The transitive-intransitive alternation and co-speech gestures

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There has been increasing interest in the topic of grammatical categories in relation to co-speech gestures in recent years. Against this background, previous research has found gestural representation coordinated with the grammatical category of transitivity in speech (McNeill 1992; Parrill 2010). However, in these studies, prototypical transitive events co-occurring with gestures were mainly handling events (e.g. clauses with *put* or *throw*) while prototypical intransitive events were mainly agentive motion events (e.g. clauses with *go, dance*). Given that studies also suggest that gesture is highly correlated with the types of events, such as events with a path (Parrill 2010), it remains unknown to what extent the difference found in gesture is caused by transitivity or simply by the types of events. Therefore, the present study aims to investigate gesture in relation to transitive and intransitive constructions with the same types of events, namely via the transitive and intransitive alternation. Examples include *she opened the door* vs. *the door opened; he rolled down the window* vs. *the window rolled down*. Specifically, this study addresses the following questions: a) whether gesture relates to transitivity or not when the same events are involved, such as breaking events, opening/closing events and motion events; b) whether gesture relates to transitivity or not when the motion events involve or do not involve a path, respectively, including +/- Agents' path (e.g., *he moved his toupee up* vs. *he moved the sofa out of the room)* and +/- implicit Figures' path (that is, +/- directional Oblique phrase; e.g., *I dropped an earring* vs. *a man in Colorado dropped an engagement ring down a sewer drain while he was proposing to his girlfriend*).

Four main types of transitive-intransitive pairs classified by Levin (1993) are employed in this study, including BREAK verbs such as *break* and *tear*; BEND verbs such as *bend* and *fold*; ROLL verbs such as *move, drop* and *roll*; and OTHERS such as *open* and *close*. A large multimodal American English database — the UCLA Library Broadcast NewsScape, accessed using Distributed Little Red Hen Lab tools (https://sites.google.com/site/distributedlittleredhen/home) — was used to extract transitive and intransitive uses of these verbs (the current corpus size N = 646). All constructions retrieved were coded in terms of their transitivity, with or without implicit Figures' path and with or without Agents' path, and as to whether they were accompanied by a representational gesture or not. In addition, all representational gestures were coded in terms of their modes of representation (Acting with object, Acting only, Tracing, Molding, Embodying) (see Müller 1998, 2014).

Results show that the amounts of representational gestures produced do not differ with respect to transitivity: 65% (transitive) vs. 61% (intransitive) ($p>0.05$, $\chi^2=0.11883$, df=1), but they differ with respect to the properties of events; that is, a lot more representational gestures were made with events with Agents' path and/or Figures' path than with those without: 83% (Transitive + Agent's path) vs. 54% (Transitive - Agent's path) ($p<0.05$, $\chi^2=7.8559$, df=1); 70% (Transitive + Oblique) vs.

47% (Transitive - Oblique) (p<0.001, χ^2=12.098, df=1); 67% (Intransitive + Oblique) vs. 33% (Intransitive - Oblique), although this last difference was not statistically significant (p>0.05, χ^2=3.4001, *df*=1). As for the gestural modes of representation, they were found to relate to both properties of events – that is, Agents' path — and transitivity. Specifically, as transitive constructions involved displacements of Agents (e.g., *he moved the sofa out of the room*) versus not (e.g., *he moved his toupee up*), the production likelihood of gestures of the Tracing mode increases significantly: 46% vs. 23% (p<0.05, χ^2=3.868, df=1); notwithstanding this, it is remarkable that Acting-with-object gestures preferably accompanied transitive constructions, whereas Tracing gestures preferably occurred with the alternate intransitive constructions, as shown by the following proportions of Acting gestures with respect to two constructions: 66% (Transitive + Oblique) vs. 0% (Intransitive+ Oblique), 77% (Transitive - Agent's path) vs. 8% (Intransitive) (p<0.0001, χ^2=35.641, df=1), 56% (Transitive + Agent's path) vs. 8% (Intransitive) (p<0.05, χ^2=10.577, df=1).

These results suggest that although gestures do interact with dynamic and spatial properties of events, they are also closely coordinated with the choice of transitivity encoding these events. One feasible explanation for this is that the transitive and the alternate intransitive constructions reflect different ways in which speakers conceptualize events: the +/- profiling of external causation, as proposed by Langacker (2008), which tends to be associated with representational forms of the accompanying gestures — Acting with object or Tracing gestures. This is consistent with the hypotheses that gestures emerge from imagistic processes during 'thinking for speaking', rather simply from visual imagery (McNeill & Duncan 2000).

Furthermore, Benedicto and Brentari (2004) noted that transitive constructions in sign languages tend to be expressed by classifiers with "handling" handshapes whereas the alternate intransitive constructions tend to be expressed by classifiers with "whole entity" or "extension" handshapes. Provided that gestures of the Acting-with-object mode seem formally similar to verbal classifiers with handling handshapes, as gestures of the Tracing mode do to verbal classifiers with "whole entity" and "extension" handshapes, the present results concerning gestural modes and transitivity may suggest that co-speech gestures and signs possibly concern similar means of expressing the transitive-intransitive alternation to some extent. However, the interaction found between the path property in transitive events and gesture in this study, as mentioned above, also suggests that co-speech gestures seem more flexible than signs do in encoding the alternation, which is probably due to the fact that co-speech gestures do not bear the full communication burden as signs of a sign language do. This result in terms of co-speech gestures and transitive motion events seems to be consistent with the finding of Schembri et al. (2005) that non-signers' gestures without speech involve more hand configurations than signs in Australian Sign Language or Taiwan Sign Language do, when they express intransitive motion events. All these have some implications for an understanding of the relationship between gestures and signs, in this regard.

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