

Cognitive dimensions of non-face emoji interpretation: Effects of autistic traits on affective processing

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Emojis, defined as “small digital images or icons used to express an idea, emotion, etc., in electronic communications” [1], have become an integral component of online interaction, functioning as paralinguistic and multimodal cues that enrich linguistic meaning [2]. Within the broad category of emojis, it is possible to distinguish a class of affective emojis. In addition to the familiar yellow discs with stylized facial expressions (commonly referred to as “smileys” 😊😍😮), affective emojis can also include non-face emojis, such as ❤️👍👎 [3].

Previous research has shown that individuals diagnosed with Autism Spectrum Disorder (ASD) classify certain affective face emojis (such as fearful, sad, and surprised faces) differently than individuals without such a diagnosis [4]. Moreover, it has been demonstrated, using ERP studies, that face emojis and non-face emojis may be processed differently, with non-face emojis potentially engaging stronger semantic components [5].

In the present study, I aimed to integrate these perspectives by investigating how autistic traits may influence the interpretation of affective non-face emojis compared to face emojis. The study presents a norming investigation of 50 emojis, including 30 non-face affective emojis and 20 face emojis. The selection of emojis followed a systematic procedure intended to maximize recognizability and familiarity among participants. An initial list was generated using EmojiTracker data, which monitored real-time emoji usage on Twitter. Because EmojiTracker was not updated at the time, the dataset was supplemented with additional sources, among others, including Unicode statistics from 2019.

The experiment lasted approximately 40 minutes and was implemented using the *jsPsych* framework. A total of 49 native speakers of American English aged 18-35 participated in the study. Participants rated emojis across five dimensions adapted from Scheffler and Nenchev [6]: familiarity, visual complexity, clarity, emotional valence, and emotional arousal. Each question appeared on a separate screen, with the emoji centered and the response captured via a slider ranging from 0 to 100. In addition, autistic traits were assessed using the Autism Spectrum Quotient (AQ-50) [7], an indicative though non-diagnostic measure of autism-spectrum characteristics. This approach addressed limitations of previous studies relying on self-reported ASD diagnoses [4].

Data were analyzed using linear mixed-effects models implemented with the *lmer* function from the *lme4* package [8]. This method allowed for the inclusion of random effects for both participants and stimuli, accounting for systematic individual differences in rating tendencies and variability between emojis. The use of linear modeling was considered appropriate due to the continuous 0-100 rating scales employed in the study.

The results revealed significant interactions between AQ scores and emoji type. Higher AQ scores were associated with perceiving non-face emojis as more visually complex ($p = 0.00402$) and less clear ($p = 0.027$) relative to face emojis (Figure 1). No significant effects were found for familiarity, emotional valence, or emotional arousal. These findings suggest that individuals with higher levels of autistic traits may rely more strongly on semantic rather than affective processing when interpreting non-face affective emojis. The study contributes to a broader understanding of how autistic traits may modulate the cognitive and linguistic interpretation of affective symbols in digital communication and provides a preliminary normed corpus of affective non-face emojis for future neurolinguistic research.

References

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Figures

Figure 1: Interactions between emoji ratings and AQ-50

The figure below present ratings on the different scales (*response* on the Y-axis) as a function of scores on the Baron-Cohen questionnaire (*mean_BC* on the X-axis). The left panel displays ratings for affective face emoji, while the right panel shows ratings for affective non-face emoji.

