Variable motion event encoding within languages and language types: a usage-based perspective*

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ABSTRACT

Speakers of the world's languages differ in the ways they talk about directed motion. Speakers of satellite-framed languages (S-languages; e.g., English) typically conflate Path and Manner in a single clause (e.g., *run out*), whereas speakers of verb-framed languages (V-languages; e.g., Spanish) tend to convey Path and Manner in two different clauses (e.g., *salir corriendo* 'exit running'). Herein, we ask whether speakers also show systematic variability *within* particular languages and language types in their directed motion descriptions. We examine this question by comparing oral narratives of adult native speakers of one V-language (Spanish) and two S-languages (German, Polish) (N = 15), where each subject provided a simultaneous description of an ongoing animated video depicting self- (e.g., *jump into the river*) and caused-motion (e.g., *throw a stone into the river*) events. Our results showed strong evidence for both intra-typological and language-internal variability, especially in the extent to which the Manner component is encoded. Overall, the locus of Path encoding (e.g., verb, prefix, particle) and the conceptual structure of motion events (i.e., self-motion, caused-motion) were two key factors that influenced the speakers' choice of lexicalization pattern. We discuss the implications of our findings, which (i) suggest a more nuanced typology of motion events that expands the binary distinction between V- vs. S-languages – in line with earlier work on

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intra-typological variability, and (ii) highlight the relevance of such a nuanced typology for motion cognition.

KEYWORDS: spatial language, self-motion, caused-motion, intra-typological variation, intra-linguistic variation, motion cognition.

1. Introduction

The expression of directed motion has been one of the topics that has caught researchers' attention for the past four decades. According to Talmy (1978), a motion event comprises four basic components: (i) *Figure*, i.e., an entity that moves, (ii) *Motion* of the Figure, (iii) *Ground*, i.e., a reference point with respect to which the Figure moves, and (iv) *Path*, i.e., the trajectory along which the motion takes place. In addition, a motion event may include a *co-event*, a semantic component that typically conveys information about the *Manner* or the *Cause* of motion. For example, the sentence *John ran into the room* explicitly mentions all these elements: the Figure (*John*), the Ground (*room*), the Path (*into*), and Motion conflated with the co-event (i.e., the Manner; *ran*).

Languages show systematic cross-linguistic variation in their encoding of directed motion events, particularly in the ways they map Path and Manner onto surface expressions. According to Talmy (1991, 2000), speakers of satellite-framed languages (S-languages; e.g., English, German, Polish) typically use a *conflated strategy*, encoding Manner in the main verb and Path in a satellite around the main verb (e.g., particle, prefix) within a single clause (e.g., *run into*, *jump up*). In contrast, speakers of verb-framed languages (V-languages; e.g., Japanese, Spanish, Turkish) generally rely on a *separated strategy*, expressing Path in the main verb, and Manner in an additional subordinated clause (e.g., Sp. *entrar corriendo* 'enter running', *salir saltando* 'exit jumping'); see also Malblanc (1968), Tesnière (1959), and Vinay and Darbelnet (1958) for previous discussions of motion event typology, especially with respect to French as compared to English and German. Because the encoding of Manner outside the main verb involves additional syntactic constituents that impose increased processing demands, speakers of V-languages frequently leave out Manner altogether from their descriptions of motion (Özçalışkan, 2009, 2016; Özçalış-kan & Slobin, 1999, 2003; Slobin, 1991).

Most of the previous work on motion events focused on languages belonging to different types (e.g., V- vs. S-language) and provided compelling evidence for the aforementioned coding patterns: when talking about directed motion, speakers of S-languages predominantly used manner verbs, whereas speakers of V-languages largely relied on path verbs (Allen et al., 2007; Berman & Slobin, 1994; Gennari, Sloman, Malt, & Fitch, 2002; Hickmann, Taranne, & Bonnet, 2009; Naigles, Eisenberg, Kako, Highter, & McGraw, 1998; Strömqvist & Verhoeven, 2004). Importantly, however, even though languages

generally show preference for one type of lexicalization pattern over another, there is also evidence indicating that languages display significant *intra-typological variation*, i.e., variation within the same typological group, especially with respect to the degree to which they elaborate Path and Manner (see Goschler & Stefanowitsch, 2013, for a recent collection of studies). For example, Ibarretxe-Antuñano (2004, 2009) suggested that languages can be placed on a continuum of Path salience that cross-cuts the binary split between V- and S-languages. By way of illustration, although Spanish and Basque are both V-languages, speakers of Spanish tend to limit themselves to conveying Path in the verb, while speakers of Basque frequently add additional Path segments such as source and goal outside the verb, resulting in more elaborated Path descriptions (see also Özçalışkan, 2009, for a similar pattern in Turkish). Similarly, languages from the same typological affiliation can differ in their ability to express Manner. For instance, previous findings suggest that, when talking about self-motion, German speakers tend to encode more specific Manner dimensions in the main verb than Polish speakers, who generally make use of a smaller variety and amount of manner verbs (Lewandowski & Mateu, 2016; Lewandowski & Özçalışkan, 2019). A similar pattern of differences has held true for other combinations of Slavic and Germanic languages such as, e.g., Polish vs. English (Kopecka, 2010; Slobin, Ibarretxe-Antuñano, Kopecka, & Majid, 2014), Serbo-Croatian vs. English (Filipović, 2007), and Russian and Polish vs. English, Dutch, and Swedish (Koptjevskaja-Tamm, Divjak, & Rakhilina, 2010), with Germanic languages consistently showing a higher degree of Manner salience compared to Slavic languages; see also Ragnarsdóttir and Strömqvist (2004) for an intra-genetic comparison of Manner encoding between Icelandic and Swedish, i.e., within the Germanic group.

Moreover, given that the affiliation to one or the other typological group is based on the *most frequent* encoding strategy, languages rarely if ever rely on their typical lexicalization pattern exclusively. For example, although English is predominantly an S-language, it has a number of path verbs, both Latinate (e.g., *enter*, *exit*, *ascend*, etc.) and of Germanic origin (e.g., *rise*, *leave*), which appear in V-framed type constructions (e.g., *The plane ascended to 3000 feet*; Stefanowitsch, 2013). In a similar vein, speakers of V-languages occasionally use the conflated strategy, especially if the motion event does not imply the crossing of a spatial boundary (e.g., Sp. *correr hacia la puerta* 'run toward the door', *caminar hasta la colina* 'walk up to the hill'; Aske 1989; Slobin & Hoiting, 1994).

In short, although languages can be classified as either S- or V-framed based on their most frequent lexicalization pattern, speakers of each language type also rely on packaging strategies that do not fully fit the characteristics of their typological affiliation. However, despite a growing body of research on patterns of motion expression, our understanding of the effects of variability *within* particular languages and language types is far from complete. For example,

most of the previous studies predominantly investigated the expression of self-motion (i.e., motion instigated by the Figure itself, e.g., *enter the room*), while considerably less attention has been paid to the encoding of caused-motion (i.e., motion instigated by an *external force*, e.g., *push the chair into the room*), one notable exception to this general trend being the expression of placement events (e.g., Bowerman, Brown, Eisenbeiss, Narasimhan, & Slobin, 2002; Gullberg & Narasimhan, 2010; Kopecka & Narasimhan, 2012). In addition, the most common speech production tasks consisted of descriptions of motion scenes in which subjects were not faced with strict time limits while elicitation methods that involved the added pressure of time constraints were used rarely (but see Pourcel, 2005, for an exception). To be more specific, in previous experiments, in which the elicitation stimuli were either pictures (e.g., Berman & Slobin, 1994; Cadierno, 2010; Özçalışkan, 2015; Strömqvist & Verhoeven, 2004) or video clips (e.g., Hendriks & Hickmann, 2015; Lewandowski & Özçalışkan, 2019; Stam, 2006), experimenters allowed the subjects to provide a motion event description in an unhurried manner *after* visualization. If the stimuli consisted of a series of isolated (decontextualized) scenes, participants were given time to describe each scene one at a time before proceeding to the next scene (e.g., Hendriks & Hickmann, 2015; Özçalışkan, 2015). In turn, if the stimuli consisted of a series of connected events (i.e., a short story), the subjects were asked to perform a free prose recall task after visually inspecting the entire sequence of stimuli (e.g., Berman & Slobin, 1994; Stam, 2006).

In this study, we aim to further contribute to the ongoing debate on motion event encoding by integrating in a single research design for both (i) self- and caused-motion events and (ii) inter- and intra-typological comparisons, using *simultaneous* commentary of an ongoing video clip as our elicitation task. The decision to use a simultaneous 'live commentary' task instead of a recall task *after* visualization was based on the assumption that the added pressure of time constraints would minimize the effects of planned performance, thereby leading to more spontaneous speech production, typical of everyday communicative interactions (cf., e.g., Ochs, 1979; Roberts & Kirsner 2000). As such, our data collection methodology adds a qualitative aspect to previous speech production tasks, which in the majority of cases did not require participants to cope with the unpredictable demands of unplanned performance.

We focus on two S-languages, German and Polish, and one V-language, Spanish. German and Spanish are two representative examples of S- and V-languages, respectively (e.g., Bamberg, 1994; Cifuentes-Férez, 2008; Harr, 2012; Sebastián & Slobin, 1994; Talmy, 2000). Polish, in turn, despite its typological similarity to German, differs from prototypical S-languages in its lexicalization of Manner, with less specific encoding of this semantic component in the main verb (Kopecka, 2010; Lewandowski & Mateu, 2016). Hence, the combination of languages involved in our study constitutes a relevant

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proving ground for the effect of both inter- and intra-typological factors in the linguistic construal of motion.

Starting with inter-typological variation, following earlier work (e.g., Berman & Slobin, 1994; Strömqvist & Verhoeven, 2004; Talmy, 2000), we expect German and Polish speakers to display greater reliance on manner tokens (i.e., number of manner verbs) and types (i.e., variety of manner verbs) than Spanish speakers in their descriptions of self-motion. Although earlier work on inter-typological contrasts in the expression of caused-motion is relatively scarce compared to earlier work on self-motion, we expect the same pattern of variation to apply to caused-motion descriptions based on the available empirical evidence (Hendriks & Hickmann, 2015; Hendriks, Hickmann, & Demagny, 2008; Ji, Hendriks, & Hickmann, 2011).

Turning next to intra-typological variation, based on previous work by Kopecka (2010) and Lewandowski and Mateu (2016), we expect greater use of manner tokens and types in German compared to Polish in self-motion descriptions. We also explore the possibility that caused-motion events will show the same pattern of similarities and differences (i.e., greater reliance on manner tokens and types in German compared to Polish).

Turning last to intra-linguistic variation, we predict that speakers of all three languages will display greater reliance on manner tokens in their caused-motion descriptions as compared to their self-motion descriptions. This prediction is based on earlier studies on physical and metaphorical motion (e.g., Hendriks & Hickmann, 2015; Özçalışkan, 2005), suggesting that speakers of both V- and S-languages increase the number of manner verbs (i.e., manner tokens) in describing events from a caused motion perspective. However, we cannot predict if the same pattern of intra-linguistic variation also applies to the variety of manner verbs (i.e., manner types), given the lack of systematic of evidence in earlier work on this subject.

2. Methods

2.1. SAMPLE

The participants included 15 adult German native speakers (M_{age} = 25, range = 19–33; 8 females), 15 adult Polish native speakers (M_{age} = 23, range = 20–24; 9 females), and 15 adult native Spanish native speakers (M_{age} = 21, range = 20–36; 10 females). Data were gathered at different universities in Germany, Poland, and Spain. Most of the participants were university students, and 4 participants were teaching assistants with postgraduate degrees. The sample size was based on earlier work by Özçalışkan (2009), which showed that 10 subjects per group would provide a minimum of 84% power to detect reliable effects at $p < .05$ (η^2 = 0.08; n = 10/group).

2.2. DATA COLLECTION

Participants were interviewed individually in a laboratory room. They were asked to watch a silent 360-second-long extract from Charlie Chaplin's *City Lights* (cf. Pourcel, 2005) and to provide a 'live commentary' of what was happening in the video to an experimenter. The elicitation stimulus depicted both self-motion events (6 different manners: step, rush, swim, jump, stagger, walk; 6 different paths: forward, backward, upward, downward, into, out) and caused-motion events (6 different Manners: push, pull, throw, submerge, drop, drag; 6 different Paths: forward, backward, upward, downward, into, out); see Appendix I for a sequence of events included in the stimulus video. Participants' responses were videotaped.

2.3. DATA CODING

Responses were transcribed by native speakers of the corresponding languages and divided into clauses. A clause unit was defined as a main verb and its associated arguments/adjuncts (e.g., Germ. *Sie laufen die Treppe runter* 'They run down the stairs'; Pl. *Schodzą po schodach* 'They walk down the stairs'; Sp. *Entran corriendo en el agua* 'They enter the water running'). Each clause was classified as either *self-motion* (i.e., events involving self-instigated movement; e.g., Germ. *Sie springen aus dem Wasser raus* 'They jump out of the water'; Pl. *Wychodzą z rzeki* 'They walk out of the river'; Sp. *Salen del agua* 'They exit the water') or *caused-motion* (i.e., events involving other-instigated movement; e.g., Germ. *Er wirft den Mann ins Wasser* 'He throws the man into the water'; Pl. *Wrzuca kamień do rzeki* 'He throws the stone into the river'; Sp. *Tira al hombre al agua* 'He throws the man into the water'). Each clause unit was further coded for verb type. Following earlier work (e.g., Özçalışkan, 2004), motion verbs were grouped as either manner verbs (e.g., Germ. *klettern* 'climb', Pl. *biegać* 'run', Sp. *empujar* 'push') or non-manner verbs (i.e., path verbs; e.g., Sp. *entrar* 'enter', Germ. *kommen* 'come', and neutral verbs; e.g., Sp. *ir* 'go', Pl. *ruszać się* 'move'). The Manner category included descriptions in which Manner and Path were conveyed in a single clause (i.e., the *conflated* strategy; e.g., Germ. *Er klettert hoch* 'He climbs up'; Pl. *Wbiegł do rzeki* 'He ran into the river'; Sp. *Empuja a Chaplin al agua* 'He pushes Chaplin into the water'), while the non-manner category included descriptions in which Manner was either not expressed or was expressed in a separate subordinate clause (i.e., the *separate* strategy; e.g., Germ. *Er kommt* 'He comes'; Pl. *Rusza się do tyłu* 'He moves backward'; Sp. *Entra corriendo* 'He enters running'). Given our interest in directed motion events, manner-only clauses (e.g., Germ. *Er springt* 'He jumps'; Pl. *Biegnie* 'He runs'; Sp. *Se tambalea* 'He wobbles') were not coded. Reliability was assessed by three independent coders (one per language) who were blind to the hypotheses of our study. The first coder coded all responses, and the

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independent coders coded 20% of the data, which included 3 randomly selected participants in each language. Agreement between coders was 92%.

2.4. ANALYSIS

We analyzed between- and within-language differences in the use of motion verbs separately for tokens and types. To check predictions on the token level we fit a Bayesian mixed model with a binomial link function (logistic regression) as implemented in the R-package brms (Bürkner, 2018), which provides an interface to the Stan programming language (https://mc-stan.org/). To be more specific, we modeled the probability of an uttered verb to be a *manner* verb. Our model includes two fixed effects, namely *language* with three levels, that is, *German, Polish*, and *Spanish*, and *event type* with two levels, that is, *self-motion* and *caused-motion*. As random variables, we implemented the *speaker* only. The uttered verb itself is either *manner* or *non-manner* and is not suitable as a random variable in this setting. We introduced a random slope of *event type* on the *speaker*. The specific predictions were checked on the basis of post-hoc tests computed by the *emmeans* R package (Length, 2019).

The predictions regarding the number of types could not be addressed in this standard framework given that their distribution does not easily fit into any of the standard distributions from the exponential family. Therefore, we decided to use the non-parametric Wilcoxon rank sum test. Since the type-based predictions are very simple and persist only to very specific subsets of the data, this can be done with little disadvantage. The data along with the statistical analyses can be found online at <https://osf.io/gp46y/?view_only=bac22d906e9f460f81bfc0e6b70974e7>.

3. Results

3.1. TOKENS

Starting with verb tokens, we first looked at inter-typological variation and found the expected differences in the encoding of motion events. Specifically, German and Polish speakers showed greater reliance on manner tokens than Spanish speakers when talking about both self- and caused-motion, resulting in more conflated descriptions in German and Polish compared to Spanish. When contrasting Spanish speakers against German and Polish speakers for self-motion, we observe a point estimate of 0.091, meaning that the odds for the utterance of a manner verb for describing self-motion events in Spanish is approximately an eleventh of that in Polish and German. The credibility interval reaches from 0.04 up to 0.15, which is well below one, corroborating our predictions; see Figure 1 for a summary of our results for manner tokens. In a similar vein, when contrasting Spanish speakers against German and
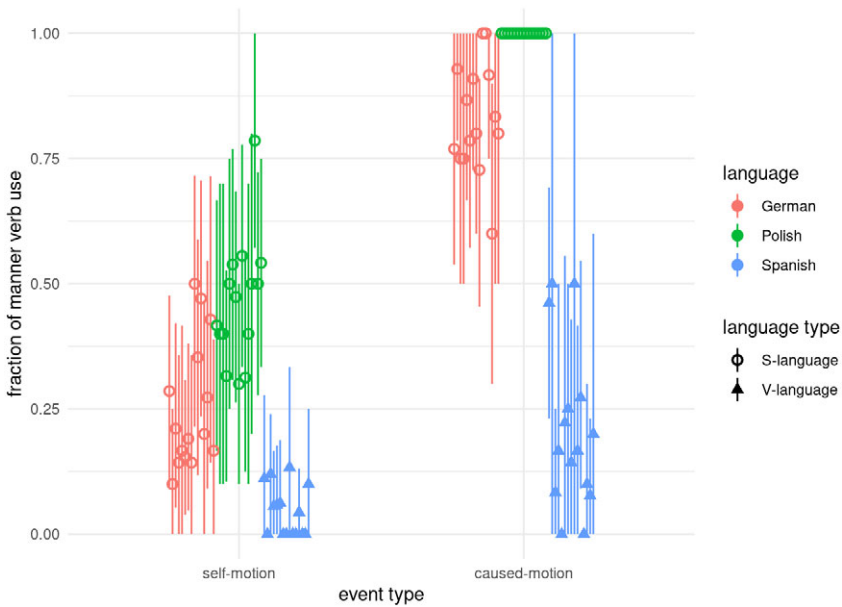
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Fig. 1. Fraction of manner verbs used by German, Polish, and Spanish speakers in self- and caused-motion descriptions.

Note. Each circle/triangle represents the fraction of manner verbs used by a specific speaker, color coded for the language, while the shape of the symbols represents the language type. Error bars are bootstrapped confidence intervals.

Polish speakers for caused-motion, we observe a point estimate of 0.0004, with the credibility interval reaching from 1.7×10^{-9} up to 0.0072, a result that is also in line with our predictions.

Next turning to intra-typological variation, contrary to our predictions, German speakers did *not* show greater reliance on manner tokens than Polish speakers in their descriptions of self- or caused-motion events. Instead, the opposite pattern became evident: regardless of event type, Polish speakers showed a higher proportion of manner tokens than German speakers, resulting in greater reliance on the conflated pattern in Polish as compared to German. For self-motion, the confidence interval reaches from 0.22 up to 0.56, centered around an odds ratio of 0.38. For caused-motion, the confidence interval reaches from 2.3×10^{-15} up to 0.02, centered around an odds ratio of 8.06×10^{-5}.

Turning last to intra-linguistic variation, in line with our hypothesis we found that event type (i.e., self-motion, caused-motion) had an effect on the packaging of motion elements. Specifically, German, Polish, and Spanish speakers increased their use of manner tokens when talking about caused-motion, resulting in more conflated caused-motion descriptions compared to

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self-motion descriptions. If we look at the overall effect of the variable *event type* we get a clear result for the odds ratio between self-motion and caused-motion with a credibility interval from 1.6×10^{-6} up to 0.037, centered around an odds ratio of 0.0056. Since this ignores clearly visible interactions it is not a well interpretable result. If we make separate tests for our three languages, we get an estimate of 0.06 for German, 1.3×10^{-5} for Polish, and 0.2 for Spanish. This result still fully vindicates our predictions. Examples of self- and caused-motion descriptions produced by German, Polish, and Spanish speakers are provided in Tables 2–4 in Appendix II, while Table 6 in Appendix IV summarizes the mean frequencies of clauses with separated and conflated packaging of motion in each language.

3.2. TYPES

Turning next to verb types, we first analyzed inter-typological variability and found the expected contrasts in the expression of motion events: German and Polish speakers produced a significantly greater variety of manner verbs compared to Spanish speakers in both their self- (Spanish vs. Polish: W =1 95.5, $p < .001$; Spanish vs. German: W = 218, $p < .001$) and caused-motion descriptions (Spanish vs. Polish: W = 208.5, $p < .001$; Spanish vs. German: W = 224, $p < .001$); see Figure 2 for a summary of our results for verb types.

Our analysis also confirmed the predicted intra-typological variation: German speakers produced a greater variety of manner verbs than Polish speakers when talking about both self- (W = 176, $p = .003$) and caused-motion (W = 182.5, $p = .001$). This pattern is consistent with earlier work on intra-typological variation between Slavic and Germanic languages in the expression of self-motion (Kopecka, 2010; Lewandowski & Mateu 2016; Slobin et al., 2014), and extends this earlier work to the domain of caused-motion, indicating that intra-typological variation in S-languages can be found across the two event types.

We last examined whether the production of verb types varied by event perspective (i.e., self- vs. caused-motion) and found evidence for an effect: German, Polish, and Spanish native speakers produced a greater variety of manner verbs in their caused-motion descriptions compared to self-motion descriptions (V = 583.5, $p < .001$). These findings thus extend previous results for manner tokens (Lewandowski & Özçalışkan, 2018) to manner types; see Table 7 in Appendix V for a complete list of manner and path verbs produced by speakers of each language.

4. Discussion

In this study, we asked whether speakers of German, Polish (both S-languages), and Spanish (a V-language) exhibit inter-typological, intra-typological, and
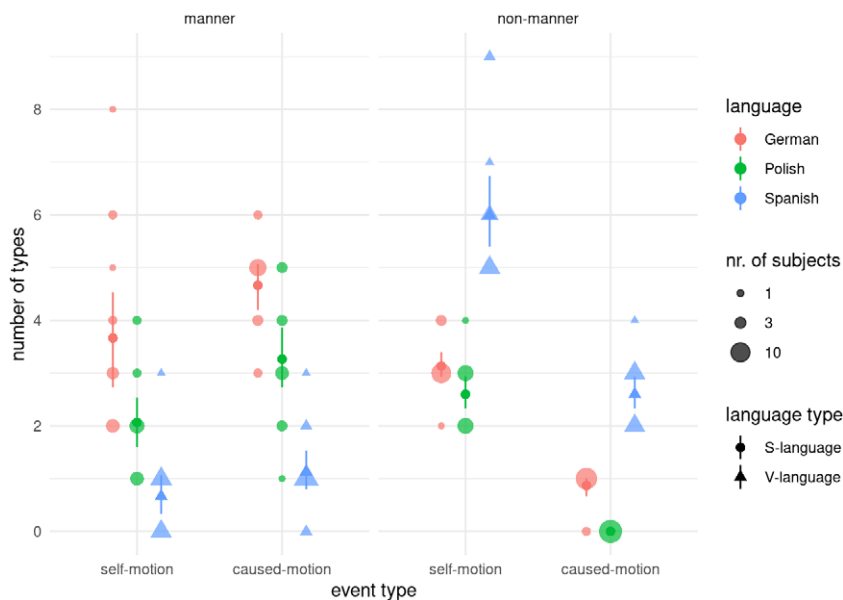
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Fig. 2. The number of verb types.

Note. Each blob corresponds to a set of speakers using the same number of types in the given combination of variables. The number of speakers per blob is indicated by its size. Error bars are bootstrapped confidence intervals.

language-internal variation in their linguistic construal of motion events. Our analysis of simultaneous verbalizations of an ongoing video sequence produced by 15 German, 15 Polish, and 15 Spanish adult native speakers provided compelling evidence for both intra-typological and language-internal, as well as inter-typological variability in the expression of motion.

4.1. INTER-TYPOLOGICAL VARIATION

Starting with inter-typological variation, German and Polish speakers showed greater preference for manner types and tokens (i.e., the *conflated* strategy; e.g., Germ. *Der Mann schreitet die Treppe runter* 'The man strides down te stairs', *Chaplin zieht ihn aus dem Wasser* 'Chaplin pulls him out of the water'; Pl. *Dopłynęli do brzegu* 'They swam up to the shore', *Rzucił linę na ziemię* 'He threw the rope onto the floor') than Spanish speakers, who mostly relied on the *separated* packaging strategy (e.g., Sp. *Chaplin baja las escaleras* 'Chaplin descends the stairs', *Apartó la maleta* 'He moved the suitcase away'). This pattern was consistent across the two event types, i.e., self- and caused-motion. As such, our analysis provides empirical evidence that the previously observed

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typological differences between V- and S-languages in the expression of self-motion (Allen et al., 2007; Berman & Slobin, 1994; Strömqvist & Verhoeven, 2004) extend to caused-motion events, a finding that is consistent with earlier work by Hendriks and Hickmann (2015), Hendriks et al. (2008), and Ji et al. (2011).

4.2. INTRA-TYPOLOGICAL VARIATION

Turning next to intra-typological variation, we found that German speakers produced greater *diversity* of manner verbs (i.e., verb types) than Polish speakers regardless of event type. This pattern was reversed for the *number* of manner verbs (i.e., verb tokens), with German speakers showing *lower* reliance on manner tokens than Polish speakers when talking about both self-and caused-motion.

With regard to type frequency, our data indicate that the contrasting use of manner types between German and Polish was not random but followed a specific pattern. While both German and Polish speakers made extensive use of *general* manner verbs (i.e., first-tier verbs according to Slobin's, 1997, classification; e.g., Germ. *Und dann springen sie rein* 'And then, they jump into'; Pl. *Wkoczyli do wody* 'They jumped into the water'; Germ. *Er wirft seinen Stock weg* 'He throws his stick away'; Pl. *Wrzucił Chaplina do wody* 'He threw Chaplin into the water'), German speakers relied on more *specific* manner verbs (i.e., second-tier verbs according to Slobin's, 1997, classification; e.g., 'stagger', 'stumble', 'nudge', 'thrust', etc.) at higher rates than Polish speakers; see also, e.g., Cifuentes-Férez (2010) and Slobin et al. (2014), for further classifications of different types of Manner. Therefore, German speakers used a narrative style that is richer in Manner specifications (i.e., more granular Manner descriptions) compared to Polish speakers. How can we explain the existence of different degrees of Manner granularity in languages than belong to the same typological group? We propose that two *closely inter-related* factors are at work here: (i) codability effects, such as constraints on Manner/Path combinability and accessibility of manner verbs in the lexicon, and (ii) attention allocation during verbalization (i.e., thinking-for-speaking; Slobin, 1996).

Starting with codability effects, Polish speakers had no choice but to exclude from their motion descriptions many of the Manners used in the German narratives due to heavy restrictions on Manner/Path combinability (e.g., Germ. *Er hat Chaplin ins Wasser reingeschubst* 'He nudged Chaplin into the water' vs. Pl. **wszturchnąć* 'nudge into'; Germ. *Er stolpert hinaus* 'He stumbles out' vs. Pl. **wypotknąć się* 'stumble out', etc.). [1] This finding is consistent with

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[1] Following conventional notations, we use an asterisk to indicate ungrammaticality.

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earlier work (Filipović, 2007; Lewandowski & Mateu, 2016) that demonstrated that prefixes, the typical locus of Path encoding in Polish (Kopecka, 2004; Lewandowski, 2014a, 2014b, 2020) show more restricted compatibility with verbs than particles and prepositional phrases, the typical locus of Path encoding in German (Bamberg, 1994; Harr, 2012).

A smaller inventory of manner verbs in Polish is another possible reason why Polish speakers produced fewer Manner types than German speakers. For example, verbs such as *schmeißen* 'chuck', *shieben* 'thrust', *hieven* 'heave', *hüpfen* 'hop', widely used by German speakers, could not have been employed by Polish speakers for the simple reason that no direct equivalents are available in the Polish lexicon. We know from previous studies on inter-typological variation in the expression of motion that grammatical restrictions on Manner encoding have an effect on the size of the manner-of-motion lexicon. S-languages, with Manner encoded in the main verb, have a richer lexicon of manner verbs than V-languages, which typically encode Manner in an optional adjunct (Slobin, 2006; Verkerk, 2013). Our study thus extends these earlier findings by suggesting that, even within the same typology, languages can have diverse manner verb lexicons, depending on the grammatical restrictions they impose on the lexicalization of Manner.

Turning now to the effects of attention allocation during verbalization, Polish speakers attended to a smaller variety of Manner distinctions than German speakers even in cases where a Polish equivalent of a German verb could have been used. For example, German speakers frequently employed verbs such as 'slip' (e.g., *Der Stein ist runtergerutscht* 'The stone slipped down'), 'rip' (e.g., *Der Mann hat Chaplin die Schnur aus der Hand gerissen* 'He ripped Chaplin's cord away'), 'pack' (e.g., *Er hat alles ins Koffer gepackt* 'He packed everything into the suitcase'), and others. Although these verbs are available in the Polish lexicon, and, importantly, they can readily combine with prefixes (e.g., *ześlizgnąć się* 'slip down'; *wpakować* 'pack into'; *wydrzeć* 'rip away'), they were *not* used by Polish speakers. It follows, then, that Polish speakers were attuned to a smaller range of Manner dimensions than German speakers, even if no codability restrictions were imposed by the linguistic system. This observation is consistent with Slobin's (1996) thinking-for-speaking hypothesis, and extends its applicability to the domain of intra-typological variation. According to Slobin (1996), typological variation affects cognition, particularly during online production of speech. More specifically, the habitual way of encoding events biases speakers to those conceptual components of the event that are easily codable in the language they speak. For example, when talking about motion, speakers of S-languages pay greater attention to the Manner of motion than speakers of V-languages, an attentional bias that results from the codification of Manner in different clausal constituents (i.e., main verb vs. adjunct, respectively). As such, the

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speakers' choice to include certain properties of the event while omitting others depends not only on how salient the property is but also on how easily encodable the property is in a given language. Following this line of reasoning, it can be claimed that German speakers displayed stronger attentional bias toward specific Manner dimensions compared to Polish speakers because German provides more accessible means, both lexical and morphological, for the expression of specific Manner distinctions than Polish.

Nevertheless, despite the greater *diversity* of manner verbs in German narratives, German speakers relied on a smaller *number* of manner verbs (i.e., manner tokens) than Polish speakers. Why, then, was the lexicalization pattern found for verb types reversed for verb tokens? One possible explanation is that, when describing motion scenes, German speakers relied on *path tokens* to a larger extent than Polish speakers, resulting in a lower proportion of manner tokens in German compared to Polish. Specifically, the German participants commonly employed two path verbs in their descriptions of self-motion, namely *fallen* 'fall' (e.g., *Er ist ins Wasser gefallen* 'He fell into the water') and *kommen* 'come' (e.g., *Er kommt aus dem Wasser* 'He comes out of the water'), and one path verb in their descriptions of caused-motion, namely *holen* 'bring, fetch' (e.g., *Er holt das Seil* 'He brings the rope'). Only the equivalent of *fallen* 'fall' was used by the Polish group (e.g., *Wpadł do wody* 'He fell into the water'), because Polish has no equivalent for the deictic path verbs *kommen* 'come' and *holen* 'bring, fetch' (Lewandowski, 2007, 2010, 2014c). Having fewer path verbs at their disposal, Polish speakers had no alternative but to increase their use of manner verbs. For example, to convey the content of *kommen*, the Polish group systematically used the basic manner verb *chodzić* 'walk' combined with a path satellite (e.g., *Mężczyzna wychodzi z wody* 'The man comes out of the water', lit. 'The man walks out of the water'), thus increasing the number of manner tokens but *not* manner types.

These results are contradictory to those presented in the study by Lewandowski and Mateu (2016), who found that German motion descriptions not only included more manner types but also more manner tokens than Polish motion descriptions. One factor that might explain this divergence is the difference in research design. Lewandowski and Mateu compared German and Polish translations of Tolkien's *The Hobbit*. They focused on nine passages with particularly rich manner information. As such, when adapting the source text to the target language, translators had no alternative but to make frequent use of manner verbs to preserve the semantic content of the original passages. Our study, on the other hand, required participants to provide a free description of motion scenes, thereby allowing them the opportunity to exclude Manner from their narratives.

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4.3. LANGUAGE-INTERNAL VARIATION

Turning last to language-internal variation, we found that speakers across the three languages encoded a significantly greater number (i.e., manner tokens) and variety (i.e., manner types) of Manner distinctions in the main verb in their caused-motion descriptions compared to their self-motion descriptions. Previous research showed that caused-motion events elicit a higher *number* of manner verbs than self-motion events (Hendriks & Hickmann, 2015; Lewandowski & Özçalışkan, 2018; Özçalışkan, 2005). Our results thus extend these previous findings by showing that, when talking about caused-motion, speakers not only increase their use of manner tokens but also *manner types*.

However, why do caused-motion events show a higher degree of Manner encoding than self-motion events? Self-motion refers to an agents' self-instigated movement and, as such, it only includes one participant, i.e., the Figure. In contrast, caused-motion events describe other-instigated movement and, as such, they include one further participant, namely, an external force that causes the Figure to move. As a consequence, while self-motion events can only specify the way in which the Figure moves (i.e., Manner of motion, e.g., *He jumped into the water*), caused-motion events are able to specify both the way in which the Figure moves (e.g., *John rolled the ball across the room*) and *the way in which the figure is caused to move* (i.e., Manner of causation; e.g., *John kicked the ball across the room*); see, e.g., Rappaport Hovav and Levin (1998). Therefore, the possibility of expressing this additional piece of information may have been one reason why speakers across the three languages increased their use of manner verbs in their caused-motion descriptions. In fact, Manner of causation is one important feature that constitutes an essential semantic attribute of the majority of caused-motion verbs involved in our study (e.g., Germ. *schubsen* 'push, nudge', *stoßen* 'push, bump', *werfen* 'throw', etc.; Pl. *pchać* 'push', *rzucać* 'throw', *(s)trącić* 'knock (over)', etc.; Sp. *empujar* 'push'; *soltar* 'drop', *tirar* 'throw, pull', etc.).

However, encoding Manner dimensions in the main verb in Spanish caused-motion descriptions (e.g., *Tiró la piedra al agua* 'He threw the stone into the water', *Empujó a Chaplín al río* 'He pushed Chaplin into the river', etc.) is at odds with the fact that V-languages typically lexicalize Path *but not Manner* in the main verb. One plausible explanation for this pattern could be that caused-motion events bring about a strong notion of dynamicity (Rohde, 2001). Specifically, given that the external agent exerts force upon the Figure to initiate its movement, it also determines the spatial source of the motion event, thus supplying a sense of directionality. We have some evidence from previous work that manner verbs that evoke directionality can occasionally appear in self-motion descriptions in V-languages (e.g., Sp. *correr a la cocina* 'run to the kitchen', *saltar al agua* 'jump into the water' vs. **bailar a la cocina* 'dance to the

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kitchen', *tambalear a la habitación* 'stagger into the room'; Lewandowski & Mateu, forthcoming; Naigles et al., 1998; Özçalışkan, 2015; Pedersen, 2014). Our results thus extend these earlier findings by indicating that directional manner verbs can be found in motion constructions across the two event types, i.e., self- and caused-motion, in V-languages.

Surprisingly, we also observed that German and Polish speakers showed a pronounced tendency toward the use of non-manner verbs (i.e., the separated packaging strategy) in their self-motion descriptions, a pattern that is not fully in line with earlier research, which exposed a clear inclination toward the conflated lexicalization strategy among speakers of S-languages (e.g., Strömqvist & Verhoeven, 2004). For example, some of the scenes included in our elicitation task could have been described in two ways: either by employing a manner verb combined with a path satellite (i.e., conflated strategy) or by encoding Path information only (i.e., separated strategy): cf. Germ. *Er gleitet ins Wasser* 'He slides into the water' vs. *Er fällt ins Wasser* 'He falls into the water', *Er kriecht die Kante hoch* 'He crawls up the ledge' vs. *Er kommt aus dem Wasser raus* 'He comes out of the water'; Pl. Wrzuca *się do wody* 'He plunges into the water' vs. *Wpada do wody* 'He falls into the water'. Both German and Polish speakers showed preference for the latter strategy: only 65 out of 257 German and 101 out of 224 Polish self-motion descriptions were Manner/Path conflated clauses.

It should be noted, however, that previous studies typically did not require participants to respond with the added pressure of restricted time, while our elicitation task (i.e., a *simultaneous* commentary of an ongoing video clip) naturally resulted in heavy time constraints on the subjects' responses. We know from psychological research that humans process information *selectively* by focusing on properties that are more central and tuning out those that are more peripheral (Pashler, 1998). We also know that time pressure may additionally intensify reduction of information processing (Maule, Hockey, & Bdzola, 2000). Consistent with these findings, our results may indicate that speakers tend to reduce the conceptual complexity of motion events as a way to adapt to time constraints. Because Path constitutes the core element of a motion event (Talmy, 2000), it logically follows that both German and Polish speakers were biased toward excluding Manner (and not Path) from their narratives. An alternative explanation could be that there is a general tendency in oral narratives, independent of time constraints, to omit Manner information *if* an alternative Path-only strategy is available *and* Manner is not particularly relevant to the discourse (see Filipović, 2007; McNeill & Duncan, 2000; Stefanowitsch, 2013, for similar phenomena in other S-languages). Further research is needed to understand the relative effect of time constraints on the speakers' choice of lexicalization patterns.

4.4. GENERAL DISCUSSION

Taken together, our findings suggest that the extent to which Talmy's (2000) typology exerts itself in language use is influenced by additional factors that expand the binary distinction between V- vs. S-languages. The locus of Path encoding (i.e., verb vs. prefix vs. particle/prepositional phrase) gives rise to inter- and intra-typological variation, while event type (self- vs. caused-motion) gives rise to language-internal variation. In addition, speech modality (e.g., oral vs. written narratives; narratives with vs. without time constraints, etc.) appears to be a third important factor influencing the packaging of motion elements – a possibility that remains to be further explored in future work.

Starting with inter- and intra-typological variation, our data strongly indicate that the locus of Path encoding affects the expression of Manner. Spanish, typically conveying Path in the main verb, imposes the tightest typological constraints on Manner encoding. In contrast, German and Polish, which lexicalize Path outside the main verb, leave the verb free to encode Manner. However, there is a split between Polish, typically expressing Path in morphologically bound prefixes, and German, typically expressing Path in morphologically independent particles and prepositional phrases. Specifically, Polish imposes heavier restrictions on Manner codability than German, resulting in distinct 'thinking-for-speaking' patterns, with Polish speakers attending to less diverse Manner dimensions than German speakers. These results are consistent with earlier work which provided some evidence that speakers of languages such as Russian, Serbian, and Latin, which typically encode Path in prefixes, convey less specific Manner distinctions than speakers of languages such as English, Dutch, and Swedish, typically conveying Path in particles and prepositional phrases (see Filipović, 2007, for Serbo-Croatian and English; Iakovleva, 2012, for Russian and English; Koptjevskaja-Tamm et al., 2010, for Russian, Polish, English, Dutch, and Swedish; and Iacobini & Corona, 2016, for Latin). In addition, we know from work on lexical semantics and construction grammar that in languages such as English and German, both typically encoding Path in particles and prepositional phrases, motion constructions are particularly flexible in that they not only combine with motion verbs but also with *non-motion* verbs lexicalizing highly specific Manner information (e.g., Eng. *Rainwater whistled into the house*, *He crashed his car into a cemetery*; Germ. *Das Fahrrad ist in die Altstadt gequietscht* 'The bike squeaked into the old town', *Er schmetterte den Ball über das Netz* 'He smashed the ball over the net'; see Goldberg, 1995; Haselbach, 2018; Levin, 1993). Consistent with our findings, these verbs are banned from occurring in motion constructions in languages such as, for example, Polish and Russian, which both typically encode Path in prefixes (e.g., Pl. **Wświsnął do pokoju* 'He whistled into the

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room', *Whuknął samochód do cmentarza* 'He crashed his car into a cemetery';
Rus. *Velosiped v"skripel v staryj gorod* 'The bike squeaked into the old town').

That being the case, the observed differences in Manner expression
between German and Polish may illustrate a broader division between
S-languages that typically encode Path in morphologically bound elements
such as prefixes (e.g., Polish, Russian, Serbian, Latin) and S-languages that
typically encode Path in morphologically independent elements such as
particles and prepositional phrases (e.g., German, Dutch, English, Swedish).
It could be hypothesized, then, that the tighter the link between Path and the
main verb, the less the ability to encode Manner and, conversely, the looser
the link between Path and the main verb, the more the ability to encode
Manner. That is, on one extreme would be V-languages, in which Path and
verb are the same element. These languages impose the tightest restrictions
on Manner encoding by allowing only a limited set of directional manner
verbs to occur in the main verb slot. Next to these languages would be
S-languages in which the locus of Path is an element that is morphologically
bound to the verb, i.e., a prefix. These languages encode more specific
Manner information than V-languages but impose fairly tight restrictions
on motion verbs encoding rich Manner information. Finally, at the other
extreme would be S-languages in which the locus of Path is an element that is
morphologically independent from the verb, i.e., a particle and/or a prepo-
sitional phrase. These languages allow the encoding of a particularly wide
variety of Manner dimensions.

However, consistent with language-internal variability, motion construc-
tions associated with morphologically bound and morphologically free ele-
ments can co-exist in a given language. For example, although German
predominantly encodes Path in particles and prepositional phrases, this lan-
guage also uses (to a lesser extent) directional prefixes. In line with the
restrictions on Manner/Path combinability outlined above, German prefixes
typically combine with a narrower range of manner verbs than German
particles and prepositional phrases (Lewandowski & Mateu, forthcoming).
As such, strictly speaking, the constraints on Manner encoding apply to
particular constructions rather than to particular languages.

It should be stressed, however, that there is not necessarily a positive
correlation between *diversity* and *number* of manner verbs. For example,
German speakers produced more manner types but *fewer* manner tokens than
Polish speakers in their directed motion descriptions. Conversely, Polish
speakers produced fewer manner types but *more* manner tokens than German
speakers, when talking about both self- and caused-motion. We proposed that
this pattern arose, primarily, as a result of greater use of path verbs in German
compared to Polish. More important, these findings show that, while the locus
of Path encoding seems to be a good predictor of Manner *diversity* in motion

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descriptions, the *amount* of Manner information may be dependent on additional factors. As such, future work examining these additional factors is needed to gain a better understanding of the extent to which Manner is encoded in the two types of S-languages.

Turning now to language-internal variability, our findings showed that not only languages as a whole but also different event types (*argument structure constructions* in Goldberg's, 1995, terms) within particular languages can display variable degrees of Manner salience. For example, our data, along with evidence from earlier research (Lewandowski & Özçalışkan, 2018; Özçalışkan, 2005), suggest that caused-motion events elicit greater diversity and number of manner verbs than self-motion events regardless of language type, which is a pattern that we attributed to differences in event structure between self- and caused-motion. Our study also demonstrated that speakers of S-languages may convey Path in the main verb at higher rates than one might expect on the basis of Talmy's (2000) typology, particularly when describing self-motion events. We suggested that one possible factor leading to an extensive use of path verbs in S-languages may be related to constraints on processing time – a hypothesis that remains to be further investigated.

Slobin (2004) proposed that the world's languages can be arranged along a cline of Manner salience, with some languages encoding more specific Manner distinctions than others. Our study adds to this line of research by showing that Manner salience is a more complex and nuanced issue than it may seem at first glance: there can be significant differences between variety vs. amount of Manner information encoded in a given language, and the same language can also show different degrees of Manner saliency depending on event type.

These findings may prove fruitful for future research on linguistic relativity. According to linguistic relativity, the structure of a language influences the way its speakers view the world (Lucy, 1996; Whorf, 1956). As mentioned before, Slobin (1996) proposed that language-specific patterns in the encoding of motion affect non-verbal cognition – but only during online language processing (thinking-for-speaking). Studies examining the effect of inter-typological contrasts in the encoding of self-motion on visual perception, similarity judgments, and gesture provide empirical support for Slobin's hypothesis. For example, when visually inspecting a motion scene, or when comparing two motion scenes that differ either in Manner or Path, participants displayed a bias toward either Manner or Path, depending on their language type, if the task involved verbal encoding. However, they did not display such bias if the task did not involve verbalization (Gennari et al., 2002; Hohenstein, 2005; Papafragou, Hulbert, & Trueswell, 2008). In a similar vein, participants showed language-specific gesture patterns only when gesture was produced with speech (i.e., co-speech gesture), but not when gesture was produced without speech (Özçalışkan et al., 2016).

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It is likely, of course, that the preferred lexicalization patterns have no or little long-term effect on non-verbal cognition. However, the presence of such effects has been exposed for at least some other cognitive domains, such as color (Regier & Kay, 2009), number (Gordon, 2004), time (Boroditsky, 2001), object position (Koster & Cadierno, 2018), spatial frames of reference (Brown & Levinson, 1993; Pederson et al., 1998), and count/mass distinctions (Imai & Gentner, 1997), etc. (see Gleitman & Papafragou, 2013, for a recent review). As such, it is also possible that the motion lexicalization patterns that are supposed to be prototypical in a given language type (i.e., either V- or S-framing) are simply not ubiquitous enough to influence non-linguistic thought (Goschler & Stefanowitsch, 2013; Pavlenko & Volynsky, 2015). This possibility should not be ruled out. Hence, future work should take into account not only the coarse-grained inter-typological contrasts but also the more nuanced intra-typological and language-internal variability in order to advance our understanding of the relationship between language and motion cognition. For example, earlier work on the effects of lexicalization patterns on non-verbal cognition in S- vs. V-languages largely focused on self-motion events (e.g., Papafragou et al., 2008; Özçalışkan, Lucero, & Goldin-Meadow, 2016). However, the domain of self-motion might not be a good testing ground for cognitive biases toward Manner in S-languages because, as our study showed, speakers of S-languages may rely on the Manner/Path conflated pattern far less frequently than is commonly assumed. The domain of caused-motion, in contrast, may be a more promising avenue for investigating the effects of S-framing on non-linguistic conceptualization, because in language use manner verbs (i.e., the conflated pattern) might be more ubiquitous in caused-motion events as opposed to self-motion events.

The assumption that Manner and Path form uniform categories is another possible limitation that might have skewed the results of studies on linguistic relativity. With respect to Manner, a more fruitful line of inquiry might be one that focuses on those *manner types* that are particularly salient in a given language. For example, it is unlikely that speakers of S-languages encoding path in prefixes will display cognitive bias toward highly specific Manner information given its relatively low frequency in discourse. However, the opposite may prove true for languages encoding path in morphologically independent elements (i.e., particles, prepositional phrases), given that these languages systematically encode more elaborated Manner distinctions.

In conclusion, our study suggests that the two-way distinction between S- and V-languages may be insufficient to not only identify the whole range of variation in the encoding of motion events but also to test the effects of language on motion cognition. Although we only focused on three languages, German, Polish, and Spanish, our results suggest, in line with earlier work (e.g., Ibarretxe-Antuñano, 2009; Slobin, 2004), that the ways in which motion

is encoded in these languages may be characteristic of a more nuanced typological classification than the dichotomy of V- and S-languages. Specifically, languages such as Hebrew, Japanese, and Turkish pattern together with Spanish and hence belong to the V-framed type. Next, languages such as Latin, Russian, and Serbian pattern together with Polish and hence belong to the 'weak' type of S-language, lexicalizing path in morphologically bound elements. Finally, languages such as English, Dutch, and Swedish pattern together with German and hence belong to the 'strong' type of S-language, lexicalizing path in morphologically independent elements. Therefore, future work that extends our findings to these groups of languages is needed to advance our understanding of variation patterns in motion event encoding and their effect on motion cognition.

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Appendix I

TABLE 1. *Sequence of events in the video stimulus*

Man staggers down the stairs
Man ties a rope around his neck
Chaplin walks down the stairs
Chaplin pulls out a hankie
Man pulls a stone out of the case
The stone gets dropped
Chaplin undoes the noose from around the man's neck
Man throws a rope around both necks
Man throws a stone into the river
Chaplin falls into the water
Man steps forward
Man throws his jacket onto the ground
Man rushes to the river
Man lends Chaplin a hand
Chaplin pulls man into the water
Man pushes Chaplin toward shore
Man and Chaplin swim toward bank
Man reaches the bank
Man's grip slips on the bank
Chaplin steps on top of man's head
Man is submerged under water
Chaplin and man pull themselves up the bank
Man gets onto the ground
Man drags Chaplin out of the water
Man shakes Chaplin's hand
Man turns around
Man bends down
Man picks up his jacket
Chaplin turns around
Chaplin picks up his hat
Man steps backwards
Man pushes Chaplin into the water
Man turns around
Man throws his jacket onto the ground
Man jumps into the water
Chaplin steps on top of man's head
Chaplin and man reach the bank
Chaplin and man pull themselves up
Man gets out
Man pulls Chaplin out
Both walk toward the stairs
Chaplin walks back and picks up his flower
Both walk up the stairs

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Appendix II

TABLE 2. *Examples of self- and caused-motion descriptions produced by German native speakers*

	self	caused
conflated	*Der Mann schreitet die Treppe* the.NOM man strides the.ACC stairs *runter.* down 'The man strides down the stairs.' *Er springt ins Wasser.* he jumps in.the.ACC water 'He jumps into the water.' *Dann klettert er hoch.* then climbs he up 'Then, he climbs up.'	*Der Mann wirft den Stein ins* the.NOM man throws the.ACC stone in.the.ACC *Wasser.* water 'The man throws the stone into the water.' *Chaplin zieht ihn aus dem Wasser.* Chaplin pulls him out.of the.DAT water 'Chaplin pulls him out of the water.' *Dann schubst er Chaplin wieder ins Wasser.* then pushes he Chaplin again in.the.ACC water 'Then, he pushes Chaplin into the water.'
separated	*Der kleine fällt ins Wasser.* the.NOM short falls in.the.ACC water 'The short man falls into the water.' *Sie versuchen, rauszukommen* they try out.to.come 'They try to come out' *Er geht nach oben* he goes to up 'He goes up'	*Er holt ein Seil aus dem Koffer* he brings a.ACC rope out.of the.DAT suitcase 'He takes a rope out of the suitcase'

T A B L E 3. *Examples of self- and caused-motion descriptions produced by Polish native speakers*

	self	caused
conflated	*Schodzi po schodach.* he.down.walks on stairs.LOC 'He walks down the stairs. *Dopłynęli do brzegu.* they.to.swam to shore.GEN 'They swam up to the shore.' *Wskoczył do wody.* he.into.jumped to water.GEN 'He jumped into the water.'	*Wciąga tego drugiego do wody.* he.into.pulls that second.ACC to water.GEN 'He pulls the other one into the water.' *Jeden wpycha do wody drugiego* one into.pushes to water.GEN second. ACC 'One pushes the other into the water.' *Rzucił linę na ziemię.* he.threw rope.ACC on floor.ACC 'He threw the rope onto the floor.'
separated	*Znów wpadają do wody.* again they.into.fall to water.GEN 'They fall into the water again.' *Wraca do ławki.* he.returns to bench.GEN 'He goes back to the bench.'	none observed

T A B L E 4. *Examples of self- and caused-motion descriptions produced by Spanish native speakers*

	self	**caused**
conflated		*Lanza la piedra al río.* he.throws the stone to.the river 'He throws the stone to the river.'
	Salta al río. he.jumps to.the river 'He jumps to the river.'	*Se empujan al agua.* REFL they.push to.the water 'They push each other to the water.'
		Le suelta la piedra en el pie. him he.drops the stone on the foot 'He drops the stone on the other man's foot.'
separated	*Chaplin baja las escaleras.* Chaplin descends the stairs 'Chaplin comes down the stairs.'	*Apartó la maleta.* he.moved.away the suitcase 'He moved the suitcase away.'
	Cae al río. he.falls to.the river 'He falls into the river.'	*Saca una cuerda de la maleta.* he.takes.out a rope from the suitcase 'He takes a rope out of his suitcase.'
	Los dos salen del agua. the two exit from.the water 'Both come out of the water.'	*Metió la flor en el bolsillo.* he.put.into the flower in the pocket 'He put the flower into the pocket.'

Appendix III

TABLE 5. *Examples of Manner descriptions provided by German vs. Polish native speakers*

	German	Polish
falling into the water	*Der Mann springt ins Wasser.* the man jumps in.the.ACC water 'The man jumps into the water.' *Er fliegt ins Wasser.* he flies in.the.ACC water 'He flies into the water.' *Er stürzt ins Wasser.* he plunges in.the.ACC water 'He plunges into the water.' *Chaplin rutscht ins Wasser.* Chaplin slips in.the.ACC water 'Chaplin slips into the water.'	*Wskakuje do wody.* he.into.jumps to water.GEN 'He jumps into the water.' *Rzuca się do wody.* he.throws REFL to water.GEN 'He plunges into the water.'
coming out of the water	*Er klettert hoch.* he climbs up 'He climbs up.' *Er krabbelt heraus.* he crawls out 'He crawls out (of the water).' *Er hievt sich hoch.* he heaves REFL up 'He heaves himself up.' *Er zieht sich hoch.* he pulls REFL up 'He pulls himself up.	*Wychodzi na brzeg.* he.out.walks on shore.ACC 'He walks up to the shore.' *Wspina się na brzeg.* he.into.climbs REFL on shore.ACC 'He climbs up to the shore.'
moving away from shore	*Sie watscheln davon.* they waddle from.there 'They waddle away.' *Er taumelt weg.* he reels away 'He reels away.' *Sie torkeln zurück.* they stagger back 'They stagger back.' *Beide schleichen davon.* both creep from.there 'Both creep away.'	*Odchodzą od brzegu.* they.away.walk from shore.GEN 'They walk away from the shore'

TABLE 5. *Continued*

	German	Polish
throwing into water	*Er schmeißt Chaplin ins Wasser.* he chucks Chaplin in.the.ACC water 'He chucks Chaplin into the water.' *Er wirft Chaplin ins Wasser.* he throws Chaplin in.the.ACC water 'He throws Chaplin into the water.'	*Wrzuca Chaplina do wody.* he.into.throws Chaplin.ACC to water.GEN 'He throws Chaplin into the water.'
pushing into water	*Er stößt Chaplin ins Wasser.* he.pushes Chaplin in.the. ACC water 'He pushes Chaplin into the water.' *Er schubst Chaplin ins Wasser.* he shoves Chaplin in.the.ACC water 'He shoves Chaplin into the water.'	*Wpycha Chaplina do wody.* he.into.pushes Chaplin.ACC to water.GEN 'He pushes Chaplin into the water.'
pulling out of water	*Er zieht ihn aus dem Wasser.* he pulls him out.of the.DAT water 'He pulls him out of the water.' *Er hievt ihn aus dem Wasser.* he heaves him out.of the.DAT water 'He heaves him out of the water.'	*Wyciąga go z wody.* he.out.pulls him out.of water.GEN 'He pulls him out of the water.'

Appendix IV

T A B L E 6. *Mean number of clauses with separated (i.e., Path-only or Path and Manner in separate clauses) and conflated (i.e., Manner and Path in a single clause) packaging of motion components produced by German, Polish, or Spanish speakers*

	Separated			Conflated
	Path-only	Path & Manner	All	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
German	14.67 (4.4)	none observed	14.67 (4.4)	13.6 (2.92)
Polish	8.07 (3.15)	none observed	8.07 (3.15)	15.47 (4.52)
Spanish	23.93 (5.01)	0.33 (0.63)	24.27 (5.26)	2.47 (1.85)

Appendix V

T A B L E 7. *Manner and path verbs used by German, Polish, and Spanish speakers*

Manner verb	Path verb
German	
self	**self**
fahren 'drive'	*fallen* 'fall'
fliegen 'fly'	*kommen* 'come'
hieven 'heave'	
humpeln 'hobble'	**caused**
hüpfen 'hop'	*holen* 'bring'
klettern 'climb'	
krabbeln 'crawl'	
kriechen 'creep'	
laufen 'run'	
rennen 'run'	
rudern 'paddle'	
rutschen 'slip'	
schleichen 'creep, sneak'	
schreiten 'stride'	
schwanken 'totter'	
schwimmen 'swim'	
springen 'jump'	
stolpern 'stumble'	
stürzen 'plunge'	
taumeln 'reel'	
torkeln 'stagger'	
watscheln 'waddle'	

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TABLE 7. *Continued*

Manner verb	Path verb
caused	
drücken 'press'	
führen 'guide, lead'	
packen 'pack'	
reißen 'tear'	
shieben 'thrust'	
schmeißen 'chuck'	
schubsen 'push, nudge'	
stoßen 'push, bump'	
werfen 'throw'	
zerren 'drag'	
ziehen 'pull'	
Polish	
self	**self**
biec 'run'	*paść* 'fall'
chodzić 'walk'	**caused**
gramolić się 'scramble'	none observed
kiwać się 'totter'	
pływać 'swim'	
rzucić się 'plunge'	
skakać 'jump'	
wspinać się 'climb'	
caused	
ciągnąć 'pull'	
nieść 'carry'	
pchać 'push'	
prowadzić 'guide, lead'	
rzucać 'throw'	
upuścić 'drop'	
Spanish	
self	**self**
caminar 'walk'	*acercarse* 'approach'
saltar 'jump'	*alejarse* 'go away'
tirarse 'plunge'	*bajar* 'descend'
trepar 'climb'	*caer* 'fall'
	llegar 'arrive'
caused	*meterse* 'enter'
empujar 'push'	*salir* 'exit'
lanzar 'throw'	*subir* 'ascend'
tirar₁ 'pull'	*venir* 'come'
tirar₂ 'throw'	*volver* 'return'
	caused
	apartar 'set aside'
	meter 'insert'
	quitar 'remove'
	sacar 'take out'
	traer 'bring'

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