

Gestural Adaptation in Extravert-Introvert Pairs and Implications for IVAs

Jackson Tolins¹, Kris Liu¹, Yingying Wang², Jean E. Fox Tree¹, Marilyn Walker¹, Michael Neff²

¹ University of California, Santa Cruz
{jtolins|kylIU|foxtree|maw}@ucsc.edu, maw@soe.ucsc.edu
² University of California, Davis
{yiwang|mpneff}@ucdavis.edu

Abstract. We compared nonverbal expressive behavior across matched and mismatched extravert/introvert pairs. We found that participants' gestures changed over time, adapting to the gesture style of their partner. Results will be used as the basis for the implementation of adaptable personality expression in interactive virtual agents.

Keywords: personality, gesture, non-verbal expressive behavior

1 Gestural Manifestations of Personality in Dyads

Studies on expressive behaviors and extraversion/introversion present an extraverted individual as likely to have more animated, more frequent, and more expansive gestures, an expressive face, and wide or frequent smiles [2]. While some research has been conducted on which aspects of a particular gesture are repeated across entrainment [1], no previous study has attempted to explore how the gestures produced by a person with one personality type influence those of a person with a similar or different personality type.

We compared the behavior of an extravert-extravert dyad to an extravert-introvert dyad. The participants engaged in a loosely structured conversation from which data was collected both through audiovisual recording and motion capture suits. Motion capture was performed with a Vicon optical motion capture system consisting of 12 4-megapixel cameras, hung 9 feet above the ground on rails around the perimeter of the motion capture studio. Three participants were recruited through newspaper advertisement and were asked to complete an online pretest personality survey. Participants were chosen who scored at least .8 standard deviations above or below the mean on the personality profile's extraversion scale.

2 Results Show Stylistic Adaption of Gesture, which has Implications for IVAs

Gestures were transcribed using a three-tiered system that captured both temporal and spatial dimensions of gestures. Results follow:

Rate: The gesture rate of the introvert was the highest, and also the most stable over time of the three conversationalists. This indicates less effort to adapt to her interlocutor. When interacting with the introvert, the extravert increased in gesture rate over time, moving closer to the rate of her conversational partner. The matched extravert-extravert pairing presented a similar pattern, with one partner moving towards the rate of the other, but in this case it was in the opposite direction, with one extravert at a low rate throughout and the other reducing their rate to match by the end.

Broadness: The introvert started with narrower gestures and became broader while the extravert did the reverse, to the point of having narrower gestures than the introvert. This pattern was not seen in the extravert pair, where both participants shifted to larger gestures over the course of the conversation.

Elbows Out: The matched extravert pair moved together towards more open arm positions. Contrastively, the introvert remained stable while the extravert reduced the expansiveness of their arms while gesturing to more closely match that of the introvert, who kept a more closed-arm position.

Outwardness: All participants began the interaction with gestures that stayed relatively close to the body. Over the course of the conversation the matched extravert pair displayed movement towards each others style, but the mismatched introvert-extravert pair reduced the outwardness of gestures.

These preliminary data suggest that agents may need to adapt to their interlocutor and that this adaptation may be dependent on the personality the agent is trying to portray. Implications for agent design include that (1) agents must be able to sense their interlocutor's movements in order to respond correctly and interactively adapt their own expressive behavior, (2) agents need to change their behavior over time to model addressee adaptation, (3) agents may need to be assigned a personality type, as different personalities appear to adapt differently, and (4) agents may need to be programmed in advance with information about their addressees.

Acknowledgements

This research was supported by NSF Grant IIS-1115742. We thank the research assistants: Jasmine Norman, Nick Russell, Anna Wartan, and Ruben Sanchez.

References

1. Bergmann, K., Kopp, S.: Gestural alignment in natural dialogue. Proceedings of the 34th annual conference of the cognitive science society (2012)
2. La France, B.H., Heisel, A.D., Beatty, M.J.: Is there empirical evidence for a non-verbal profile of extraversion?: a meta-analysis and critique of the literature. *Communication Monographs* 71(1), 28–48 (2004)