

Reference tracking by hands in discourse units

When communicating who does what to whom in discourse context, speakers have to establish and maintain referents in discourse units. Reference tracking can be accomplished by lexical nominal expressions, pronouns, and zero anaphora in spoken modality. For example, “Man holds woman’s hand and he kisses her”; the pronouns “he” refers back to the man and “her” to the woman. This paper explores the possibility of reference tracking done by manual modality, gesture. Gesture is considered to track referents when the spatial layout of gestures referring to the same entity is *consistent* in the discourse unit. In the above example, if a speaker points at the left for “man” and the right for “woman” and reuses the same spatial locations for “he” and “her”, those gestures are considered to track referents.

We asked whether gestures tracked referents, and if so, under what circumstances gestures tracked referents? In order to approach these questions, we instructed adults, all naïve to sign language, to describe two stories with speech (co-speech gestures) and without it (gesture alone). One story included protagonists with different sex, aka., Man-Woman story, another story included protagonists with the same sex, aka., Man-Man story.

In Study 1, we compared gestures produced alone and gestures accompanying with speech and asked which type of gestures are more likely to use space to track referents. Findings showed that both co-speech gestures and gestures produced alone tracked referents. However the gestures produced alone were more likely to track referents than co-speech gestures, $F(1, 6) = 8.42, p < .012$. It implies that when gestures take on the primary burden of communication, adults exploit the spatial properties of gestures to track referents.

Co-speech gestures did track referents, even though to a lesser extent. In Study 2, we explored the semantic coordination between speech and gesture and asked whether clarity of reference tracking in spoken modality might influence the extent of reference tracking in gestural modality. We found that speakers were more likely to use consistent lexical nominal expressions and pronouns to unambiguously track referents in Man-Woman story than in Man-Man story, $t(8) = 2.62, p < .034$. In addition, the co-speech gestures in Man-Woman story were significantly more likely to track referents than those in Man-Man story, $t(8) = 3.10, p < .024$. Henceforth, when spoken reference tracking is less (more) clear, participants are less (more) likely to use co-speech gestures to track referents.

In this work, we have shown that gesture is the alternative option for reference tracking. We find that adults are more likely to use gestures to track referents when they are produced alone than when they accompany speech. In addition, we demonstrate that adults do not routinely use space to track referents in speech-accompanying gestures. Rather, they tend to track referents in gestures when accompanying speech also tracks referents in a clear unambiguous way.

(Word count = 475)