

To what extent does linguistic encoding of motion influence event segmentation?

The human ability to segment the continuous stream of sensory information in which we receive from our environment into classes of events is evident from an early age (Yates et. al 2022). Event segmentation allows us to parse the overload of sensory information we receive when perceiving the world into meaningful units, events, we can then process and interpret (Zacks & Swallow 2007). Language plays an important role in transferring this information to others, differing in how they package the components of an event into words to form sentences (Shafto et. al 2014). By reviewing studies which investigate how languages encode motion differently and the influence it has on the cognitive processes concerning event segmentation, I will showcase the universal aspects of event representations and the nuances that arise based on linguistic influence. This literature review synthesizes research in linguistic typology and event segmentation, focusing on how languages encode motion events and its consequences on cognitive processing. Exploring studies that provide conflicting findings concerning the argument that the structure of a language influences the way its speakers conceptualize the world, I will be answering the following question: To what extent does the linguistic encoding of motion in a speaker's native language influence event segmentation?

I. Talmy's Typology: a Binary Linguistic Framework

According to Talmy (2000), each language can be distinguished into two distinct categories: verb-framed if the language encodes the path of motion into the verb, satellite-framed if the language encodes the manner of motion into the verb and path of motion into a different element in the sentence. Thus, experiments comparing speakers of verb-framed languages and speakers of satellite-framed languages provide evidence for Talmy's argument that the way a language encodes motion influences how a speaker perceives and communicates features of

motion events. In particular, findings of a verbal event description task in languages of two different typologies, French being verb-framed and Germany being satellite-framed, found evidence that the manner in which a language encodes motion event information into words may influence the way that one perceives and segments events. French speakers were more likely to communicate assertions when describing events with changes in direction or orientation than German speakers (Gerwien & Stutterheim 2018). As French speakers encode path and directional information in verbs, these findings indicate that the structure of the French language shaped the way that the speaker chose to describe the event. These findings support Talmy's typology classification of language as French speakers were found to lexically communicate the same scene differently than German speakers, supporting arguments for strong linguistic influence over event segmentation cognitive processes based on the structure of a language. Thus, by using Talmy's binary parameters in categorizing languages based on path or manner of motion encoding into verbs, differences in findings from speakers in one of each language provides evidence for linguistic influence over how one understands and communicates event units.

Event Endpoints: Universal Across Language

Further findings of a second experiment which suppress the linguistic encoding of motion events in a non-verbal task support the idea that linguistic structure plays a role in how a speaker segments events. Gerwien & Stutterheim discovered results hinting to strong linguistic influence over event unit formation: in a non-verbal segmentation task, French speakers pressed a button more frequently than German speakers when perceiving a stream of events. These findings provide further support for Talmy's categorization system of language, indicating that French speakers perceive a greater amount of events from a stream of visual stimuli than German

speakers do. The observed cross-linguistic differences in segmentation imply that linguistic encoding can influence where speakers place event boundaries, highlighting the role of language in shaping perception. However, the task's non-verbal nature also reveals that participants across language groups consistently segmented the stream into meaningful units, pointing to the existence of shared, possibly universal, cognitive mechanisms guiding event perception. This implies that the linguistic encoding of motion impacts the selection of what a speaker considers to be an event based on where they choose to place event endpoints.

Thus, the structure of a language can be seen to shape where and when a speaker decides to segment events, as also seen in Zhang's (2024) study investigating the extent to which grammatical aspect, a linguistic feature that conveys how an event unfolds over time, influences how speakers attend to the endpoint of a motion event. In the study, Zhang examined aspectual features of Mandarin Chinese using a questionnaire focused on the use of progressive markers, grammatical forms (such as "is walking" in English) that indicate an action is currently in progress. The legitimacy of Talmy's binary classification system was investigated based on the absence or presence of obligatory grammatical devices for marking 'progressivity,' the expression of an ongoing action. Zhang compared motion event descriptions made by native Mandarin speakers with those of English, Swedish, and Afrikaans speakers. Results of these comparisons revealed that Mandarin speakers mentioned the endpoint of an event as frequently as English speakers, both of which are classified to be aspect languages. In comparison to the non-aspect languages of Swedish and Afrikaans speakers, Mandarin speakers mentioned the endpoint of an event significantly less frequently. These findings suggest that grammatical aspects of language, such as linguistic elements which encode "progressivity," influence the extent to which a speaker allocates attention to and speaks about the endpoint of an event.

Event Boundaries: Universal Across Language

Further sensitivity to event boundaries can be seen in studies where participants reliably distinguished between bounded and unbounded events even when linguistic encoding was suppressed. Participants watched video stimuli without being asked to verbally describe the event, preventing speakers from preparing to communicate what the event they watched was about. Even when participants were refrained from verbally describing the occurrences of an event, a sensitivity to event boundedness was discovered as participants were able to distinguish boundaries of an event by pressing a button. These findings indicate a sensitivity to event boundedness which is rooted in non-linguistic cognition (Ji & Papafragou 2020). Thus, event endpoints and boundaries appear to be salient transition points for when a speaker is able to identify the beginning and end of a certain event. Although these findings provide evidence that event endpoint identification is rooted in non-linguistic cognition, the study was performed on speakers of a single language and therefore was unable to account for linguistic variation when speakers identified event boundaries. In order to account for this, I will shift to Park's (2015) study on Korean-English bilinguals.

Event Boundaries in Bilingual Speakers

In a non-linguistic categorization task, it was revealed that Korean-English bilinguals' categorization patterns aligned more closely with those of Korean monolinguals than with English monolinguals, providing further evidence for the dominant influence of one's L1, a speaker's first or native language, over their L2, their second language acquired later in life. Despite this strong L1 influence, measures of L2 proficiency were found to impact bilinguals' non-verbal performance, shaping the extent to which they adopted L2-based encoding patterns. This suggests that while foundational event construal may be shaped early by the L1, increasing

proficiency in an L2 can modulate these patterns, even in non-verbal cognitive tasks. These findings suggest that the degree to which one is proficient in a second language can influence the way that they segment and encode events. Although Talmy's typology may not provide the level of nuances required for bilingual speakers or the extent to which one is fluent in a second language, Korean monolinguals categorized in the non-linguistic task by path whereas English speakers did so by manner. This provides further evidence that languages can be distinguished in how they encode the manner or path of motion, but nuances such as the degree to which one is fluent in a language or how many languages they are fluent in influences the cognitive processes underlying event segmentation. Collectively, these findings suggest that while certain aspects of event cognition such as sensitivity to event boundaries or event segmentation may be grounded in domain-general, non-linguistic processes, the structure of one's native language exerts a measurable influence on how events are segmented and mentally represented. Furthermore, evidence from bilingual speakers indicates that linguistic structure and second language proficiency opens up a whole new realm of research to be explored concerning cross-linguistic transfer and its impacts on the cognitive processes underlying event segmentation.

II. Beyond Binary Parameters

As demonstrated in previous studies, languages can be distinguished concerning how they lexicalize motion events. This distinction between two types of languages provides implications for a strong influence of linguistic structure concerning event segmentation: Bohnemeyer et. al (2007) found evidence supporting their argument that the correlation between syntax and event segmentation is language-specific. Their case study on the segmentation of motion events into smaller expressions in a variety of different languages provide evidence of language-specific lexicalization patterns and universal constraints on form-to-meaning mapping.

Using video stimuli and a questionnaire, there was a surprising amount of variation in motion-event segmentation across the eighteen typologically diverse languages. This variation, driven by lexicalization differences and differences in the availability of syntactic constructions, categorizes languages into three types: those which can integrate subevents of departure, passing, and arrival all in one macro-event expression, those who encode departure and arrival in macro-event expression but commonly require a second-macro event expression for the integration of passing subevents, and those who isolate each location-change subevent of departure, passing, or arrival in a separate macro-event expression. Although arguing for a revision of Talmy's binary typology, these findings still support the claim that linguistic structure impacts event segmentation. Studying a wide variety of languages with a wide variety of syntactic variation indicated that speakers segment events differently, allowing us to revise Talmy's typology to account for the syntactic variance across languages. Focusing on how languages vary in grammatical and syntactic structure will allow us to create a more concise method of characterizing languages to help highlight which aspects of event segmentation actually vary from language to language and which appear to be universal across language. Croft et. al (2010a) agree with revising Talmy's typology to incorporate a broader range of symmetrical construction types, or linguistic structures used to represent events composed of multiple related subevents: coordination, serialization, and compounding. These construction types give equal structural status to the subevents involved unlike Talmy's original verb-framed and satellite-framed asymmetry, where one event (typically the manner or path) is subordinated to the other. By including these additional patterns, the revised typology becomes more inclusive of the structural diversity found across languages in how complex events are expressed. For instance, a morphosyntactic scale, a continuum of linguistic constructions based on the degree of

morphological integration and syntactic complexity, can be derived from these construction types. This morphosyntactic scale is paralleled by a semantic or conceptual scale of how naturally the subevents of the complex event go together. Grammatical analyses across languages have revealed that these construction types often fall along two main grammaticalization paths, developmental routes by which separate elements of meaning become more tightly integrated over time. Through this framework, one can see the relationship between language and event segmentation: linguistic form can be paired with semantic meaning, and more complex syntactic forms can be coupled with conceptual representations of events. By employing these refined typological tools and mapping grammar to the segmentation of events into subevents, researchers can use these methods to handle cross-linguistic variation in the context of event segmentation.

Alongside Bohnemeyer's call for a revision of Talmy's typology and Croft's grammatical cross-linguistic analysis in French and German, Hopperdietzel's grammatical analysis of different languages has found evidence that different types in Talmy's classification system can be placed into two grammaticalization paths that end with the univerbation of the event and frame expressions in a single morphologically bound predicate form (Hopperdietzel 2022). This shows the relationship between language and event segmentation: form can be paired with meaning, and complex morphosyntactic structures can be coupled with complex semantic situation types. Hopperdietzel's syntactic analyses of resultative constructions in serializing languages such as Mandarin and Samoan further support this approach by demonstrating that the expression of result meaning exhibits a similar internal structure across typologically diverse languages. These studies suggest that event decomposition is not solely governed by grammatical categories like serialization or framing type, but rather by the semantic

compatibility of manner and result components, which may be realized through different morphosyntactic strategies. Such findings reinforce the need for refined typological tools and for mapping syntactic constructions onto event segmentation patterns. Alongside Bohnemeyer's call for revising Talmy's typology, Croft's grammatical cross-linguistic analysis in French and German, and recent work on RSVCs, these studies collectively provide converging evidence for mapping from syntactic structures to the segmentation of events, even in cases where serialization blurs expected typological boundaries.

III. Differences Amongst Dialects

Findings from dialect studies have likewise shown that a division into these categories may not be sufficient in the case of contact languages (Berthele 2004). Applying Talmy's typological distinction to Swiss German, Standard German, and French, Berthele investigated whether two typological categories were sufficient enough to account for the nuances of different dialects of language. Although French narratives used more path verbs than German narratives in a motion event description task, it was found that we might have to dissect language structure even further depending on different dialects: Swiss German speakers rarely expressed manner, in some cases even less frequently than French speakers. Akin to arguments of Bohnemeyer and Croft, Berthele argues that Talmy's typological categories not only need to be refined but take additional dimensions into account. By refining Talmy's categories, researchers can use frameworks which better account for the nuances of language and even dialects for studying linguistic impacts on event segmentation. Further studies on how speakers of different dialects segment events will allow us to narrow down which aspects of language most strongly impact a speaker's process of interpreting and representing events. Taking Berthele's study a step further, Piatkowska (2021) applied Talmy's typological distinction to English as a lingua franca, a

vehicular contact language between speakers who do not share a first language (Mauranen 2018). Through Mauranen's lens, English is viewed in the study as a global means of communication as a L2, learned language, across diverse linguistic communities. This brings up the argument that learning English as a second language is not the same as learning English as one's native language, providing interesting impacts for event segmentation. This would mean that language studies would have to be reframed: how a native English speaker segments events might have different findings than someone who learned English as a second language. To test this, Piatkowska launched a qualitative pilot study among Polish users of English, discovering characteristics of motion which could not be discretely classified as belonging to verb-framed or satellite-framed typologies. Expressions of a motion event were analyzed with reference to a division into verb and satellite framed languages to determine if the categories are sufficient enough for contact languages or whether new elements had to be introduced for the binary typology classification to suit all characteristics of languages. Finding that neither satellite nor verb-framed aspects of conflation and manner saliency dominated the expressions of motion events in participants, Piatrowska revealed the relevance of attention allocation and fictive typology in linguistic typology. Her findings, alongside Bohnemeyer and Croft, conclude that English as a second-order dialect did not classify as satellite-framed or verb-framed according to Talmy's typology, suggesting that motion event cognition is more fluid and complex. Her results amongst those of studies I have previously discussed provide arguments for the revision of Talmy's typology classification system of language, or perhaps a whole new system that can account for the unique linguistic patterns of contact languages.

IV. Cross-Linguistic Influence in Bilingual Speakers

As findings from dialect studies suggest that linguistic variation even within a single language can significantly influence how events are segmented and conceptualized, linguistic influence becomes even more pronounced when considering bilingual speakers. Findings of event segmentation tasks concerning bilingual speakers reflect interaction between one's native language and one's second language: Hohenstein et. al (2006) found that bilingual speakers differed from monolingual speakers in motion event description tasks. Investigating the extent to which cross-linguistic transfer was seen in bilingual speakers, it was found that Spanish-English bilinguals' production of both Spanish and English was affected. In Spanish, bilinguals used more manner verbs than Spanish monolinguals did, and in English, more path verbs were used than in English monolinguals. Thus, bilinguals appear to differ from monolinguals in their grammatical constructions of events when speaking their non-native language, displaying L1 to L2 transfer. Through these findings, the influence of one's native language on their second language in the context of describing motion events demonstrates that the acquisition of an additional language not only impacts how a speaker uses their native language, but also how they encode information from motion events in comparison to monolingual speakers. Contrasts of motion event descriptions in monolingual and bilingual speakers demonstrates that the way that a speaker chooses to segment and communicate an event is influenced by the structure of their native language, how many languages they can speak and the structure of those languages in relation to their native language, and the degree to which they are fluent in those languages. A more recent study concerning Korean and English bilinguals confirms this crosslinguistic influence on event cognition: Park (2015) found that Korean-English bilinguals' L2 description of motion events were under the influence of both L1 and L2. They also exhibited encoding patterns that could not be traced back to their L1 or L2 patterns, suggesting that bilinguals have

unique qualities of their own concerning the encoding of motion events into language. Not only does this support previous studies I discussed concerning a refining of Talmy's typology, but this opens up a new area of research concerning event segmentation studies of bilingual speakers. As distinct encoding patterns were found in bilinguals depending on whether they spoke their native language or their second language, a whole new language classification system might have to be created in order to account for the unique linguistic characteristics that influence bilingual speakers' understanding and communication of motion events. Together, findings from Spanish-English and Korean-English bilinguals illustrate how bilingual speakers exhibit cross-linguistic influence from both their native and secondary languages. Likewise, they develop encoding patterns of motion distinct from monolinguals which calls for a refined typology accounting for the unique cognitive and linguistic characteristics of bilinguals' event segmentation. Further evidence supporting the claim that bilingual speakers exhibit unique linguistic encoding patterns distinct from that of monolingual speakers of either language can be seen in the performance of native Mandarin speakers in comparison to L1 Mandarin learners of L2 Swedish in a memory-based triad-matching task (Zhang 2024). Findings provide evidence that L2 learners can draw on all linguistic resources from all the languages they know when perceiving and interpreting motion events. Bilingual speakers exhibit a cognitive pattern entirely distinct from monolingual speakers of their L1 and their L2, suggesting that there is a cognitive shift which occurs when a second language is learned. Alongside evidence that a monolingual's language structure impacts the way they create motion event representations, these findings indicate that learning another language influences motion event cognition in a way that is different from someone who speaks only one language. Thus, future research should account for the unique cognitive patterns that arise as a result of learning another language. Understanding

how language impacts a speaker's interpretation of motion events is not only dependent upon the structure of the language one speaks, but also how many languages the speaker is fluent in as well as the degree of fluency of each language. Thus, studies performed on event segmentation tasks in bilingual speakers underscores a fundamental shift in cognitive and linguistic processing that emerges through the acquisition of an additional language. It appears that bilingual speakers do not merely oscillate between two monolingual systems. Instead, they demonstrate unique encoding strategies shaped by the interaction of their languages, often resulting in novel patterns not attributable to either language alone. This growing evidence challenges existing typologies and emphasizes the need for a more nuanced framework that captures the dynamic nature of bilingual cognition. In order to further understand the cross-linguistic interaction on the cognition of bilingual individuals, future studies will need to move beyond traditional monolingual methods and consider bilingualism as a distinct linguistic and cognitive experience which influences how motion events are perceived, segmented, and communicated.

V. Conclusion

In sum, the extent to which linguistic encoding of motion influences event segmentation is a multifaceted question that intersects with linguistic typology, cognitive processing, and cross-linguistic variation. The research reviewed in this paper provides converging evidence that language does indeed shape the way individuals perceive, segment, and communicate motion events. Talmy's binary classification of verb-framed and satellite-framed languages serves as a foundational framework, revealing significant differences in event segmentation between speakers of typologically distinct languages. However, the emerging body of cross-linguistic and bilingual research highlights the limitations of this binary model, advocating instead for a more nuanced and flexible typological system. Studies on grammatical aspect, syntactic variation,

dialects, and bilingualism all point to the complexity of language's influence on cognition, arguing that motion event encoding cannot be fully explained by simple dichotomies.

Findings from non-verbal tasks reinforce the idea that while some aspects of event segmentation may be rooted in universal cognitive processes, the structure of a speaker's native language exerts a measurable influence on where event boundaries are perceived and how motion is described. Furthermore, evidence from bilingual and contact language speakers illustrates that linguistic cognition in multilingual individuals represents a unique system, shaped by the interaction and transfer between languages, often resulting in encoding strategies that diverge from monolingual norms. This indicates that bilingualism is not merely the coexistence of two linguistic systems, but a distinct cognitive experience that affects event segmentation in meaningful ways.

Ultimately, the reviewed literature affirms that linguistic encoding of motion plays a significant role in event segmentation, though the degree and nature of this influence are modulated by factors such as typological structure, syntactic strategies, bilingual proficiency, and language contact. To fully capture the intricate relationship between language and cognition, future research must move beyond rigid classification systems and embrace models that account for linguistic diversity, dialectal variation, and the dynamic nature of bilingual and multilingual speakers. Only through such refinement can we begin to understand the true extent of linguistic influence on how humans parse and interpret the continuous flow of experience into meaningful events.

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