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CAUSALITY INFLUENCES SPEECH ABOUT MANNER OF MOTION IN ITALIAN

FEDERICA CAVICCHIO
UNIVERSITÀ DEL SALENTO

Abstract – Different languages express manner and path of motion in distinct ways. Some languages, such as English, express manner and path of motion in a single clause. They are called Satellite-framed languages. Other languages, called Verb-framed languages (e.g., Italian), usually convey manner and path of motion into two separate clauses. Previous studies on English showed that when the manner of motion caused the path movement (manner-causal), speakers used the Satellite-framed construction typical of their language. However, English speakers used more Verb-framed clauses when the manner of motion did not cause the path of motion (manner-incidental). This study tests if Italian speakers would use more Satellite-framed verbs with manner-causal or manner-incidental events. Our results showed that Italian speakers were more likely to produce Satellite-framed verbs with manner-causal than manner-incidental motion events, providing evidence against the language relativity hypothesis.

Keywords: Manner and Path of Motion; Motion Causality; Linguistic Relativity; Cognition.

1. Introduction

Linguistic relativity is commonly linked with the idea that the spoken language affects how a speaker thinks. The term linguistic relativity was coined by John B. Carroll, editor of Whorf's seminal collection of essays Language, Thought and Reality (1956). According to Whorf, different language grammars point the speakers to different observations and evaluations of similar events. Consequently, speakers of different languages will have different ways of conceiving reality. However, Whorf's claims about the impact of language on thought have never been easy to interpret. As a result, various versions of his theory have flourished, some with more robust conclusions than others. The strongest formulation of Whorf's theory considers language as the only force shaping and determining thought. This vision leads to the extreme conclusion that no thought is possible without language. While this powerful conclusion is difficult to prove empirically, linguists and psychologists have tested some lighter versions of Whorf's theory. These studies investigate two main versions of Whorf's theory. The weaker of the two versions admits that language must impact thinking during but not beyond speech and is attributable to the "thinking for speaking" hypothesis (Slobin, 1987; 1996). The second version postulates the influence of language on thought even beyond speech and admits that language can influence *habitual thought*. Whorf defined habitual thinking as the mechanism by which linguistically determined concepts are fixed in a language and become widespread ways of speaking and thinking of a language community. Whorf argued that concept patterns are largely unconsciously and build on the speakers' linguistic habits over time.

Among the many domains tested for linguistic relativity, one of the most prolific is space and movement. Experiments on spatial movement have focused on how speakers of a specific language reason, organise, perceive, and conceptualise spatial actions and

movements. Experiments on how speakers express the spatial references showed cognitive differences in coding spatial relationships between entities in space. For example, Levinson (2003) showed that languages such as Arrernte, Guugu Yimithirr and Tzeltal use general spatial terms such as east/west/north/south when European languages use viewer-perspective terms such as right/left/ front/back.

Many experiments have tested the manner and path of motion and the conceptualisation of spatial actions and movements. Talmy (2000; see also Fortis and Fagard 2010 and Stosic 2020, for the most recent interpretations of the concept of manner of motion in Talmy's work) observed that some languages conflate the manner (i.e., how someone or something moves) and the path (i.e., the direction in which someone or something moves) of motion in a single syntactic component, or a closed class, as discussed by Pinker (1989). Other languages instead separate manner and path in two clauses. Consequently, languages have been classified by whether the framing is expressed by the main verb or a satellite (Talmy 2000, p. 221): "Satellite-framed languages" (S-languages) and "Verb-framed languages" (V-languages). S-languages, such as English, express the manner of motion in the verb and the motion path in a particle within a single verbal clause (e.g., "It rolls down the hill"). In contrast, speakers of V-languages, such as Italian, show a separated pattern, expressing path in one clause and manner in another, usually a subordinate clause ("*Scende dalla collina rotolando*" – [it descends the hill rolling]). Additionally, Slobin (2003, 2004, 2006) observed that, compared to V-language speakers, S-language speakers are generally facilitated in expressing the manner of motion of an event. S-language speakers have a more comprehensive array of manner verbs and a higher rate of manner verb use than V-language speakers. These observations led to labelling S-languages as high-manner-salient languages and V-languages as low-manner-salient languages.

The *Habitual Thought Hypothesis* explains the tendency of S-languages to prefer manner verbs as follow. As theorised by Whorf, the presence of language-specific schemes, which have habitually shaped conceptual patterns of thought in a specific group of speakers, can influence the typological features of that language. On the one hand, the formation of habitual thoughts can make speech production more efficient after a speaker learns what to encode when preparing a verbal message. In terms of speech access, habitual thoughts can help the speaker select the appropriate information while preparing the preverbal message (Levelt 1989). On the other hand, language influences language-specific spatial thinking and spatial memory. Therefore, the idea that habitual schemes for motion events exist is plausible, as demonstrated by Lucy (1992), Pederson *et al.* (1998) and Majid *et al.* (2004).

The theory of linguistic relativity and the Habitual Thought Hypothesis are opposed by many, and especially by the nativists, according to whom languages differ on a superficial level but not on a semantic level, which derives from innate conceptual structures (e.g., Fodor 1975; Chomsky 1980; Jackendoff 1983). In this view, linguistic categories of motion are mappings of pre-existing, biologically programmed space concepts (Li, Gleitman 2002). Building on Pinker's observation that syntactically relevant aspects of verb meaning are like the meanings of closed class items (Pinker 1989), Goldberg (1997) predicted that the syntactically relevant aspects of verb meaning in verbs "X CAUSES Y to MOVE Zpath" are akin to the meanings of closed class items. Goldberg argued that "if a speaker wished to project the clausal pattern exclusively from the verb's lexical semantics, in the sentence "the train screeched into the station" […] we would require a special sense of screech that would mean, "Y MOVES while screeching" (Goldberg 1997, p. 384). Following Goldberg's prediction, a verb causing a location

change such as “to crawl” can appear with prepositions of motion to place as in “to crawl to”, or prepositional constructions such as “to crawl into”. On the other hand, when verbs do not cause a change of place, such as the verb to sing, the prepositional construction is meaningless. Verbs denoting an activity that is not causally related to a change of location, such as “to sing”, can temporally overlap with a change of location, such as in “sang in the room”, but since these verbs do not cause a change of location, an expression such as “sang into the room” is meaningless (Kita *et al.* 2007). A second verb expressing motion is thus necessary, such as in “he sang while entering the room”. When a verb does not cause the path of motion, even a typical S-framed language such as English needs a second verb expressing the movement to place, effectively resembling the pattern of V-framed languages.

Following Goldberg’s predictions, Özyürek *et al.* (2001) and Özyürek *et al.* (2005) designed two groups of stimuli: in one group, the manner of motion was either guiding or facilitating the actor’s movement path, i.e., the manner was causal to the path (see Figure 1 a, the protagonist rolls down a slope, the rolling movement causes the descending movement). In the second group of stimuli, the manner of motion was incidental to the change of location and, consequently, to the path of motion (see Figure 1 b, the protagonist falls from a cliff and rotates as he falls, the rotation does not cause the fall).[1] As predicted by Goldberg, Özyürek and colleagues (2005) found that English speakers produced V-framed expressions when describing manner-incidental stimuli (Figure 1 b) more often than when describing manner-causal events (Figure 1 a). For manner-incidental stimuli, the first clause was about the path movement, and the second clause described the manner, usually in a subordinate (e.g., *it rotated as it fell*, or *it fell rotating*) or a coordinate clause (e.g., *it fell, and it was rotating*).

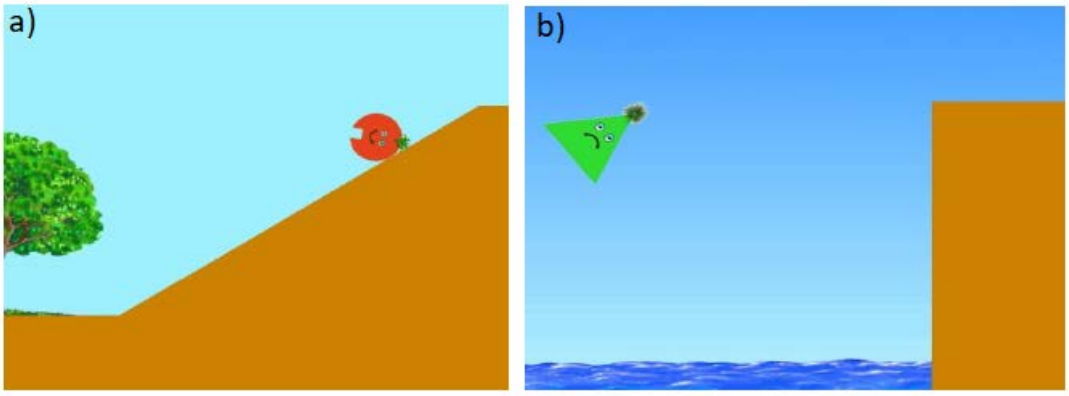

Figure 1
Examples of a) manner-causal stimuli, the rotation causes the downward movement of the character, b) manner-incidental stimuli, the rotation does not cause the downward movement (Özyürek *et al.* 2001).

1.2. The language typology of Italian

Like most Romance languages, Italian is considered a typical V-framed language (Talmy 2000). In the verbs of movement, the direction is typically expressed in the main clause (e.g., *cade, entra, sale,* etc.). In contrast, the manner of the movement is expressed in a

[1] The ten stimuli are publicly available at this public web repository: https://osf.io/9e45b/.

second verb, usually a gerund (e.g., *rotolando, saltando, correndo*, etc.). Nevertheless, as observed by Jansen (2004), Iacobini and Masini (2006), Folli (2008), Spreafico (2008, 2009), Iacobini (2010), Iacobini and Vergaro (2012), Mosca (2012), Iacobini, Corona and Buoniconto (2020), Buoniconto (2020a, 2020b), Benigni and Lo Baido (2020), Italian can use S-framed constructions. In their quantitative study on verbs of motion produced by Italian speakers, Wessel-Tolvig and Paggio (2016) noted that Italians expressed movement using V-framed verbs in only 21% of the cases. Moreover, Wessel-Tolvig and Paggio stated that in 30% of the cases, the speakers used only one verb expressing the path of motion, omitting the manner of motion presented in the stimuli. These findings argued against the classic view of Italian as a V-framed language with a low salient manner of movement (Slobin 2006).

It should be noted that very little research has been conducted on Italian regarding manner salience. Schwarze (1985) noted that Italian locative adverbs could combine with a manner of motion verb. In V-languages, manner verbs are acceptable as the main verb of the clause only when there is no boundary-crossing, that is, when the motion event does not involve entering, exiting, or crossing (Slobin 2004). Differently from many V-languages, in Italian boundary-crossing-events, such as "*Corse fuori di casa*" (S/he ran out of the house) or "*Salta in macchina!*" (Jump into the car!) instead of "*Uscì di casa correndo*" (S/he exited the house running) or "*Entra in macchina con un salto!*" (Enter the car with a jump!) are allowed and widely used (Cardini 2008, p. 535). However, the data collected in two studies by Cardini (2008) suggests that Italian is indeed a low-manner-salient language. In the domain of manner of motion, Italian speakers exhibited neither the vocabulary size nor the linguistic behaviour of the speakers of prototypical S-language such as English. In his first experiment, Cardini noted that the size of the semantic domain of manner-of-motion verbs, measured by the number of manner-of-motion verbs recalled by the speakers, was significantly smaller in Italian than the English. Moreover, Italian speakers retrieved manner-of-motion verbs significantly slower than English speakers. In his second experiment, Cardini noted that the frequency and variety of manner-of-motion verbs in the spontaneous speech were also significantly lower in Italian than in English.

1.3. Aim of the present study

Italian has a variable pattern of expression and syntactic realisation for the manner of motion. In the following, using the manner-causal and manner-incidental stimuli from Özyürek *et al.* (2001), we test whether Italian speakers prefer S-framed or V-framed constructions or omit the manner of the movement altogether, ignoring it. In contrast with the Habitual Thought Hypothesis, we predict that speakers will prefer S-framed verbalisation for manner-causal stimuli since the salience of the manner in these stimuli is more prevalent than the path. On the other hand, we expect speakers to go back to the V-framed pattern in their speech descriptions, verbalising the manner of motion in a secondary clause when the manner is incidental to the path of movement.

2. Method

2.1. Participants

Twenty native Italian speakers (age range: 21-33, 11 females), students at the University of Trento, participated in the experiment. Participants came from different regions of

north, central and south of Italy. They signed a consent form so that we could record them during the task.

2.2. Materials

The participants saw 10 Tomato man video clips (Özyürek *et al.* 2001) depicting motion events with simultaneous manner and path. The stimuli comprise five manners and three paths. The manners are *jump, roll, rotate, spin and tumble*, whereas the path are *ascendent, descendent* and *around*. For the manner of motion, *jump* describes an up and down movement along a flat or inclined surface, *roll*, *rotate* and *tumble* depict the movement of an object on its horizontal axis, and *spin* describes an object turning on its vertical axis. The combination of manner and path resulted in the following 10 stimuli: *jump+ascend, jump+descend, jump+go around, roll+ascend, roll+descend, rotate+ascend, rotate+descend, spin+ascend, spin+descend,* and *tumble+descend*. The five movies depicting the manner *jump* and *roll* were in the manner-causal stimuli set. The remaining five stimuli were in the manner-incidental set, depicting the manner *rotate*, *spin*, and *tumble*.

Before submitting the stimuli to the participants, ten native Italian speakers (different from the main experiment, age range: 19-27, 7 females) viewed the 10 Tomato man video clips. They rated the relationship between manner and path by judging on a 1 to 5 scale (from 1 not at all to 5 very much) the degree to which the manner was incidental to the change of location. After calculating the mean score attributed on the scale to each stimulus, a t-test showed that raters judged manner to be more incidental for the clips in the manner-incidental set (M=4.1, SD=0.5) than in the manner-causal set (M=1.9, SD=0.4), $t(9)=7.33$, $p<0.01$).

2.3. Procedure

The participants saw on a 13-inch PC screen each video. The videos were shown in two separate sessions and counterbalanced order. All interactions were audio and video recorded with a Sanyo Xacti HD2000 camera.

The participants were seated at approximately 40 cm from the computer screen. An assistant pressed the mouse button to start the experiment. The participants were instructed to describe the stimulus in detail to the listener, who could not see the stimuli. After the participants saw the first stimulus, they turned toward the listener, sitting near the camera, and described what they had just seen. To avoid the common ground effect[2] (Holler, Stevens 2007), the listeners changed between the two sessions. The listeners interacted with all the participants either in the first or the second telling.

2.4. Speech coding

An annotator segmented all speech referring to the stimuli motion event into clauses. She then annotated the clauses into three groups, depending on the clause packaging. Clauses had three possible packaging: S-framed clauses, which encoded both manner and path

[2] When people are in a conversation, they may already share knowledge relating to the talk topic with the other speakers, especially if they already know or had a previous conversation with such speaker. As a result, they can adjust and abbreviate their conversation. The term common ground refers to the knowledge that people in an interaction assume they already share.

within one clause (e.g., *rotola giù* – it rolls down); V-framed clauses, consisting of manner and path verbs expressed in two separated clauses (e.g., *sta rotolando* e poi *cade* nell'acqua – it rolls and then it falls into the water); and manner or path Only, in which the speakers described only the Manner or the Path of motion overlooking one of the cartoon's movements components. For example, when the cartoon rolls down into the water, the participant only expressed the path movement (it fell into the water – *è caduto* in acqua) completely overlooking the manner movement (rolls – *rotola*). Other speakers neglected the movement path, expressing the manner of movement only (e.g., it twirled – *ha girato* su sé stesso).

In Table 1, we report some examples of the segmented clauses and their packaging annotation. To establish the reliability of the clause annotation, a second coder annotated 30% of the data. The inter-rater agreement between the two coders reached a kappa score of 0.85 ($p<0.01$), which is considered as a high agreement for this type of task (Cavicchio, Poesio 2009).

Clause packaging	
S-framed	(1) *rotola giù dalla collina* ([it] rolls down the hill - Manner+Path) (2) *Salta sul pendio* ([it] jumps up the hill - Manner+Path)
V-framed	(3) *sta rotolando* ([it] is rolling - Manner) (3.1) *e poi cade nell'acqua* (and then [it]falls into the water - Path) (4) *gira su sé stesso* ([it] twirls - Manner) (4.1) *mentre sale* (as [it] ascends - Path)
Manner or Path Only	(5) *è caduto in acqua* ([it] fell in the water - Path only, the manner of the event is omitted by the speaker) (6) *ha girato su sé stesso* ([it] twirled - Manner only, the speaker omits the path of motion)

Table 1
Examples of clause packaging: S-framed, V-framed, and Manner or Path Only clauses and their syntactic realisation of manner and path of movement.

2.5. Data Analysis

In Figure 2, we report the percentage of general use for each clause packaging type (V-framed, S-framed, manner or path Only) for each stimulus type (manner-causal or manner-incidental).

The 20 participants produced Manner and Path information with either Tight clauses or Separate clauses in 89% of the 10 stimulus events. However, in 11% of the cases, participants produced path or manner Only syntactic constructions. These productions are equally distributed across manner-causal and manner-incidental stimuli (see Figure 2). We concluded that causality, or lack thereof, did not influence path Only and manner Only speech realisations. The production of manner and path Only clauses were likely errors in producing the target clause, possibly due to the participants' momentary lack of attention or failure to memorise the movements' manner or path while they attended the videos.

Considering the data plotting in Figure 2, we excluded the path and manner Only productions. We coded the dependent variable *clause packaging* as binary: 1 for S-framed and 0 for V-framed constructions. Using the statistical package lme4 (Bates *et al.* 2014) in R 3.6, we fitted a general mixed model on the dependent variable *clause packaging* using a maximum model random slopes approach (Barr *et al.* 2013). Stimulus type (manner-causal or manner-incidental) was the main factor. Random intercepts and slopes by subjects (participants) and items (video clips) were also calculated. The results showed

that speakers were significantly more likely to produce S-framed constructions with manner-causal events (Est.=0.8, SE=0.4, p=0.02, sample size n=356). In Figure 3, we report the probability of producing an S-framed verb for the stimulus type (manner-causal and manner-incidental).

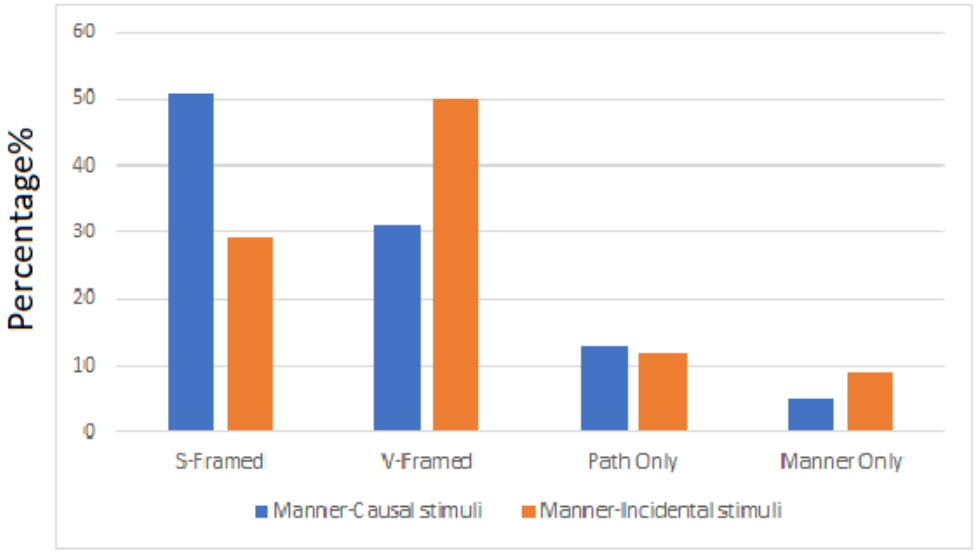

Figure 2
Percentage of S-framed, V-framed and Manner or Path only verbs for each stimulus type (manner-causal and manner-incidental).

3. Discussion

Our data confirmed that Talmy's (2000) typological categorisation tendency still holds. Overall, Italian speakers chose V-framed clauses more frequently (56% of all clauses, N=596). When Italian speakers chose to express the manner of motion in a separate clause, in nearly 71% of the cases, they did so through a gerundive. However, our result also shows that Italian speakers used significantly more S-framed constructions when the manner of motion causes the path of motion. The experimental work we carried out with the manner-incidental and the manner-causal stimuli points to a significantly higher salience of the manner of motion domain when the manner causes the movement path. This result contrasts with the findings of previous studies investigating the use of manner-salient verbs by Italian speakers (Cardini 2008). We argue that the stimulus type can manipulate the degree of manner-salience, regardless of the language typology.

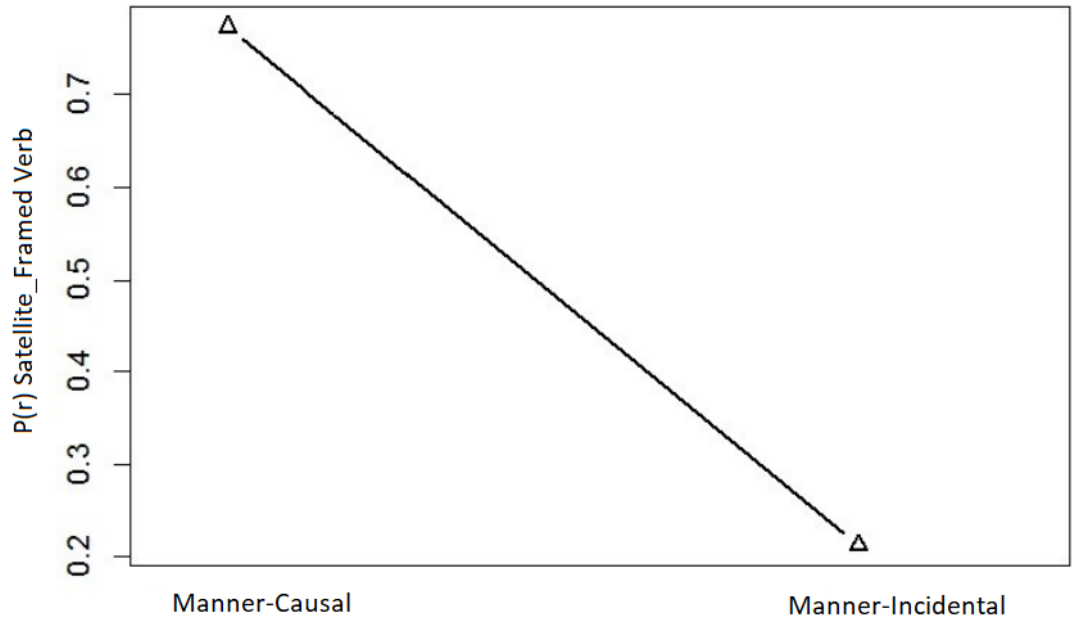

Figure 3
Probability of producing an S-framed verb for stimulus type
(manner-causal or manner-incidental).

Overall, the data demonstrated the flexibility with which Talmy's typological categorisation of S- and V-languages should be taken. As in Kita *et al.* (2007) study, S-framed or V-framed clauses varied according to the stimulus type. The data analysis showed that the probability of producing a one clause description was significantly higher for manner-causal than for manner-incidental stimuli. Therefore, we conclude that, when the manner causes the path of the movement, even a low-salient-manner language such as Italian tend to use S-framed constructions. As predicted, our findings are in contrast with the Habitual Thought Hypothesis. Even though Slobin expressed the idea that languages could be placed along a "cline of manner salience continuum" (2004, p. 26) rather than be forced either into the S- or V-framed group of languages, our results, combined with the previous findings on English by Kita *et al.* (2007), suggest that the conceptual and syntactic representations of motion are generated interactively, and do not follow the habitual tendencies or the typology of a language.

Why do speakers use S-framed constructions so much more when talking about manner causal events of motion? A possible explanation lies in the complexity of such motion events. When the manner of motion causes the path of motion, the event description involves explaining to the interlocutor how a force is applied to the character to initiate the movement (Talmy 1988; Lewandowsky, Özçalışkan 2018). The strength of movement causality between manner and path maps the salient information delivered by the visual stimuli into the linguistic and the discourse mental representations (Burmester *et al.* 2018). As a result, the higher visual salience for the manner of movement of the manner-causal stimuli turns into a higher linguistic salience for the manner of movement in speech (Cavicchio *et al.* 2014).

4. Conclusion

The current study tested the Whorfian linguistic relativity hypothesis by testing Italian speakers on their use of manner and path of motion. Italian is considered a V-framed language. However, for manner-causal stimuli, Italian speakers primarily provide information about the manner of motion through the main clause, followed by a preposition, in an S-framed fashion. On the other hand, for manner-incidental stimuli, the speakers consistently chose V-framed construction, with a path verb in the main clause and a manner verb in the dependent or coordinate clause. Thus, although Italian speakers slightly prefer V-framed verbs, they consistently chose S-framed constructions when the manner causes the path of movement.

As for the significance of our findings for the language and thought debate, we found that the syntactic packaging of manner and path expressions was not pre-determined by a habitual conceptual scheme congruent with the language typology of Italian. Our results are akin to Kita *et al.*'s (2007) on a typologically S-framed language, English. These findings suggest that, in the manner of motion domain, it is the cause-effect relationship that drives the cognitive mechanisms involved in language conceptualisation rather than the typological features of that language.

The sample size and procedure of the current study is comparable to Kita *et al.*'s (2007). However, to generalise the results of this study, future research should collect data on larger samples of participants with a wider diastratic and diatopic differentiation.

Bionote: Federica Cavicchio is a researcher at the Department of Human Studies, Università del Salento. She is affiliated with the Centro di Ricerca Interdisciplinare sul Linguaggio (CRIL). Currently, she is working on phonetic training targeted at learners of English as a second language. She completed her Ph. D in Cognitive Neuroscience, with a thesis on computational linguistics and emotion in dialogue interactions, at CIMEC (Centro Interdipartimentale MEnte e Cervello), Università degli Studi di Trento. She carried on research at the University of Birmingham (UK), the University of Haifa (IL) and the University of Padova (IT), focusing on manual gestures, bilingualism, second language learning and emotion and language processing.

Author's address: federica.cavicchio@unisalento.it

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