



## Typological and Cultural Influences on Fictive Motion Verbs: A Comparative Study of English and Arabic

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### Abstract

Fictive motion verbs—verbs that use motion language to describe static scenes—offer an excellent way to understand how languages construe spatial and abstract domains of experience. To that end, we comprehensively compare fictive motion verbs in English and Arabic and use a corpus of 2,000 examples of fictive motion verbs from each language across genres, including newspapers, scholarly articles, and literature. We categorized the verbs according to Talmy's (2000) typology of motion events, and examined frequency, conceptual preference, semantic flexibility, and use in context. Our study indicated that Arabic favored path (37%) and position (27%) verbs with external directionality and communal foregrounding, whereas English favored manner (42%) and path (28%) verbs with internal processes and individual processes foregrounding. Fujishima's (2002) analysis reported that Arabic verbs were more semantically flexible because of the root derivation system compared to English verbs, which were conventionalized content. The differences between the languages pointed to ways of typological linguistics, cognitive processing and cultural constraints that are relevant to cognitive linguistics, linguistic relativity, second-language acquisition, and cross-cultural communication. Our contribution was to establish how metaphorical motion verbs shed light on cognitive and cultural frames for each language. The findings highlight how typological and cultural differences in fictive motion verbs can inform pedagogical strategies for addressing L1 transfer challenges in English-Arabic second-language acquisition.

*Keywords:* fictive motion, motion verbs, English, Arabic, cognitive linguistics, linguistic typology, conceptual metaphor, semantic flexibility

### 1. Introduction

Fictive motion verbs use dynamic language to discuss static entities and provide an important avenue for considering views on how languages encode spatial and metaphoric systems. For example, in English, one might say "the fence runs along the river," whereas one might say "السياج يمتد على طول النهر" in Arabic. This illustrates cognitive activities that apply motion schemas to stationary entities. It

showcases the interconnectedness between language, cognition and culture (Ibarretxe-Antuñano & Özçalışkan, 2024).

Recent studies have looked at fictive motion verbs as a typological consideration, with satellite-framed languages that focus on manner of motion such as English and verb-framed languages that focus on path of motion such as Arabic offering different types of conceptualizations for the abstract way in which their speakers view if an entity or a thing can be seen (Pulvermüller & Kemmerer, 2024). Fictive motion verbs demonstrate a larger notion around metaphorical language, which falls into a relatively small, distinct pillar of cognitive linguistics. Metaphorical language can conceptualize a way of thinking rooted in physical experiences that shape and are affected by cultural and societal values that allow an ability to think around abstract thought (Pérez-Paredes & Curry, 2024).

The cognitive connotations of fictive motion verbs have been a hot topic in 2024, especially for the role they play in embodied cognition. Studies have shown that when you listen to sentences like “The path winds through the forest,” sensorimotor brain regions activate, indicating that listeners perform motion simulations while they process static scenes (Pulvermüller & Kemmerer, 2024). This phenomenon is not uniform across languages. Arabic verb sentences can be morphologically rich, facilitating the flexibility of mental simulations—even if the meanings are ideologically more structured than English's verbs (Al-Sharif & Bender, 2024). These contributions dovetail with theories of linguistic relativity, where patterns that are language-specific shape cognitive frameworks that, in turn, shape how speakers interpret spatial and abstract relationships (Othman & Alhailawani, 2023). By concentrating on fictive motion verbs, this study offers points of entry into investigating how linguistic structures influence and shape cognitive and cultural differences across various languages.

In addition, fictive motion verbs have valuable implications for applied linguistics and words, especially in written communication and instructed contexts. For instance, in second-language learning contexts, differences in motion verb usage may lead to challenges, as we noted in our discussion about English as a second language learners who scored well in their first year English courses, but struggled with the difference in use of path verbs in English or Arab learners of English using path verbs as opposed to manner verbs which are more often used in Arabic, and where different approaches to pedagogy would be required (Boulton & Pérez-Paredes, 2024). About computational linguistics—in this instance, computational semantics—applying the metaphorical, can be very important for creating proper models regarding semantic or pragmatic parsing, particularly for bilingual applications of English-Arabic, as the two languages are typologically very different (Al-Sharif & Bender, 2024). Our discussions here demonstrate the cross-disciplinary nature of fictive motion verbs and offer a springboard from which to consider how language determines cognition and assists in cross-cultural communication in an increasingly interconnected world (Ibarretxe-Antuñano & Özçalışkan, 2024).

The idea of fictive motion, where motion verbs take on a situation that uses a static entity, is an important area of investigation in cognitive linguistics to understand how languages construe relationships - be they spatial or abstract. For example, we can say in English, "The road runs across the valley," and in like manner, in Arabic, "الطريق يمتد عبر الوادي" (The road runs across the valley), to implicate a fictive motion while allowing a dynamic register for a static scene. Fictive motion involves cognitive processes that use representations of motion schemas to contemplate static objects (Talmy,

2000). In simple terms, fictive motion in language illustrates how thought is manifested through language with metaphorical expressions that relate different physical and abstract worlds. Although fictive motion has attracted significant attention in English (Matlock, 2020; Wilson & Gibbs, 2022), less has been done to investigate fictive motion in the Arabic language (Alsaif & Markert, 2021), and there is little comparative literature between the languages, also. From this perspective, the comparative gap is an important one; a comparison of Arabic (a Semitic, verb framed language) and English (a Germanic, satellite framed language) can illuminate the nature of thought, structure, acculturation, and cognition, which ultimately supports the ideas underpinning the linguistic relativity hypothesis (Whorf, 1956).

This study investigates three research questions: (1) What are the categories of fictive motion verbs in Arabic? (2) What are the categories of fictive motion verbs in English? (3) What are the differences between these languages in fictive motion verbs? By analyzing a corpus of 2,000 tokens (total) per language, the study describes the overall distribution, conceptual orientation, semantic scope, and contextual diversity of each of the fictive motion verb categories. The study's results contribute to cognitive linguistics by advancing the field's understanding of how typological and cultural factors determine the use of metaphorical language. The study's findings also have implications in real-world language teaching contexts (when dealing with L1 transfer), by recognizing differences in language, and in contextual communicative intercultural communication issues, which likely occur to a large extent in their representations of cultural cognition. Also, I documented some cognitive processing differences with fictive motion verbs and how they activate mental simulations, as well as any possible downstream uses of this aspect for translation, NLP, and other fields.

The conceptual importance of fictive motion is to help investigate how languages represent and encode embodied cognition, in which physical movements shape our abstract representations and concepts (Lakoff & Johnson, 2020). Fictive motion verbs such as “the path winds through the forest” or “المسار يتلوى عبر الغابة” activate fictive-college motion mental simulations that are recorded in the brain's sensorimotor areas (Bergen & Wheeler, 2021). Therefore, the cognitive processes described above suggest that the language captures not only the features of a path but also performs spatial experience, leading speakers to engage in how they perceive and think about an action in the presence of a static entity. In English, fictive motion verbs allow for detailed descriptions of the manner in which an object moves, such as “wind” or “twist,” for example, whereas in Arabic, fictive motion verbs encode the focus of the path and direction by using the verbs “يتلوى” [twist] and “يمتد” [extend]. These two structures create cognitive strategies that differ, where English speakers appropriate the dynamics of motion, while Arabic speakers appear to appropriate spatial trajectories. This remains a hypothesis that we will test in this study using corpus analysis (Alsaif & Markert, 2021).

Cultural context has also expanded the study of fictive motion verbs, as metaphorical language often embodies the values and priorities of a culture (Kövecses, 2020). In Arabic-speaking cultures, where collectivism and group relationships are foregrounded, fictive motion verbs may prefer expressions of space relevance and group transitions, as in the expression “تقارب” (converge) in the context of social or political agreement (Suleiman, 2020). In contrast, English-speaking cultures generally supported individualism, so fictive motion verbs target internal processes or agency, using something like “churn” to describe personal or economic dynamics. This cultural variance is especially worthwhile to cross-linguistic studies, as it implies that fictive motion verbs are not only

linguistic forms, but also repositories of culturally-based meaning, which frames how speakers, at a distance, conceptualize abstract concepts such as time, progress, or ideology.

The practical applications of this study reach beyond the confines of theoretical linguistics and into applied spheres, such as education, translation, and technology. In terms of second language acquisition, the syntactic distinction between fictive motion verbs allows educators to build in this knowledge regarding L1 transfer between L1 / L2 learners. For example, Arabic students learning English may overuse path or motion verbs; when attempting to express fictive motion (e.g., “the discussion extended” instead of “the discussion deepened”), while English students of Arabic; are confronted by the lack of distinctions within the noun or verb forms of fictive motion verbs like “امتد” (Jarvis & Pavlenko, 2020). From the perspective of translator studies, being aware of the differences in fictive motion verbs helps the translator to recognize false equivalencies or mistranslations when referring to metaphorical conveyances. For example, if the translator translates the Arabic “تقارب” as “approach” rather than “converge,”, this choice will affect the meaning (Baker, 2022). Across settings utilizing natural language processing (NLP), the discoveries from the analysis of fictive motion will improve the semantic parsing models of these NLP applications by considering language-specific metaphorical conventions of fictive motion and improved understanding of fictive motion verb usage from a multilingual and bilingual perspective (Bender & Koller, 2020). In this regard, the study aims to expand the conversation across theoretical and applied linguistics as a comprehensive project considering fictive motion verbs in English and Arabic.

Fictive motion verbs convey dynamic spatial linguistic descriptions of static scenes and serve as a reminder of how typology and cultural cognition can shape metaphorical expression across languages. Recent work examined Fictive motion with typological contrast between English (satellite-framed) using manner verbs such as “churn” or “twist” and Arabic (verb-framed) using path verbs such as “امتد” (extend) or “تقارب” (converge) (Othman & Alhailawani, 2023; Al-Zahrani & Matlock, 2023). These typological differences represent cognitive tendencies where English prioritizes individual processes and Arabic path verbalization of spatial directionality links to cognitive cultural values of individualism vs collectivism (Ibarretxe-Antuñano & Özcalışkan, 2024). For example, in a fictive situation in the Arabic language “النفوذ يمتد عبر الحدود” (The influence extends across borders), using the path verb demonstrates the importance of community values, while in English “The debate churned” using manner verbs shifts attention to internal attributes of the process (Pérez-Paredes & Curry, 2023). This comparison of fictive motion verbs in English and Arabic contributes to the meaning of linguistic relativity, suggesting language-specific patterns determine cognitive simulations of space and metaphor (Sandy, 2023). This paper, through the analysis of 2,000 verb tokens per language, leads to emergent theoretical takeaways while maintaining a gap between theory and practice, asking how typological and cultural factors affect metaphorical language use in the English and Arabic languages.

## 2. Literature Review

### 2.1. Theoretical Foundations

Fictive motion, as discussed by Talmy (2000), refers to using verbs of motion to describe static scenes, since these verbs engage cognitive processes that are active in nature, in which humans impose a dynamic framework onto stable entities. Fictive motion is explored in cognitive linguistics which considers language as continuing to emergent systems that are shaped by embodied cognition (Lakoff & Johnson, 2020). Talmy's (2000) typology of motion events classifies motion events in a language either as a satellite-framed language, where path is encoded in particles, such as English, where "run out" contains 'out' as a particle, or as a verb-framed language, where path is encoded in the verb, such that Spanish, for example, has related verbs such as "entrar corriendo" [enter running]. Arabic is a Semitic language, which in general features verb-framed characteristics in the fi'l form of the verb, where motion is often encoded in the roots of the verb. More specifically, fictive motion in Arabic is understudied (Alsaif & Markert, 2021). This comparison of fictive motion in typologically different languages is important, as typological differences inform how languages secure path/role and manner, as well as position or posture, in the literal-figurative space.

Fictive motion verbs channel spatial movements into abstract places, using embodied metaphors to create economy in communication (Michaelis, 2021). For example, "The fence runs along the river" uses a motion verb to refer to a static scene, consistent with phenomenological thought's description of first-person navigation of space as traveling through a static environment that is conceptually traversed as though it is dynamic (Gallagher, 2020). Towards providing a framework for how languages conceptualize static scenes as dynamic, Talmy (2000) distinguished fictive motion into six categories—emanation, pattern paths, frame-relative motion, advent paths, access paths, coextension paths—defined in part by factivity (whether or not the entity in question is real or imaginary), and observer perspective (the subjective versus the objective perspective). Talmy's (2000) categories provide an explicit framework for studying how languages conceptualize static scenes and process language as though they are dynamic, as well as how languages shape the nature of cognitive processing to the language structure each language is preceded by.

Recent developments in theory are highlighting the relationship between linguistic typologies and cultural cognition in the expression and understanding of fictive motion. For example, Kövecses (2020) suggests that although we all use metaphorical language, it reflects the values of the culture in which we live. In particular, while both languages engage in fictive motion, there are cultural differences based on values about individualism and collectivism for the English and Arabic-speaking worlds, respectively. Arabic favoring verbs that depict collective movement or convergence about space reflect their emphasis on communal values versus individualistic preferences, such as verbs that depict individuals or internal dynamics in English. The importance of cultural thinking is key to understanding how fictive motion verbs encode meanings related to the social (the language), ideological (the speaker), and temporal (the context) dimensions of fictive motion as well as the spatial dimension as used in English and Arabic language typologies that are typologically and culturally different (Suleiman, 2020).

Cognitive processing theories add depth to this discussion. Fictive motion verbs are theorized to engage mental simulations of motion, activating sensorimotor regions of the human brain (Matlock, 2020). This is in line with embodied cognition, which posits that in understanding language, the brain

simulates actual embodied experiences (Barsalou, 2021). In Arabic, root-based morphology may also allow verbs to adjust meaning through semantic flexibility, whereas English may rigidly bind verb meanings within domain-specific lexicons, not allowing verbs to express a variety of metaphorical contexts (Levin & Rappaport Hovav, 2020). With these cognitive differences in mind, fictive motion verbs may inform and reflect both linguistic structure and how speakers conceptualize and process abstract concepts.

Recent theoretical exploration in cognitive linguistics emphasizes fictive motion verbs as phenomena that suggest linguistic typology may influence metaphorical conceptualization. In verb-framed languages like Arabic, path verbs like "امتد" (extend) dominate and nest directionality in roots, while in satellite-framed languages like English, manner verbs like "swirl" dominate, with path expressed conceptually through particles (Othman & Alhailawani, 2023; Ibarretxe-Antuñano & Özçalışkan, 2024). These typological differences have implications for cognitive processing, whereby Arabic speakers focus more on spatial trajectories, while English speakers emphasize dynamic processes (Sandy, 2023). Cultural factors also play a role in modulating these differences, noting that Arabic's collectivist cultural orientation accentuates verbs of spatial or social convergence, as in the verb تقارب (approximate), while English emphasizes internal dynamics, as in "The economy churned" (Pérez-Paredes & Curry, 2023). These insights push Talmy's (2000) motion event typology forward by accounting for the interplay of linguistic structure and cultural cognition for fictive motion expressions (Al-Sharif & Bender, 2024).

## 2.2. Empirical Studies

Empirical studies on fictive motion in the English language have determined the categories of manner, path, position, and perimeter verbs to be prevalent categories, specifically path verbs (e.g., "go", "extend"), more present in fictive compared to manner verbs (e.g., "roll", "churn") (Matlock, 2020). Wilson and Gibbs (2022) have indicated that fictive motion verbs activate literal motion schemas in their research. They provided information on hyperscanning studies in psycholinguistics, where they could show there was a difference in a participant's reaction time to semantically congruent verb pairs compared to semantically incongruous pairs as shown in examples of sentences such as "The road runs along the coast", where the reaction time for the congruent verb pairs was faster than the incongruent, implicating cognitive simulation of movement. Alsaif and Markert (2021) located similar categories of fictive motion verbs in Arabic, but noted a preference for fictive uses of "ذهب" (go) compared to "مشى" (walk), indicating fictive forms in Arabic allowed a broader range of meaning than in English. They described smaller congruency effects from fictive motion stimuli compared to English, suggestive of the less conventionalization of fictive meanings in their study as a result of the Arabic system's reliance on morphological productivity.

Cross-linguistic studies yield rich additional insight. Pappafragou and Selimis (2020) studied fictive motion in Greek and English and found that language-specific behaviors influenced linguistic (but not non-linguistic) spatial tasks, lending support to hypotheses of linguistic relativity. Stosic et al. (2021) examined fictive motion in French, Italian, and Serbian. They noted differences between the languages based on the frequency of fictive motion verbs that related to typological structures found in each language, such as among verb-framed languages (path verbs) and satellite-framed languages

(manner verbs). Matsumoto (2022) analyzed fictive motion verbs in Japanese and described subjectification and path verbs, echoing ideas in prior work on German (Takemoto, 2020). These studies illustrate the importance of comparative analyses to understand how a typological and cultural perspective relates to the use of fictive motion verbs in various languages.

Recent work emphasizes cognitive and cultural aspects. Alsaif and Markert (2021) show that fictive motion verbs in Arabic encapsulate community and space, which likely emerged from a culture that values and emphasizes collective identity (Suleiman, 2020). For example, collective agreement can be described in Arabic using conflated fictive motion verbs like “تقارب” (converge), which is often used in political or social discussions. On the contrary, English uses “churn” or “swirl”, most likely because English privileges individualistic metaphors in the process and context of motion verbs to organize internal dynamics in debates or emotions (Kövecses, 2020). This clarifies that metaphorical language is inseparable from how linguistic structure creates cognitive processes intertwined with cultural context, the focus of this study.

Various studies have also examined the cognitive effects of fictive motion. For example, Bergen and Wheeler (2021) reported that fictive motion sentences activate motor cortex areas, indicating that comprehenders mentally simulate motion with motion-involvements for static scenes. In Arabic, Al-Ahmadi (2022) examined fictive motion constructions in works of literature, using the verb "امتد" (extend) to describe both spatial and temporal extension, which illustrates the flexible morphology of Arabic verbs. From a cross-linguistic perspective, Ibarretxe-Antuñano (2023) looked at path verbs in Basque and English, noticing that verb-framed languages express more nuanced directional meanings; it is feasible that Arabic reflects more density in meaning than it has been given credit for. These studies lay the groundwork for examining how fictive motion verbs may represent differences in cognition and culture, particularly for languages that have received little research attention, like Arabic.

Empirical research in 2023 and 2024 provides strong evidence in both the cognitive and cultural aspects of fictive motion verbs. Al-Zahrani and Matlock (2023) explain that Arabic path verbs like “امتد,” are more semantically flexible encompassing spatial, temporal and ideological domains; they attribute the flexibility to Arabic root semantics versus English manner verbs, such as “percolate,” which Harris (2017) suggests to be more rigid (Al-Zahrani & Matlock, 2023). Othman and Alhailawani (2023) conducted a diachronic study of Arabic novels, and their findings indicated that the presence of manner is now more salient in contemporary novels than in older novels. These lexicalization patterns also seem not to adhere strictly to Talmy’s verb-framed typology for Arabic (Othman & Alhailawani, 2023). Additionally, research in neurocognition provided evidence that fictive motion verbs evoke areas in the motor cortex and that Arabic holophrastic, polysemous verbs may lead to broader spatial simulations than English (e.g., Pulvermüller & Kemmerer, 2024). In the area of computational linguistics, Al-Sharif and Bender (2024) provided evidence for semantic parsing of Arabic that retains metaphorical aspects of the language in relation to existing natural language processing models (Al-Sharif & Bender, 2024). These findings highlight the importance of cross-linguistic comparisons to understanding how typology and culture influence fictive motion verb use (e.g., Boulton & Pérez-Paredes, 2024).

### 2.3. Recent Advances in Fictive Motion Research

Recent research into fictive motion verbs has informed cognitive linguists about the various ways of encoding spatial and metaphorical concepts in languages. According to the 2024 studies, typological differences are found between satellite-framed and verb-framed languages, where English prefers manner verbs such as "swirl" and "churn," while Classical Arabic presents path verbs such as امتد (extend) or تقارب (converge) (Ibarretxe-Antuñano & Özçalışkan, 2024). Such differences bear on cognition, such that English prioritizes manner of motion processes as against Arabic's spatial trajectories, the latter probably influenced by cultural values on individualism versus collectivism (Pérez-Paredes & Curry, 2024). For example, the frequent occurrence of path verbs in Arabic, as in "النفوذ يمتد عبر الحدود" (The influence extends across borders), locates it more in a communal context, whereas the English manner verb of "The debate churned" stresses the internal dynamics (Othman & Alhailawani, 2023). These findings bring about further evidence for the linguistic relativity position, whereby it is presumed that language-specific patterns in fact shape cognitive simulations of abstract phenomena.

Neuro-cognitive investigations in 2024 enlighten us regarding the cognitively inclined processing of fictive-motion verbs by showing that sentences such as "The path winds through the valley" activate sensorimotor brain areas, performing an internal simulation of motion for a static scene (Pulvermüller & Kemmerer, 2024). In Arabic, the richness in the verbal morphology of verbs like "امتد" might aid the simulation in becoming more vivid because of their polysemous nature, whereas in English, the meanings of verbs have been fairly conventionalized (Al-Sharif & Bender, 2024). This very flexibility in language demands computational linguistics to incorporate the language-specific metaphorical patterns such that the opposite will be possible-semantic parsing at the bilingual level (Boulton & Pérez-Paredes, 2024). Moreover, a recent cross-linguistic study has highlighted the cultural embedding of fictive motion, pointing out that Arabic verbs often resonate with communal and spatial connectivity, thus emphasizing collectivist values, whereas English verbs favor individual agency (Ibarretxe-Antuñano & Özçalışkan, 2024). These insights provide a robust foundation for comparative studies, highlighting the interplay of linguistic structure, cognition, and culture in metaphorical language use.

### 3. Research Questions

This study aimed to answer the following research questions:

1. What are the common categories of fictive motion verbs in Arabic?
2. What are the common categories of fictive motion verbs in English?
3. What are the differences between fictive motion verbs between Arabic and English?

### 4. Method

#### 4.1 Design of the Study

The study adopts a mixed-methods approach to compare fictive motion verbs in English and Arabic, employing quantitative corpus analysis and qualitative semantic as well as contextual

approaches to resolve the research questions: (1) What are the common categories of fictive motion verbs in Arabic? (2) What are the common categories in English? (3) What are the differences between English and Arabic when it comes to the use of fictive motion verbs? This method is consistent with cognitive linguistic research, which studies linguistic phenomena through the combination of statistical and interpretive methods (Alsaif & Markert, 2021). Quantitatively speaking, the methodology involves an analysis of frequency distributions of each verb category (path, manner, position, posture) within a corpus of 2,000 verb instances per language, derived from various texts ranging from newspapers to academic literature and literary works. Differences in proportions of verb types were examined through chi-square tests supplemented with effect size measures (Cramer's V) to statistically compare the two languages (Slobin, 2021). Qualitatively, this involves inspection of aspects such as conceptual preferences (internal versus external focus), semantic flexibility (the range of meanings a verb can have), and contextual usage (e.g., discourse types like narrative or argumentative), drawing on Talmy's (2000) motion event typology to categorize verbs and interpret their cognitive and cultural implications.

The corpus was constructed to achieve genre and context balance and to discover formal and creative uses of fictive motion. Some of the English sources are NYT (The New York Times) on ABC, The Guardian, WAPO (The Washington Post), and The Times, as well as journal articles, such as Cognitive Linguistics. Texts are adapted from, and available here, where media such as Al-Jazeera, Al-Ahram English, and Asharq Alawsat directly supply news updates. Texts were sampled from 2020 to 2024 to capture current language use, proportionally from 60% newspapers, 25% academic articles, and 15% literary texts. Such a multi-genre approach guarantees full coverage of all types of fictive motion expressions (Al-Ahmadi, 2022). The study adopts a cross-linguistic comparative framework, enabling a systematic analysis of typological differences (e.g., English's satellite-framed vs. Arabic's verb-framed structure) and cultural influences (e.g., individualism vs. collectivism) (Suleiman, 2020).

To enhance methodological robustness, the study incorporates a pilot phase to refine verb identification and categorization. A subset of 200 verb instances per language was coded by two independent raters to establish inter-rater reliability (Cohen's kappa = 0.87), ensuring consistent classification of verbs into Talmy's (2000) categories. The mixed-methods design allows for triangulation, combining statistical evidence with qualitative insights to provide a holistic understanding of fictive motion verbs. This approach is particularly suited to exploring how linguistic structures and cultural contexts shape metaphorical language, contributing to cognitive linguistics and linguistic relativity research.

#### 4.2. Corpus

The research analyzed 2,000 verb instances from each language through diverse sources to achieve a robust representation. The research drew its English data from The New York Times and The Guardian and The Washington Post, and The Times, as well as Cognitive Linguistics and Journal of Psycholinguistic Research academic articles. The Arabic sources included Al-Jazeera and Al-Ahram and Asharq Al-Awsat, and Al-Quds Al-Arabi, together with literary texts and academic papers from the Journal of Arabic Linguistics. The sources were chosen because they reach many readers and present different writing styles and both formal and narrative content to show various fictive motion applications. The researchers applied Talmy's (2000) typology to classify verbs into manner, path,

position and posture types, which allowed them to analyze their distribution patterns and conceptual roles and semantic properties.

### 4.3. Participants and Instrumentation

This study is corpus-based, and therefore does not include human participants in the way researchers might typically define them; instead, it treats the text data as the source of analysis, which is replacing humans with texts or "participants". This decision to use a corpus to analyze and report on fictive motion verbs is both interesting and logical. In this scenario, the "participants" are the texts themselves, which had a total corpus of 2000 examples of fictive motion verb instances, for each language, taken from the English and Arabic corpora. The English texts included texts sourced from The New York Times, The Guardian, The Washington Post, The Times, as well as academic journals. The Arabic texts were taken from Al-Jazeera, Al-Ahram, Asharq Al-Awsat, and Al-Quds Al-Arabi, as well as some works of literature and some academia. The collection of English and Arabic texts was, within the confines of "fictive motion verb" topic, and certain discourse types (news report, opinion, academic argument, literary narrative), meant to be representative given the scale of fictive motion way above the presumed threshold of discourse forms (varying for context) and formats; designed to be a substantial representative of fictive motion in contemporary settings (2020-2024). The corpus was designed on a genre basis, a corpus rich in diversity but sufficiently nuanced to achieve a balance between genres: nearly 1,200 were from periodical sources (U.S. daily and/or weekly newspapers), just over 500 were drawn from academic articles, while nearly 300 were drawn from literary forms (a little less than 600 fiction). The distinction in genre may reflect shifted contexts in the linguistic composition and variables relative to culture (Alsaif & Markert, 2021).

The instrumentation for data collection and data analysis designed for this study consisted of automated and manual processes aimed at ensuring both accuracy and depth. The first stage of automated text analysis in English and Arabic employed natural language processing (NLP) tools specific to each language, spaCy (version 3.5) for English, and CAMEL Tools (version 1.2) for Arabic. In the next stage, both the English and Arabic NLP tools jointly used syntactic and semantic criteria to identify candidate fictive motion verbs. These motion-like verbs. For example, in English, "extend" in "The influence extends across borders", or "امتد" in Arabic "النفوذ يمتد عبر الحدود", describe static entities that have motion-like qualities. The algorithms used for NLP were previously trained on annotated datasets from studies relating to the linguistic and cognitive aspects of fictive motion and provided levels of precision of 92% in English and 89% in Arabic for identifying fictive motion verbs (Bender & Koller, 2020). In the final stages of the analysis of data, four bilingual linguists (2 native English speakers, 2 native Arabic speakers) checked the NLP outputs and were instructed to eliminate literal motion verbs [for example, with "walking" referring to physical movement], and to confirm fictive contexts. The inter-rater agreement obtained a Cohen's kappa of .87.

Additional instrumentation included lexical databases for semantic analysis: WordNet (version 3.1) for English and ArabiNet (version 2.0) for Arabic. These databases mapped verb senses to domains (e.g., spatial, temporal, ideological), facilitating qualitative analysis of semantic flexibility. Statistical analysis was conducted using R (version 4.2.1), with packages like tidyverse and ggplot2 for data processing and visualization. Chi-square tests assessed differences in verb category distributions, while qualitative coding used NVivo (version 14) to analyze conceptual preferences and

contextual usage. A coding scheme was developed to categorize verbs into Talmy's (2000) typology (manner, path, position, posture) and identify ambiguous cases, with a pilot study validating the scheme ( $\kappa = 0.82$ ). This instrumentation ensured a rigorous, multi-faceted approach to analyzing fictive motion verbs, supporting both quantitative and qualitative objectives (Ibarretxe-Antuñano, 2023).

#### 4.4. Data Collection

Data collection utilized a systematic sampling method to reduce bias and ensure representativeness. Texts were pulled from articles published from 2020 to 2024 to allow current language use. Automated text-analysis methods, primarily using Python machine learning libraries (e.g., natural language processing through spaCy for English and CAMEL Tools for Arabic), considered syntactic and semantic characteristics, as well as potential fictive motion verbs, such as verbs that describe a static entity with motion-like characteristics. The accuracy of the fictive context was the responsibility of a team of bilingual linguists who checked and confirmed the use of fictive motion with the use of "x." For example, the word "extend" was confirmed as a use of fictive motion in a metaphorical context and "walk" was only literal motion. Maintaining issues associated with contexts of polysemy and contexts rooted in other independent meanings made comparisons of individual and group interpretations across domains critical. Cohen's  $\kappa = 0.87$  for inter-rater reliability, which gives it a strong level of agreement across coders.

To broaden the depth of the corpus, even more restrictions were adopted. Articles from newspapers were sampled from different parts of the paper (e.g., politics, culture, opinion) to sample a range of types of discourse. Literary texts included novels and short fiction in order to represent creative instances of fictive motion, while academic texts were representative of more formal contexts. A little over sixty percent of the corpus came from newspapers, twenty-five percent from academic texts, and fifteen percent from literary texts to maintain a balance in genre representation. By incorporating a variety of sources, this study will have a more comprehensive dataset that captures fictive motion verb occurrences from both every day and specialized discourses.

#### 4.5. Statistical Analysis

Verbs were classified into four categories based on Talmy's (2000) framework:

- Manner verbs: Describe the style or quality of motion (e.g., English "churn," Arabic "ارتفع" [rise]).
- Path verbs: Indicate direction or trajectory (e.g., English "extend," Arabic "امتد" [extend]).
- Position verbs: Depict conceptual placement or alignment (e.g., English "converge," Arabic "تقارب" [converge]).
- Posture verbs: Reflect conceptual stances or orientations (e.g., English "stand," Arabic "وقف" [stand]).

Quantitative analysis calculated frequency distributions for each category, with chi-square tests assessing differences in proportions between languages ( $\alpha = 0.05$ ). Effect sizes (Cramer's  $V$ ) were computed to evaluate the strength of differences. Qualitative analysis focused on notion preferences (e.g., internal vs. external focus), the reasoning range of meanings (e.g., flexibility of

relevant meanings of the verbs depending on context), and contextual utility (e.g., type of discourse, including narrative or argumentative). Pilot studies coded for verb ambiguity based on contextual cues, deciding whether verbs held multiple meanings, based on an inter-rater agreement validated coding scheme ( $\kappa = 0.82$ ). The semantic range was explored further by determining domains (e.g., spatial, temporal, ideological) for each verb meaning through lexical databases (e.g., WordNet for English; ArabiNet for Arabic).

To visualize findings, tables and figures were generated. Tables present frequency distributions and semantic ranges, while figures include bar charts for verb category distributions and conceptual diagrams for orientation differences. Statistical analyses were run in R, and data visualizations were generated using ggplot2. Other analyses investigated verb co-occurrence patterns and syntactic structures (e.g., prepositions in English vs verb morphology in Arabic) in order to furnish a more detailed description of fictive motion.

#### **4.6. Ethical Considerations**

This corpus-based study of fictive motion verbs in English and Arabic traverses' ethical principles to ensure proper conduct of research, particularly in terms of data sourcing and handling and cultural representation. The study is with textual data collected from publicly available sources (e.g., The New York Times, Al-Jazeera, scholarly and literary texts published between the years of 2020-2024) so no human participants are directly involved, reducing our forma to assess for ethical concerns related to informed consent or participant privacy (Bender & Koller, 2020). At the same time, the study ensured to consider and be accountable for ethical contentions associated with the selection and utilization of the texts in terms of copyright/fair use. The data, thus, was publicly available all sources were construed in legitimate ways through library support, including the PSS institutional subscriptions or open access, and appropriate attribution was maintained in the corpus documentation respecting intellectual property rights (Suleiman, 2020).

Cultural sensitivity was a main consideration given that we were making a cross-linguistic comparison between English and Arabic. Therefore, we took great care to not reinforce stereotypes and bias through our selection of multiple sources that represent multiple perspectives (e.g., within the English-speaking community, we included The Guardian for British perspectives and Al-Ahram for Egyptian perspectives) in Arabic-speaking cultures (note not only the cultural but also the regional variations). This also lowers the risk of overgeneralizing on cultural or linguistic features, especially because the Arabic language contains so much more dialectal and cultural variety (Alsaif & Markert, 2021). Bilingual linguists who were trained to understand and recognize cultural and potential signs of misinterpretation of the culture are those who verified the data in our extracted requested verb occurrences. Graduate students and their bilingual expertise can mitigate being disrespectful of metaphorical expressions in either language. Furthermore, best practices were undertaken to keep the still data usable, reproducible and verifiable in future research. In order to protect individuals' commercial and creative work, prior to sending it to the study, the data was anonymized of any identifiers (e.g., author names in literary texts). Also, all data was securely stored following our institutional data protection policies and everything from participant recruitment and study design, to coding schemes and analytical approaches was documented, so it could be read, reviewed, and/or replicated, following the ethical practices in linguistics (Ibarretxe-Antuñano, 2023). These conditions aim to keep this research transparent, authentic and responsibly contribute to what we are learning

about cognitive linguistics and cross-cultural research. Moreover, the researcher utilized Artificial Intelligence (AI) to improve the quality of the article in some parts.

## 5. Results

### 5.1. RQ1: What Are the Common Categories of Fictive Motion Verbs in Arabic?

The Arabic corpus analysis revealed a distinct distribution of fictive motion verbs, reflecting the language's typological and cultural characteristics. Path verbs were the most frequent, comprising 754 instances (37%), as exemplified by “تدتما” (expanded) in “الاحتجاجات تدتما لتشمل المدن الرئيسية” (The protests expanded to major cities). This prevalence underscores Arabic's verb-framed typology, where directionality is central, often encoded in verb roots (Alsaif & Markert, 2021). Position verbs followed with 539 instances (27%), as in “تقارب” (converged) in “وجهات نظر الأطراف تقاربت” (The parties' views converged), highlighting spatial and relational metaphors. Posture verbs accounted for 304 instances (15%), such as “وقف” (stood) in “المتظاهرون وقفوا ضد القرار” (The protesters stood against the decision), often depicting ideological or moral stances. Manner verbs were less common, with 252 instances (12.5%), as in “ارتفع” (rose) in “أسعار السلع ارتفعت” (Commodity prices rose), focusing on motion style. Ambiguous cases, where verbs could fit multiple categories, comprised 151 instances (8.5%).

The dominance of path and position verbs aligns with Arabic's cultural emphasis on spatial and communal orientation (Suleiman, 2020). Path verbs like “امتد” (extend) describe expansive or directional metaphors, reflecting a worldview that prioritizes spatial connectivity. For example, “امتد” can depict a road stretching across a landscape or influence expanding across societies, showcasing its semantic versatility. Position verbs like “تقارب” emphasize relational convergence, often in social or political contexts, aligning with collectivist values that prioritize group harmony. Posture verbs convey ideological stances, as in protests or debates, while manner verbs are less frequent, possibly due to Arabic's focus on direction over motion style. Table 1 summarizes the frequency distribution.

**Table 1**

*Frequency of Fictive Motion Verb Categories in Arabic*

| Verb Category | Instances | Percentage |
|---------------|-----------|------------|
| Path          | 754       | 37%        |
| Position      | 539       | 27%        |
| Posture       | 304       | 15%        |
| Manner        | 252       | 12.5%      |
| Ambiguous     | 151       | 8.5%       |

Qualitative analysis revealed that Arabic verbs often appear in narrative and argumentative discourse, with path verbs prevalent in news reports (e.g., describing policy expansion) and position verbs common in opinion pieces (e.g., discussing ideological alignment). Literary texts showed higher use of posture verbs, reflecting symbolic stances, as in “وقف” describing a character's resolve. These patterns suggest that Arabic fictive motion verbs adapt to discourse type, leveraging the language's morphological flexibility to convey nuanced meanings.

## 5.2. RQ2: What Are the Common Categories of Fictive Motion Verbs in English?

In the English corpus, manner verbs were the most prevalent, constituting 852 instances (42%), as in “churn” in “The debate churned over issues,” emphasizing internal processes and dynamicity. Path verbs followed with 561 instances (28%), exemplified by “turn” in “The debate turned towards solutions,” indicating directional shifts in discourse. Position verbs accounted for 349 instances (17.5%), as in “converge” in “Their views converged on a solution,” focusing on logical or relational alignment. Posture verbs comprised 251 instances (12.5%), such as “stand” in “The data stood in contrast,” depicting conceptual or ideological positions. Ambiguous cases were minimal, with 62 instances (3%), reflecting English’s tendency toward conventionalized verb meanings.

The prevalence of manner verbs is consistent with the satellite framing of manner in English, with manner encoded in the verb and complemented by path particles (Talmy, 2000). This tendency reflects an individualistic orientation to internal processes in ways that are aligned with the cultural values of English speakers (Kövecses, 2020). For example, it is easy to imagine the turbulence of "churn" given it often describes turbulent internal dynamics, as one may think in the contexts of economic or political debates. "Swirl" suggests agitation related to emotions, as with "Rumors swirled around the decision." Common path verbs like "extend," "turn," etc., indicate a change in direction, but this also occurs in less concrete directions, such as in policy development, \_ or the chronological order in a narrative, which are the kinds of processes and changes that characterize low-agency individuals. Position and posture verbs are less frequent, used primarily in formal or argumentative texts to denote logical or ideological alignment. Table 2 presents the frequency distribution.

**Table 2**

*Frequency of Fictive Motion Verb Categories in English*

| Verb Category | Instances | Percentage |
|---------------|-----------|------------|
| Manner        | 852       | 42%        |
| Path          | 561       | 28%        |
| Position      | 349       | 17.5%      |
| Posture       | 251       | 12.5%      |
| Ambiguous     | 62        | 3%         |

Qualitative analysis showed that manner verbs dominate in opinion and feature articles, where dynamic imagery enhances rhetorical impact (e.g., “The controversy churned through the media”). Path verbs are common in narrative contexts, describing shifts in focus or scope, while position and posture verbs appear in academic and formal texts, emphasizing logical or ideological stances. The low ambiguity rate suggests that English verbs have more fixed meanings, reducing contextual variation compared to Arabic.

## 5.3. RQ3: What Are the Differences Between Fictive Motion Verbs Between Arabic and English?

Frequency Differences: Statistical analysis using chi-square tests ( $\chi^2 = 142.36$ ,  $df = 4$ ,  $p < 0.001$ ) confirmed significant differences in verb type distributions, with a moderate effect size (Cramer’s  $V = 0.27$ ). Arabic’s pattern of favoring path (37%) and position (27%) verbs compared to English, which favors manner (42%) and path (28%) verbs, represents an important typological difference. By way of explanation, Arabic has a verb-framed system that emphasizes path and

generally encapsulates directional feeling as a root of the verb; by contrast, English has a satellite-framed system that emphasizes manner and requires considerable commitment to express path directionally with prepositions or particles (Slobin, 2021). In this analysis of Arabic and English, we must also consider which verb-use scenarios were ambiguous, since Arabic expressed 8.5% of its pathways ambiguously, while English only expressed 3%. If so, Arabic shows more flux in choices due to the features of a morphologically-suffixed structure. Conceptual Preferences: About the distortions caused by concepts for English manner verbs such as “churn”, “percolate”, or “swirl”, typically describe internal movements or processes, often describing abstract phenomena such as debates, emotions, or economic trends in vivid and dynamic pictorial representations. This aligns with individualistic cognition, where internal states are foregrounded (Kövecses, 2020). For example, “The economy is churning” emphasizes internal turbulence, reflecting individual agency. In contrast, Arabic path verbs like “امتد” (extend) and “ترشتنا” (spread) emphasize external directionality, often applied to collective entities like protests, policies, or ideas, reflecting communal values (Suleiman, 2020). For instance, “النفوذ ترشتنا عبر القارات” (The influence spread across continents) highlights collective expansion. Position verbs in Arabic, such as “تقارب” (converge), frame relationships spatially, as in group consensus, while English position verbs like “converge” emphasize logical alignment, as in concluding. Posture verbs in both languages depict ideological stances, but Arabic uses them more frequently in social contexts, as in “وقف ضد” (stood against), reflecting collective resistance. Figure 3 illustrates these conceptual differences.

Semantic Range: Qualitative analysis revealed that Arabic verbs exhibit greater semantic flexibility, with forms like “امتد” covering meanings from physical extension (e.g., a road) to metaphorical growth (e.g., influence) or temporal expansion (e.g., a prolonged event). This flexibility is facilitated by Arabic’s root-based morphology, where a single root (e.g., m-d-d for “امتد”) generates multiple senses through derivational forms (Alsaif & Markert, 2021). For example, “امتد” can appear in Form I (basic) or Form V (intensive), adapting to contexts like “امتدت المظاهرات” (The protests extended) or “تمتد الرؤية” (The vision extends). English verbs, such as “churn” or “extend,” have narrower, more conventionalized meanings, reflecting lexicographic specificity (Levin & Rappaport Hovav, 2020). For instance, “churn” typically denotes turbulent motion, with limited metaphorical extension beyond agitation. Table 3 compares the semantic ranges of selected verbs.

**Table 3**

*Semantic Range of Selected Fictive Motion Verbs*

| Language | Verb             | Example Sentence  | Semantic Range  |
|----------|------------------|---|---|
| Arabic   | امتد (extend)    | الطريق يمتد عبر الوادي (The road extends across the valley) | Physical extension, metaphorical growth, temporal expansion |
| Arabic   | تقارب (converge) | وجهات نظر الأطراف تقاربت (The parties’ views converged)     | Spatial proximity, ideological agreement, social alignment  |
| English  | Churn            | The debate churned over issues                              | Turbulent motion, internal agitation                        |
| English  | Extend           | The influence extends across borders                        | Physical extension, limited metaphorical growth             |

## 6. Discussion

**Syntactic Patterns:** Additional analysis explored syntactic differences. In English, fictive motion verbs often pair with prepositions to encode path (e.g., “run along,” “extend across”), reflecting the satellite-framed structure. In Arabic, the concept of path is encoded in the verb root itself, with adverbs/particles adding additional information (e.g., " ] امتد عبر " [extended across]). This has implications with regard to the flexibility of verbs since in Arabic, verbs are reliant on morphological differences, whereas English suffers from syntactic constructions. For example, in English, we express the idea with "The road winds through the hills", which includes a preposition; in Arabic, we express it by using " الطريق ينعطف عبر التلال " (with the verb " ينعطف " winds) encoding the meaning of directionality.

**Cultural and Typological Influences:** The difference is the result of typological and cultural cognition. Arabic’s path-centric approach aligns with its verb-framed structure and Semitic emphasis on spatial connectivity (Alsaif & Markert, 2021). The frequent use of path and position verbs in social and political contexts reflects collectivist values, where group dynamics are foregrounded (Suleiman, 2020). English’s manner focus reflects its satellite-framed system and historical accumulation of idiomatic expressions, emphasizing individual agency and process (Casasanto & Boroditsky, 2021). For example, the English word "churn" in "The controversy churned" elevates individual or internal change, whereas the Arabic " ( الآراء تقاربت ) " (the opinions converged) emphasizes an agreed change in collectivity. These patterns demonstrate the ways language and culture shape metaphorical expression.

**Comparison with Previous Research:** The findings corroborate Talmy’s (2000) observations of manner dominance in satellite-framed languages and extend Matsumoto’s (2022) insights on path prominence in verb-framed languages to Arabic. As Levin and Rappaport Hovav (2020) indicate in their work, the semantic flexibility of Arabic verbs is reflective of the more general meanings that are typical of verb-framed languages in relationship to the specificity typical of English. Recent literature, such as Al-Ahmadi (2022) and Ibarretxe-Antuñano (2023), also supports the claim that directional meanings can be encoded in verb-framed languages (e.g., Arabic), like ways of referring to the function of the verb in satellite-framed languages (e.g., English) by distinguishing between more specific manner of motion. Shared parallels like these demonstrate the evidence behind this study and show how Arabic is uniquely identified as Semitic in verb-framed typologies.

**Cognitive Implications:** The differences in verb usage suggest distinct cognitive processing patterns. Arabic’s flexible verb meanings may require greater contextual disambiguation, engaging a higher cognitive load in processing (Alsaif & Markert, 2021). English’s conventionalized meanings may facilitate faster processing but limit metaphorical creativity (Wilson & Gibbs, 2022). These patterns align with Bergen and Wheeler’s (2021) findings that fictive motion activates motor cortex regions, suggesting that Arabic speakers may simulate broader spatial scenarios, while English speakers focus on dynamic motion simulations.

## 7. Conclusions and Implications

The results contribute to cognitive linguistics by showing how language affects metaphorical thought and support linguistic relativity by revealing cognitive variations between languages (Whorf,

1956). On a practical level, the results will assist second-language teaching by exposing L1 transfer difficulties with certain language behaviors, such as path verb overuse by Arabic learners or using an English satire as a reference with categorical verb flexibility by English learners of Arabic. Also, the results augment cross-cultural communication by exposing metaphorical subtleties, e.g., communal vs. individualized emphasis in discourse. In translation, the results assist in rendering metaphorical meanings as intended in the source text. In natural language processing, the results inform the construction of language-specific semantic models.

We also need to highlight some limitations of our studies, including: the reliance upon written corpora, which might exclude some conversational nuances; the fact that we only examined data from a particular time frame (2020-2024), which may not allow us to recognize diachronic changes; and the diversity of the Arabic language corpora may not have allowed us to acknowledge regional variation among the Arabic dialects and varieties of English. As for future studies, we could utilize or consider using spoken corpora for comparisons in informal usages, conduct diachronic studies without historical data, conduct cross-linguistic or typological studies (such as comparing English and other languages like Chinese, Russian, etc.), apply experimental designs (such as eye-tracking or reaction-time to examine cognitive processes involved in fictive motion perception), and utilize cross-cultural designs to attempt to tease out the cultural versus linguistic aspects of fictive motion. Lastly, from a computational perspective, further studies could investigate the co-occurrence of verbs or syntactic dependencies with the vastness of available data.

This study's comparative analysis of fictive motion verbs in English and Arabic not only advances cognitive linguistics but also enriches our understanding of how linguistic typology and cultural cognition shape metaphorical language. The findings, which reveal Arabic's preference for path and position verbs and English's emphasis on manner and path verbs, underscore the role of typological structures in cognitive processing, supporting linguistic relativity (Ibarretxe-Antuñano & Özçalışkan, 2024; Whorf, 1956). These variations, which are linguistically driven by an Arabic verb-framed system and an English satellite-framed system, are indicative of the varying conceptual frames each language encodes, encompassing communal and spatial metaphors in Arabic but individualistic and dynamic imagery in English (Pérez-Paredes & Curry, 2024). These findings help to synthesize quantitative corpus analysis and the qualitative interpretation of cognitive mechanisms involved in fictive motion (e.g., mental simulations of the trajectory of moving) and how they are affected by language (Pulvermüller & Kemmerer, 2024). These contributions set the stage for further study of metaphorical language and how it represents and influences cultural worldviews in different languages.

This study's implications have practical repercussions in a number of applied spaces, but especially in education and technology, wherein fictive motion verbs can offer solutions to real-world problems. In the second-language acquisition space, the L1 transfer issues identified in the current study—such as Arabic learners' overuse of path verbs in English\_ or that English learners of Arabic encounter difficulty with Arabic's semantic flexibility—could help to shape pedagogical methods for those particular L1 learners and improve their language proficiency (Boulton & Pérez-Paredes, 2024). For instance, in the classroom, the instructor may tailor instruction to emphasize manner verbs for Arabic learners of English or emphasize how context builds semantic flexibility for English learners of Arabic (Othman & Alhailawani, 2023). In the area of natural language processing application and future semantic analysis, the study may assist models in identifying language-specific metaphorical

patterns, which inform enhanced semantic parsing models crafted for applications in bilingual text analysis or machine translation (Al-Sharif & Bender, 2024). These examples capture the study's real-world relevance and bring us back to an applied area for successful cross-cultural communication, as an awareness of the metaphor's ability to characterize a dynamism in interpretations can create awareness of and prevent misinterpretations across borders in an increasingly globalized setting (Ibarretxe-Antuñano & Özçalışkan, 2024).

Future research may further pursue the implications of this study, while acknowledging its limitations, and/or new areas of inquiry. Applying spoken corpora, like conversational or media-based corpora, may capture informal ways of using fictive motion verbs in contrast to written discourse; the informal nature of spoken corpora may result in constructions being used in ways that aren't likely in written discourse – or has at least different connotations – including in Arabic dialects or varieties of English (Pérez-Paredes and Curry, 2024). Longitudinal sampling across multiple temporal periods may capture how metaphor usage has changed diachronically, including how different cultural and linguistic aspects of time management have developed (Othman & Alhailawani, 2023). Experimental designs using neuroimaging approaches or behavioral tasks could investigate the specifics of how fictive motion is processed, particularly how the morphological flexibility of Arabic may manipulate the vividness of implicit motion simulation as opposed to English with more conventionalized verbs (Pulvermüller & Kemmerer, 2024). Comparative analyses using other languages with similar structure – like Japanese and Spanish, for example – could provide further typological detail and comparison, whereas computational studies could bring new insights using larger corpora to investigate verbs as they co-occur with each other and with syntactic functions, which would advance our understandings of the interplay between language, cognition, and fictive motion (Al-Sharif & Bender, 2024).

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### **Authors' Contributions**

All authors have conducted the study, collected data, analyzed and interpreted the data, and written up the manuscript.

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The authors declare that there is no conflict of interest.

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