in PATH utterances

One aspect of shared syntax appears to be the existence of a special subclass of nouns, here dubbed 'locative N' (N_{LOC}), found within a layered PP structure. This nominal projection is absent from most influential analyses of PP, which otherwise converge in recognizing a strict structural hierarchy with directional adpositions above locational adpositions, with PATH above PLACE (see below). Respective examples of the nouns in questions are: *on top of*, *in front of*; *à côté de* – P_{LOC} side of – 'beside', *en bas de* – P_{LOC} bottom of – 'at the bottom of'; *no shita ni* – of underneath P_{LOC} – 'under', *no naka ni* – of inside P_{LOC} – 'in'. A comparative analysis of these locative nouns reveals that in all three languages, (i) N_{LOC} is syntactically distinct from open-class, lexical N; (ii)

it is categorially distinct from adpositions; and (iii) it has its own position within layered PP, invariable both across languages and throughout the process of first language acquisition.

N_{LOC} may be distinguished from lexical N in such PP contexts by a cluster of properties: it is not preceded by a determiner; it may not be pluralized; and it may not be modified (whether adjectivally, or by means of PPs or relative clauses). Such clustering is indicative of the absence of a DP projection, and I assume that all N_{LOC} project a bare NP. The ungrammatical cases below may be rendered grammatical if the N_{LOC} *top* is replaced with a DP *the top*.

(15) He climbed {on top of the mountain / *on tops of the mountains / *on snow-covered top of the mountain}.

These contrasts are also found in French: *Il a grimpé {*en hauts des montagnes / *en haut enneigé de la montagne}* – he AUX climbed {P_{LOC} top-PL of-the-PL mountain-PL / top snow-covered of the mountain}. Although Japanese lacks overt D and plurals, the restriction on modification obtains, and the same contrast may be shown by substituting the N_{LOC} *ue* 'top' for an open-class N such as *chōjō* 'summit': *Yama no yuki no tsumotta {*ue / chōjō} ni nobotte itta* – mountain GEN snow GEN covered {top / summit} P_{LOC} climb-TE went – 'He climbed {*on snow-covered top of / on the snow-covered summit of} the mountain'.

N_{LOC} can be distinguished from P by two criteria in English and French, and three in Japanese. Unlike P, (i) N_{LOC} cannot directly assign case to the GROUND object, but requires the insertion of a grammatical P (English *of*; French *de*; Japanese *no*); (ii) it cannot directly predicate anything of the FIGURE, but requires a higher P to 'relate' the FIGURE to the GROUND; and (iii) in Japanese only, it may be assigned accusative case, e.g. *Hashi no shita o kugurimashita* – bridge GEN underneath ACC go-via-under-PST – 'He went

under the bridge'. In the context of continuing debate on this issue, such evidence supports an analysis of these elements as N (following Ayano, 2001), rather than P (as in Watanabe, 1993).

5.3 Universal PP hierarchy

I maintain that there is a universal layered PP structure, with a higher functional head hosting the PATH feature, and a lower lexical head hosting the PLACE feature. This idea has been adapted by several syntacticians from Jackendoff's (1990) theory of Conceptual Semantics, and it is widely accepted that the [PATH [PLACE]] configuration is part of syntactic structure, regardless of its status in conceptual structure (van Riemsdijk, 1990; Koopman, 2000; Ayano, 2001; den Dikken, 2003). Incorporation of N_{LOC} into this layered PP structure, following the arguments given above, results in the hypothesis that Universal Grammar makes available the following syntactic structure:

(16) $[_{P,\ PATH}\ \alpha\ [_{P,\ PLACE}\ \beta\ [_{N,\ LOC}\ \gamma\ [_{P}\ \delta]]]]$

An illustrative example from the English transcripts is provided below.

(17) a. <E3e [4]: [he jumps…] *from on top of the rock*>.

b. $[_{PP,\ PATH}$ from $[_{PP,\ PLACE}$ on $[_{NP,\ LOC}$ top $[_{PP}$ of $[_{DP}$ the rock]]]]]

The pictorial stimulus of the monkey going under a bridge provided several utterances using the items *par* 'via' (P_{PATH}), *en* 'in / at' (P_{LOC}), *dessous* 'under' (N_{LOC}), *de* 'of' (P), and *pont* 'bridge'. The following is a composite example, based in the utterances of F3a, F6a, and F7a:

(18) $[_{PP,\ PATH}$ (par) $[_{PP,\ PLACE}$ (en) $[_{NP,\ LOC}$ (dessous) $[_{PP}$ (du) $[_{DP}$ pont]]]]]

In Japanese there is a complication in that both P slots may not be simultaneously filled. I follow Ayano (2001) in assuming that examples such as (19) have *ni* 'P_{LOC}' in the lower position, with an abstract directional morpheme in the upper slot, whilst examples such as (20) have an overt directional P and a covert locational P.

(19) a. <J5d: *dōkutsu no naka ni haittetteru no*>
cave GEN inside P_{LOC} enter.TE.go.PROG PART
'He's going inside the cave.'

b. [[[[[[dōkutsu $_{DP}$] no $_{P}$] naka $_{NP, LOC}$] ni $_{P,LOC}$] Ø $_{P, PATH}$] haittetteru $_{VP}$]

(20) a. <J6d: *yama no ue kara korogatta*>
mountain GEN top from rolled
He rolled from the top of the mountain.'

b. [[[[[[yama $_{DP}$] no $_{P}$]ue $_{NP, LOC}$] Ø $_{P,LOC}$] kara $_{P, PATH}$] korogatta $_{VP}$]

For posited universal structures, assuming the 'continuity hypothesis', it is to be predicted that they will be present and inviolable at all stages of acquisition. Thus we should never find errors in violation of this layered PP hierarchy, e.g.

(21) **en jusque* bas de l'arbre *[P_{PLACE} [P_{PATH}]]
P_{LOC} until bottom of the-tree
(context: *jusqu'en bas de l'arbre* 'to the bottom of the tree)

(22) *dōkutsu no *ni naka* *[N_{LOC} [P_{PLACE}]]
cave GEN P_{LOC} inside
(context: *dōkutsu no naka ni* 'into the cave')

In 1608 recorded utterances of path predication, such errors were never attested. That this is so in each language and in all age groups lends further support to the notion that these aspects of phrase structure are part of universal grammar.

6 Conclusion

Talmy's typology is explicitly stated in terms of language *use*, rather than language *knowledge* in the generative sense, and rests on the notion of 'characteristic expressions' being colloquial, frequent, and pervasive (Talmy, 1985: 62). From this perspective, predictions of general tendencies were upheld (strongly for English and Japanese, weakly for French). However, the original experimental data brought to bear on this phenomenon cast doubt on the the possibility of formal characterization at the whole-language level. Several findings support a non-parameterized, lexicalist account of PATH predication, three of which bear repeated mention. First, the three languages fell into discrete response categories for directional utterances in the absence of an inherent PATH verb, in all child age groups. Second, both lexicalization types were found in V-framed languages, in all age groups. Third, the three languages are revealed to have a shared syntax of directional predication, involving the same set of semantic features and the same set of basic syntactic structures, including a layered PP structure. Thus there is no language-particular grammar involved in this variation. Rather, both directional V and a fully articulated PP structure are available in all three languages, show no discernable development, and are presumably part of the machinery of Universal Grammar. Children already understand the syntactic possibilities in the predication of directed motion, but must associate semantic features such as PATH and PLACE with particular predicates in their developing lexicon. Individual lexical entries are thus the primary locus of variation in the linguistic expression of motion events.

Notes

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[1] Glosses include the following abbreviations: ACC - accusative; ASP - aspect; COMP – complementizer; GEN - genitive; HON – honorific; INT – intentional particle ('want to'); P_{LOC} - general locative adposition, translated as *at*, *in*, *on*, etc. according to context; PART - discourse particle; PST – past tense; PROG - progressive; TE - Japanese TE-form, which has various functions; TOP – topic marker.

[2] I follow Chomsky (2000) in his use of the abbreviation LI for 'lexical item'.

[3] Contra the claims of Hohenstein, Naigles and Eisenberg (2004), who assume that irrespective of the particular language, path verbs have a universal 'path-verb syntax' (ibid: 578), in which 'the ground component surfaces as as the direct object (or object of a content-poor or 'dummy' preposition)' (ibid: 571).

[4] For full discussion of this experiment, see Stringer (in prep.). The basic idea of using a picture story to elicit descriptions of motion events was drawn from work by Berman and Slobin (1994).

[5] Slobin's (1996) comparative study of English and Spanish motion events indicates that speakers of verb-framed languages may have a locational bias in event descriptions, leaving aspects of the trajectory to be inferred.

[6] The exception being a case where a MANNER verb assigned accusative case to a GROUND object: <JAb [17]: *iwa o jampu shite*...> - rock ACC jump do-TE – 'He jumps (over) the rock, and...').

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