

# Is personality reflected in hand gestures co-occurring with speech?

*Renia Lopez-Ozieblo*

The Hong Kong Polytechnic University

Renia.lopez@polyu.edu.hk

This study evaluates whether second-language (L2) speakers' hand gestures, as observed when narrating a story online, can be correlated to their personalities. Gestures are thought to be idiosyncratic (McNeill, 1992) and related to both proficiency and individual differences, among other factors. Personality is one of the five domains of individual differences, together with cognitive abilities and social attitudes (Lubinski, 2000). Personality encompasses how a person thinks, feels and behaves and is reflected in a series of traits that have been categorized as openness (e.g. open to new ideas and experiences), extraversion (e.g. outgoing, adventurous), agreeableness (e.g. trust, altruism, compliance), conscientiousness (e.g. competence, self-discipline) and neuroticism (e.g. anxiety, depression, self-consciousness). The evaluation of these traits is commonly done through an open source self-completed questionnaire, the Big-Five inventory (BFI), or questionnaires based on the BFI (John, Naumann, & Soto, 2008). A much shorter, 10-question version, has also been developed (Rammstedt & John, 2007).

The BFI has recently been used in language research that suggests that openness and conscientiousness have a particularly positive effect on L2 language learning, whereas neuroticism has a negative effect (Chen et al., 2021). In gesture research by Craenen et al. (2018), the 10-question version of the BFI has been used in work involving human-robot interaction that suggests that certain gesture types are affected by extraversion, agreeableness, and neuroticism. For example, neuroticism was seen to be more highly associated with head-touching gestures, adaptors, and extraversion was associated with greater speed and animacy of gestures (ibid.), as was gesture rate (Neff et al., 2010). Similar research has also shown that adaptors are more associated with neuroticism (Neff et al., 2011) as are beats and metaphoric gestures (Kopple, 2014) while iconic gestures are related to agreeableness (ibid). Hostetter and Potthoff (2012) also used the BFI to analyze differences in gestures in a communicative task between two participants, observing a correlation between extraversion and representational gestures.

In this study, sixty Cantonese speakers were asked to complete the 10-question version of the BFI online by Rammstedt and John (2007) as well as an additional questionnaire to establish any useful demographic variables, such as age, gender and educational background. Participants were asked to complete the BFI in their mother tongue (L1), not in English, to ensure they understood the questions. Participants oral proficiency was evaluated by three independent proficiency evaluators using a set of rubrics developed for this project and based on the Cambridge Oral proficiency rubrics following the Common European Framework of Reference for Languages (Council of Europe, 2001). During an online session, lasting about 45 minutes, participants were asked to watch a three-minute cartoon from the *Tweety and Sylvester* series and to retell it in as much detail as they could. Narrations were on average three minutes long. Data on gesture type, including referential (representational and deictic), pragmatic (discursive and stress/beats), adaptors, lexical gestures and flutters (micro-gestures that look like nervous ticks), and their frequency, in terms of number of gestures per duration of the narration, was transcribed together with the speech. The narrations were first transcribed into speech using PRAAT and the gesture analysis was carried out in ELAN. Two annotators working independently transcribed the gestures, with a third transcribing 70% of the data. Disagreements were discussed between the first two annotators achieving a preliminary inter-rater agreement of over 90%.

This talk will present the results from a linear mixed-effects regression analysis used to model data on the frequency and type of gestures observed during the narrations, together with the results from the BFI and the proficiency levels. Preliminary results suggest that factors other than proficiency and personality play a more important role in predicting gesture frequency. We expected to find data to support existing observations on adaptors as well as on iconic gestures (as above) and evidence that more open individuals (more creative, innovative, open to ideas) might use more iconic gestures than less open ones, reflecting a link between creativeness and gesture (as suggested by Prof. Gale Stam during a personal exchange). However, preliminary results have not found any relationships between openness and gestures (by any type). Nevertheless, conscientiousness might be correlated with a preference for discursive gestures. Conscientiousness refers to the ability to control impulses, plan ahead, analyze our impact on others and be goal-directed. Discursive gestures, those with a function similar to discourse markers in speech (Lopez-Ozieblo, 2020) allow speakers to "order" the elements of an utterance, manage the flow of the speech and indicate the relationship between segments of the utterance, among other functions. Thus, this relationship is not surprising. Contrary to previous findings, neuroticism seems to have a negative correlation with adaptors and flutters. Adaptors are often associated with anxiety (Ekman & Friesen, 1969) as are flutters (or fidgets) and so, expected in individuals with high neuroticism traits. We would like to suggest that flutters are micro-gestures that are actually co-speech gestures, just not fully developed, and not anxiety related (we are exploring, via interviews with the participants, their views on gestures, this might provide an explanation as it is possible that participants were consciously suppressing their gestures). Adaptors, self-touching gestures, need to be further subdivided as many are also co-speech gestures, indicate a word-searching process (Skogmyr Marian & Pekarek Doehler, 2022), often co-occurring with disfluencies, while others might be segment markers (Żywicznyński, Waciewicz & Orzechowski, 2017).

A confounding factor, and a limitation of this study, is that in bilingual speakers, answers to the BFI vary by language (Dylman & Zakrisson). Although our participants were not fully bilinguals it is possible that their L2 personality might differ from their L1 one, and that this is expressed in their gestures but has not been captured in the BFI.

**Index Terms:** gesture frequency and type, personality, Big 5, English proficiency

## References

- Chen, X., He, J., Swanson, E., Cai, Z., & Fan, X. (2021). Big Five Personality Traits and Second Language Learning: a Meta-analysis of 40 Years' Research. *Educational Psychology Review*, 1-37.
- Council of Europe. Council for Cultural Co-operation. Education Committee. Modern Languages Division. (2001). *Common European framework of reference for languages: Learning, teaching, assessment*. Cambridge: Cambridge University Press.
- Craenen, B., Deshmukh, A., Foster, M. E., & Vinciarelli, A. (2018, August). Shaping gestures to shape personalities: The relationship between gesture parameters, attributed personality traits and Godspeed scores. In 2018 *27th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)* (pp. 699-704). IEEE.
- Dylman, A. S., & Zakrisson, I. (2023). The effect of language and cultural context on the BIG-5 personality inventory in bilinguals. *Journal of Multilingual and Multicultural Development*, 1-14.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, 1(1), 49-98.
- Hostetter, A. B., & Potthoff, A. L. (2012). Effects of personality and social situation on representational gesture production. *Gesture*, 12(1), 62-83.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In John, O. P., Robins, R. W., & Pervin, L. A. (Eds.). *Handbook of personality: Theory and research*. (3rd ed.). New York: Guilford Press.
- Kopple, K. (2014). Individual differences in frequency and type of gesture production: Relationship to personal characteristics (Doctoral dissertation, Bryn Mawr College).
- Lopez-Ozieblo, R. (2020). Proposing a revised functional classification of pragmatic gestures. *Lingua*, 247, 102870.
- Lubinski, D. (2000). Scientific and social significance of assessing individual differences: "Sinking shafts at a few critical points". *Annual review of psychology*, 51(1), 405-444.
- McNeill, D. (1992). *Hand and mind: What gestures reveal about thought*. Chicago: University of Chicago Press.
- Neff, M., Wang, Y., Abbott, R., & Walker, M. (2010, September). Evaluating the effect of gesture and language on personality perception in conversational agents. [Conference presentation]. *International Conference on Intelligent Virtual Agents*. Berlin, Germany.
- Neff, M., Toothman, N., Bowmani, R., Tree, J. E. F., & Walker, M. A. (2011). Don't scratch! Self-adaptors reflect emotional stability. *Springer*, 6895 LNAI, 398-411. [https://doi.org/10.1007/978-3-642-23974-8\\_43](https://doi.org/10.1007/978-3-642-23974-8_43).
- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of research in Personality*, 41(1), 203-212.
- Skogmyr Marian, K., & Pekarek Doehler, S. (2022). Multimodal word-search trajectories in L2 interaction. *Social Interaction. Video-Based Studies of Human Sociality*, 5(1).
- Żywiczyński, P., Waciewicz, S., & Orzechowski, S. (2017). Adaptors and the turn-taking mechanism: The distribution of adaptors relative to turn borders in dyadic conversation. *Interaction Studies*, 18(2), 276-298.