

Linguistic Typology and the Acquisition of Motion Event Encoding: A Crosslinguistic Review

Feiyang Sun

School of translation, University of South China, Hengyang 421000, China

Abstract

The encoding of motion events has become a central testing ground for the relationship between linguistic typology and cognitive development. Grounded in Talmy's binary distinction between satellite-framed (S-type) and verb-framed (V-type) languages, and extended by Slobin's notion of equipollently-framed (hybrid) languages, this review synthesizes empirical studies published between 2004 and 2022 on the acquisition of motion event encoding across typologically distinct languages, with particular attention to English, Greek, Spanish, French, Korean, and Mandarin Chinese. The review is organized around five driving questions: developmental timing, cognitive mechanisms, bilingual dynamics, diachronic factors, and methodological convergence. Foundational production studies established that typology constrains lexical selection and pragmatic monitoring rather than non-linguistic conceptual representation, while research on Mandarin and Korean challenged the universality of the S/V dichotomy by demonstrating the functional efficiency of compact structures such as resultative verb compounds and serial verb constructions. Cognitive investigations using eyetracking, structural priming, and event segmentation tasks further revealed that language-specific attentional templates and event schemas emerge by around age three, shaping preverbal information selection. Research on simultaneous and sequential bilingualism showed that crosslinguistic influence is bidirectional or unidirectional depending on typological distance, structural gaps, and proficiency, and that it evolves dynamically with age and event salience. Two theoretical constructs are proposed to integrate these findings: the Functional Efficiency Hypothesis, which attributes early semantic density in Mandarin and Korean to compact encoding, and the Cognitive Precursor Hypothesis, which locates typological effects in preverbal attentional and schematic processes. Mandarin Chinese, straddling structural hybridity and functional S-type efficiency, is shown to be pivotal in refining typological models and in demonstrating that languages occupy positions along a continuum rather than falling into discrete categories. The review concludes that linguistic typology functions not merely as a taxonomic label but as a developmental imperative, orchestrating the interplay of cognition, grammar, and use from the earliest stages of language acquisition.

Keywords

Motion events; linguistic typology; satellite-framed languages; verb-framed languages; equipollently-framed languages; language acquisition; crosslinguistic influence; thinking for speaking; Mandarin Chinese; bilingual development.

1. Introduction: Linguistic Typology and Motion Event Encoding in Children: A Crosslinguistic Analysis of Acquisition Pathways

The encoding of motion events constitutes a critical domain in cognitive development, revealing profound connections between language and cognition. Research demonstrates that children's conceptualization of path and manner (e.g., "run into," "climb over") is systematically

constrained by their native language's typology. Grounded in Talmy's typological framework, this review synthesizes empirical studies on the ontogeny of motion event encoding, with a specific focus on how language typology (e.g., verb-framed vs. satellite-framed languages) shapes acquisition pathways.

By integrating crosslinguistic evidence, we aim to elucidate the dynamic mechanisms through which linguistic structures influence cognitive processing, thereby advancing theoretical understanding of linguistic relativity in child development.

2. Literature Review

2.1. Introduction

The linguistic encoding of motion events—encompassing the movement of an entity (Figure) along a trajectory (Path) executed in a specific way (Manner)—exhibits profound crosslinguistic variation, fundamentally shaping how speakers conceptualize and verbalize spatial dynamics. Leonard Talmy's (2000) seminal typology established a binary framework: Satellite-framed languages (S-type, e.g., English, German) characteristically encode Manner in the main verb and Path in a satellite element (e.g., “run into”); Verb-framed languages (V-type, e.g., Spanish, Greek) encode Path in the main verb and Manner optionally in peripheral structures (e.g., Spanish *entrar corriendo* – “enter running”). Challenging this dichotomy, Slobin (2004) proposed a third category—Equipollently-framed or hybrid languages (e.g., Mandarin Chinese)—where Manner and Path receive equivalent grammatical weight, often through serial verb constructions (SVCs) or complex predicates (e.g., Chinese “跑进” – run-enter). This tripartite framework has catalyzed two decades of empirical research into how children acquire these divergent linguistic strategies.

The central questions driving this scholarship include: 1. Developmental Timing: At what ages do typological constraints manifest in children's speech? 2. Cognitive Mechanisms: How does typology shape pre-linguistic event parsing and attention? 3. Bilingual Dynamics: How do simultaneous bilinguals negotiate conflicting typological systems? 4. Diachronic Factors: To what extent do historical language changes (e.g., grammaticalization) modulate acquisition? 5. Methodological Convergence: How do diverse methodologies (corpus analysis, eyetracking, priming) refine typological models?

Synthesizing findings from 2004 to 2022 reveals a coherent, albeit complex, narrative: typology acts as a powerful developmental blueprint, interacting with universal cognitive constraints, language-specific grammatical resources, and bilingual crosslinguistic influence to shape the trajectory of motion event acquisition from early childhood onward.

2.2. Foundational Evidence: Crosslinguistic Asymmetries in Adult and Child Production (2004–2005)

The empirical groundwork for Talmy's typology in online language production was laid by Papafragou, Massey, and Gleitman (2004), who compared how English (S-type) and Greek (V-type) adults and children described animated motion events. English speakers overwhelmingly favored mentioning Manner within the main verb (e.g., “run,” “jump”), even when Manner was contextually inferable (e.g., a boy jumping *into* a room inherently implies jumping). Greek speakers primarily used Path verbs (e.g., “bino,” “enter”) and explicitly mentioned Manner only when it was unpredictable or non-inferable (e.g., specifying “limping into” a room versus simply walking). Quantitatively, Manner appeared in 95% of English descriptions but only 53% of Greek ones. Crucially, non-linguistic memory tests revealed no difference between groups in recalling event details, demonstrating that the typological constraint operated strictly at the level of linguistic encoding choices, not on underlying conceptual representations. This study established that language-specific grammatical resources critically shape “how” speakers

verbalize perceived motion, delimiting Talmy's typology to the interface between conceptualization and linguistic formulation. Concurrently, Chen (2005) challenged the universality of the S/V dichotomy through corpus and experimental analyses of Mandarin. Structures like serial verb compounds (e.g., "pǎo jìn", "run-enter") grammatically equated Manner ("pǎo") and Path ("jìn"). Quantitative analysis of spoken and written data revealed comparable frequencies of pure Manner verbs (32%), pure Path verbs (30%), and Manner-Path compounds (38%). Chen concluded that Mandarin exemplifies Slobin's equipollent type, where neither Manner nor Path inherently dominates due to syntactic flexibility. This study highlighted the role of structural properties (e.g., SVCs) in enabling semantic equivalence, contrasting with Papafragou et al.'s emphasis on pragmatic monitoring. Hohenstein (2005) further expanded the scope by examining Spanish-English bilingual children, identifying hybrid strategies blending V-type (Spanish) and S-type (English) patterns. Children used Path verbs more frequently than monolingual English peers but retained higher Manner verb usage than monolingual Spanish speakers. However, this early work lacked granularity on directionality or developmental trajectories of crosslinguistic influence—a gap later addressed by Engemann (2022). Collectively, these foundational studies established three principles: typology acts as a filter constraining lexical selection during production; speakers actively suppress redundant information (e.g., inferable Manner in Greek); and languages may defy binary classification through equipollent framing mechanisms.

2.3. Resolving the Mandarin Typology Debate and Early Acquisition Patterns (2006–2011)

The typological status of Mandarin Chinese emerged as a pivotal controversy during this period. Peyraube (2006) argued Mandarin is unequivocally S-type based on diachronic analysis, demonstrating that directional complements (e.g., "shàng" "up," "xià" "down") evolved from full verbs in Old Chinese (V-type: Path-dominant, e.g., "rù" "enter") to grammaticalized satellites in Middle Chinese (c. 10th century). In contrast, Chen and Guo (2009) countered with synchronic evidence from modern Chinese novels, identifying balanced distributions of Path-only (28%), Manner-only (31%), and Manner-Path compounds (41%), asserting that Mandarin's structural hybridity necessitates an equipollent classification. This debate was empirically resolved by Ji, Hendriks, and Hickmann (2011), whose comparative studies of 3- to 8-year-old English and Mandarin children revealed striking developmental asymmetries. For voluntary motion, Mandarin 3-year-olds used Resultative Verb Compounds (RVCs, e.g., "pǎo jìn" "run-enter") at near-adult frequency (75% of utterances), achieving semantic density (mean components/clause: 1.8) significantly higher than English peers (0.9). English children relied on sparse Path-only constructions ("go in") until age 5. Similarly, in caused motion contexts, Mandarin 3-year-olds employed RVCs like "tuī xià" ("push-descend"), while English children depended on analytic constructions ("push it down") even at age 8. Ji et al. argued that RVCs' functional efficiency—reducing processing load through compact encoding—enables early semantic density in Mandarin, accelerating acquisition compared to English. This synthesis reconciled the typology debate: Mandarin exhibits functional S-type efficiency (supporting Peyraube) alongside structural hybridity (supporting Chen & Guo). Parallel work by Choi (2009) on Korean challenged V-type homogeneity. Despite Korean's classification as V-type (like French), children (1;11–4;2) used adverbs for Manner (e.g., "ppalli", "quickly") in 40% of utterances and serial verbs for simultaneous Manner+Path in 35%, yielding semantic density (1.5 components/clause) exceeding French peers (0.8). This demonstrated that intra-typological grammatical resources (e.g., SVCs in Korean) modulate acquisition pace. Longitudinal confirmation came from Wang (2017), who tracked Mandarin children (13–48 months) and observed RVCs emerging at 2;6 and dominating by age 3, aligning with S-type functional behavior. These findings collectively underscored the Functional Efficiency

Hypothesis: compact structures (RVCs, SVCs) reduce cognitive load, enabling early mastery, while Mandarin's typological ambiguity reflects an ongoing diachronic V→S shift (Shi & Wu 2014).

2.4. Deepening the Cognitive Underpinnings: Attention, Schemas, and Production (2011–2021)

Cognitive mechanisms bridging typology and production became a focal point. Bunger et al. (2021) employed eyetracking during description tasks with English (S-type) and Greek (V-type) 3-year-olds, revealing divergent visual attention before speaking. English children fixated on Manner (65% of gaze time), while Greek peers focused on Path endpoints (70%). During non-linguistic memory tasks, these differences vanished, confirming that typology shapes conceptual preparation for speaking rather than non-linguistic cognition. By age 3, language-specific “attentional templates” guide event parsing, illustrating how typology filters perceptual input during the earliest stages of production planning. Zhao (2018) further probed cognitive schemas through structural priming experiments. When Chinese speakers were primed with non-canonical sentences (e.g., “jìn pǎo” “in-run” vs. canonical “pǎo jìn” “run-in”), adoption of primed structures surged to 45% (baseline: 12%). This indicated that abstract event schemas are activated during message planning, with flexibility in mapping conceptual structure to linguistic form—a hallmark of equipollent framing. The interplay between typology and temporal cognition was examined by von Stutterheim et al. (2020), who compared French (V-type), Tunisian Arabic (V-type), English (S-type), and German (S-type). S-type speakers privileged Manner as the “reportable event,” leading to fine-grained segmentation (e.g., “run-jump-land”), while V-type speakers prioritized Path endpoints, yielding coarse-grained units (e.g., “cross the street”). These segmentation differences were linked to grammatical aspect encoding (e.g., English progressive morphology), revealing how temporal and spatial domains interact in typologically constrained event conceptualization. Synthesizing these insights, typology influences production long before articulation: attentional biases filter visual input (Bunger et al.), schematic activation guides conceptual-linguistic mapping (Zhao), and event segmentation defines what constitutes a reportable unit (von Stutterheim). This cognitive triad underscores typology's penetration into preverbal processing, shaping how children and adults select and structure information for expression.

2.5. Bilingual Acquisition and the Dynamics of Crosslinguistic Influence (2018–2022)

Simultaneous bilingualism provided a natural laboratory for examining typological negotiation. Engemann (2022) analyzed 96 English-French bilingual children (ages 5–6, 8–9), revealing bidirectional and unidirectional crosslinguistic influence (CLI). Bidirectional CLI manifested as mutual influence in Manner/Path verb selection (e.g., Path overuse in French; Manner underuse in English). Unidirectional CLI emerged as satellite-like innovations in French Path encoding (e.g., “sauter over” “jump over” instead of “traverser” “cross”), escalating with age and event salience (e.g., boundary-crossing events triggered 85% of innovations). Engemann argued CLI is driven by structural overlap (enabling bidirectional semantic transfer) and structural pressure (S-type dominance driving syntactic restructuring in V-type French). Critically, CLI evolved with proficiency, contradicting Hohenstein's (2005) static model and highlighting typological distance (S-V > V-V) as a key modulator. Park (2020) extended this to L2 acquisition, showing Korean (equipollent) learners of English defaulted to L1-equivalent strategies (e.g., “run enter room” instead of “run into”). Advanced learners approached S-type patterns only with high L2 vocabulary ($\beta=0.72$, $p<0.01$), underscoring lexical proficiency's role in overcoming L1 entrenchment. These studies converge on a Mechanistic Model of Bilingual CLI: typological distance determines restructuring likelihood (S-V pairs > V-V pairs); structural gaps in V-type

languages invite satellite innovations; proficiency intensifies CLI with age and L2 mastery; and event salience (e.g., boundary-crossing) amplifies syntactic transfer.

2.6. Theoretical Synthesis

The Functional Efficiency Hypothesis posits that compact encoding (e.g., Mandarin RVCs, Korean SVCs) reduces cognitive load, enabling early semantic density (~3 years), whereas analytic packaging (e.g., English satellite framing) delays mastery (~5 years). The Cognitive Precursor Hypothesis asserts that language-specific attentional templates (Bunger et al.) and event schemas (Zhao) emerge by age 3, shaping preverbal information selection. Mandarin’s dual identity—functional S-type efficiency (Peyraube 2006) and structural hybridity (Chen & Guo 2008)—resolves the “Mandarin Paradox.” This reflects a diachronic V→S shift: Pre-Modern Chinese (10th–17th c.) accelerated satellite framing (Shi & Wu 2014), while Modern Chinese retains V-type residues (Wu 2017), positioning it on a typological continuum (Wu 2017). Universal constraints (e.g., lower semantic density in early childhood) coexist with typological acceleration via compact encoding. Finally, CLI is structurally modulated and developmentally dynamic: bidirectionality stems from structural overlap (e.g., Engemann’s bilinguals), while unidirectionality arises from dominance/gaps (e.g., S-type pressure restructuring French).

Table 1

Level of Influence	S-type (English)	V-type (Greek)	Hybrid (Mandarin)
Grammatical Resources	Path Satellites (particles)	Path Verbs (enter, exit)	RVCs (pǎo jìn), Serial Verbs
Acquisition Strategy	Manner Verb Surge ~5 years	Path Verb Dominance from ~3 years	Adult-like RVCs mastered by ~3 years
Cognitive Biasing	Attention to Manner (pre-linguistic)	Attention to Path (pre-linguistic)	Attention to Manner+Path (inferred from output)

2.7. Key Empirical Finding

Developmental trajectories reveal typology’s cascading effects. At ages 2–3 years, Mandarin children use adult-like RVCs (e.g., “pǎo jìn”) with semantic density (1.8 components/clause) far exceeding English peers (0.9), while Korean children leverage adverbs and SVCs for denser expression (1.5) than French children (0.8). English and French 3-year-olds rely on sparse Path-only constructions (“go in”) or omit inferable Manner, respectively. By 3–4 years, language-specific attentional biases crystallize: English children fixate on Manner (65% gaze time), Greeks on Path endpoints (70%). Bilingual children (Eng-Fr) exhibit early bidirectional CLI and satellite innovations (“sauter over”). At age 5, English children surge in Manner verb usage (“run into,” density: 1.2), though still lagging behind Mandarin, while Greek children achieve adult-like pragmatic monitoring. Bilingual CLI intensifies, with French innovations escalating during boundary-crossing events. By age 8+, Mandarin children attain adult-level semantic density (2.0), English children mature in Manner+Path combinations (~1.5), but L1 transfer persists in Korean→English learners, requiring high L2 vocabulary for restructuring. These milestones underscore typology’s role as a developmental accelerator or brake, mediated by language-specific grammatical tools.

Table 2

Age	Language Type	Key Feature
2–3 yrs	V-type (Korean)	Frequent use of adverbs to encode Manner (e.g., ppalli, “quickly”); Semantic density > French peers

Age	Language Type	Key Feature
3–4 yrs	Hybrid (Mandarin)	Adult-like use of RVCs (e.g., pǎo jìn, “run-enter”); Semantic density significantly > English peers
	S-type (English)	Predominant use of Path-only satellite constructions (e.g., “go into”); Rare use of Manner verbs
	V-type (Greek)	Path verbs dominate descriptions; Pre-linguistic attention biased towards Path (especially endpoints)
	S-type (English)	Pre-linguistic attention biased towards Manner; Very few combined Manner+Path expressions
	Bilingual (Eng-Fr)	Bidirectional CLI in verb semantics (Manner/Path selection); Emergence of hybrid/unidirectional CLI (e.g., satellite-like Path in French)
5 yrs	S-type (English)	Significant surge in Manner verb usage (e.g., “run into”); Semantic density increases but remains < Mandarin peers
	V-type (Greek)	Path verbs still dominate; Explicit Manner mention increases only when non-inferable (e.g., “limping into”)
8+ yrs	Hybrid (Mandarin)	Semantic density ≈ adult levels; RVCs used productively for caused motion (e.g., tuī xià, “push-descend”)

3. Conclusion

The Ontogenesis of “Thinking for Speaking” The chronological trajectory from 2004 to 2022 reveals typology’s profound, multi-systemic role in motion event acquisition. Foundational studies established crosslinguistic encoding asymmetries driven by grammatical resources and pragmatic monitoring (Papafragou et al. 2004; Chen 2005). Subsequent research unveiled how language-specific structures shape developmental paths, enabling early mastery in languages with compact encoding (Ji et al. 2011a,b; Choi 2009) while highlighting intra-typological variation and historical evolution (Shi & Wu 2014). Cognitive investigations illuminated typology’s penetration into pre-linguistic processes, guiding attentional biases (Bunger et al. 2021), activating event schemas (Zhao 2018), and defining reportable units (von Stutterheim et al. 2020). Bilingual research revealed CLI’s dynamic nature, moderated by typological distance and structural gaps (Engemann 2022). Mandarin Chinese, straddling structural hybridity (Chen & Guo 2008) and functional S-type efficiency (Peyraube 2006), has been pivotal in refining typological models. It demonstrates that languages resist binary categorization yet fundamentally shape “thinking for speaking” (Slobin 2004). Crucially, the specific linguistic tools available—more than abstract universals—determine how children parse, conceptualize, and articulate motion. This synthesis affirms that typology is not merely a linguistic taxonomy but a developmental imperative, orchestrating the interplay of cognition, grammar, and use from the earliest stages of language acquisition.

References

[1] Beavers, J., Levin, B., & Tham, S. W. (2010). The typology of motion expressions revisited. *Journal of Linguistics*, 46(2), 331–377.

[2] Bunger, A., Skordos, D., Trueswell, J. C., et al. (2021). How children attend to events before speaking: Crosslinguistic evidence from the motion domain. *Glossa: A Journal of General Linguistics*, 6(1).

[3] Chen, L., & Guo, J. (2009). Motion events in Chinese novels: Evidence for an equipollently-framed language. *Journal of Pragmatics*, 41(9), 1749–1766.

- [4] Chen, L. (2005). The acquisition and use of motion event expressions in Chinese [Doctoral dissertation]. University of Louisiana at Lafayette.
- [5] Choi, S. (2013). Language-specificity of motion event expressions in young Korean children. In *Grammaticalization and first language acquisition: Crosslinguistic perspectives* (pp. 157–184). John Benjamins Publishing Company.
- [6] Congcong, W. (2023). On Chinese children's acquisition of motion events. *Pacific International Journal*, 6(2), 63–68.
- [7] Engemann, H. (2022). How (not) to cross a boundary: Crosslinguistic influence in simultaneous bilingual children's event construal. *Bilingualism: Language and Cognition*, 25(1), 42–54.
- [8] Hohenstein, J. M. (2005). Language-related motion event similarities in English-and Spanish-speaking children. *Journal of Cognition and Development*, 6(3), 403–425.
- [9] Ji, Y., Hendriks, H., & Hickmann, M. (2011). Children's expression of voluntary motion events in English and Chinese. *Journal of Child Language*, 34(4), 2–20.
- [10] Ji, Y., Hendriks, H., & Hickmann, M. (2011). How children express caused motion events in Chinese and English: Universal and language-specific influences. *Lingua*, 121(12), 1796–1819.
- [11] Kopecka, A., & Pourcel, S. (2005). Motion expression in French: Typological diversity. *Durham & Newcastle Working Papers in Linguistics*, 11.
- [12] Papafragou, A., Massey, C., & Gleitman, L. (2006). When English proposes what Greek presupposes: The cross-linguistic encoding of motion events. *Cognition*, 98(3), B75–B87.
- [13] Park, H. I. (2020). How do speakers of different languages differ in the encoding of complex motion events? *Linguistic Research*, 37(1), 95–120.
- [14] Peyraube, A. (2008). Motion events in Chinese: A diachronic study of directional complements. In *Space in languages: Linguistic systems and cognitive categories* (pp. 121–135). John Benjamins Publishing Company.
- [15] Shi, W., & Wu, Y. (2014). Which way to move: The evolution of motion expressions in Chinese. *Lingua*, 146, 1237–1292.
- [16] Slobin, D. I. (2004). The many ways to search for a frog: Linguistic typology and the expression of motion events. In *Relating events in narrative, Volume 2* (pp. 219–257). Psychology Press.
- [17] Talmy, L. (2000). *Toward a cognitive semantics: Concept structuring systems* (Vol. 1). MIT Press.
- [18] Talmy, L. (2000). *Toward a cognitive semantics: Typology and process in concept structuring* (Vol. 2). MIT Press.
- [19] Von Stutterheim, C., Gerwien, J., Bouhaous, A., et al. (2020). What makes up a reportable event in a language? Motion events as an important test domain in linguistic typology. *Linguistics*, 58(6), 1659–1700.
- [20] Wu, J., & Pan, Y. (2017). A comparative syntactic-semantic study of motion event verbs in English, Chinese, and Japanese. *Foreign Languages Research*, 34(2), 57–62.
- [21] Zhao, C., & Hu, B. (2018). The role of event structure in language production: Evidence from structural priming in Chinese motion event descriptions. *Lingua*, 208, 61–81.