

Taking reference resolution beyond the third person: Using emoji to refer to speakers and addressees

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Referential dependencies are central to language comprehension. Prior studies have mostly focused on anaphors, especially 3rd person pronouns (see Kaiser & Fedele 2019 for an overview). Less attention has been given to indexicals like 1st person “I” and 2nd person “you,” presumably because their meaning is set when used in a context (Kaplan 1989). The ambiguities bedeviling 3p pronouns are largely absent with 1p/2p pronouns. However, we show that once we go beyond pronouns and look at emoji, we find unexpected ambiguities involving 1p/2p reference. We suggest that, unlike 1p/2p pronouns, speaker- and addressee-referring emoji share similarities with 3p pronouns and appear to have indexical and anaphor-like traits.

Background. In (1), where the speaker expresses an opinion about the addressee with the subjective adjective *excellent*, there are two key individuals: (a) The **attitude target** (in (1), the *addressee*) and (b) **the attitude holder** (the *speaker*). The indexicals *I* and *you* can unambiguously express **additional comments** foregrounding the speaker’s feelings (2a) or the addressee’s accomplishment (2b). (We use ‘speaker’ and ‘addressee’ for texts as well.)

With **emoji**, the thumbs-up 👍 and the strong arm 💪 seem to provide equivalent devices for expressing the speaker’s feelings and the addressee’s accomplishment (3a,b). To test this intuition, we looked at resolution of 👍 and 💪 in text messages: We tested to what extent the emoji are construed as linking to (i) the attitude holder (express speaker feelings) or (ii) the attitude target (express addressee accomplishment). We assume both interpretations are present to some degree, but pit them against each other to probe for differences between emoji.

We test 2 hypotheses. The **Iconicity hypothesis** states that 👍 and 💪 are *rigidly* interpreted based on the iconically-depicted actions, resembling 1p/2p pronouns: 💪 is predicted to link to the attitude target (addressee “you”): s/he is demonstrating strength. (💪 is used to express both physical strength and accomplishments in other domains.) 👍 is predicted to link to the attitude holder (speaker “I”): in (1), s/he would be doing thumbs-up to express approval.

The **Multi-factor Hypothesis** extends the idea that multiple constraints guide reference resolution, proposed for 3p pronouns (e.g. Ariel 1990), to the 1p/2p domain. On this view, 💪 is *more likely* to be linked to the addressee than 👍 but this preference (presumably based on inference; which people do anyway) is not hard-wired into the emoji and can be modulated by other factors: We test if explicit mention of the attitude holder with “I thought...” (e.g. Stephenson 2007, Table 1) makes the attitude holder more salient/available. Further, we test for effects of visual cues involving skintone match between the emoji and speaker vs. addressee (Fig.1).

Experiment. Participants (62 native US English speakers, 24 targets, 32 fillers) saw screenshots of text messages (Fig.1), and indicated to what extent the emoji expresses the sender’s feelings vs. recipient’s accomplishments (Fig.2). On targets, we manipulated (i) emoji type (👍 vs. 💪), (ii) whether the emoji matches sender vs. recipient skintone, and (iii) whether the sentence was embedded under “I thought.” (Skintones use the 5-step Fitzpatrick scale currently used by Unicode, Fig 3. Skintones differed by at least 2 tones.) See Table 1.

Our **results** support the *Multi-Factor hypothesis*. As Fig.4 shows, 💪 is more likely to be linked to the addressee than 👍 (main effect of emoji, $lmer$, $|t|=2.36$, $p<0.02$). Crucially, emoji with “I thought” are more likely to be linked to the speaker than emoji in matrix conditions (main effect of structure, $|t|=3.04$, $p<0.01$). Emoji interpretation is modulated by salience of the attitude holder, as predicted by the Multi-factor hypothesis. There is no significant effect of skintone match (there is a numerical trend in the strong-arm matrix condition, ns.) and no interactions. Lack of skintone effects may relate to participant characteristics. (Based on self-report, 31% use emoji very frequently; 37% use skintone on emoji; 81% are white.) **In sum**, 👍 and 💪 differ in speaker- vs. addressee-orientation, but this is modulated by salience of the attitude holder, echoing salience effects typically exhibited by 3p pronouns, not 1p/2p pronouns.

- (1) Sam says to Alex: Your_{ALEX} speech was excellent_{SAM'S OPINION}.
- (2a) Your speech was excellent; I liked it! [speaker's feelings]
- (2b) Your speech was excellent; you were awesome! [addressee's accomplishment]
- (3a) Your speech was excellent 👍 [thumbs-up]
- (3b) Your speech was excellent 💪 [strong arm/flexed biceps]

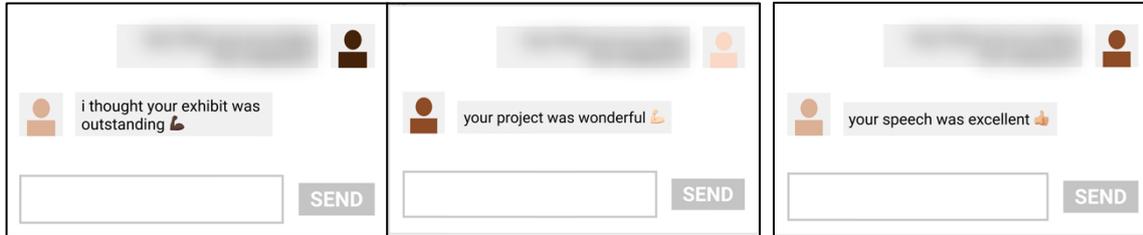


Fig.1. Examples (all subjective adjectives were positive). Recipient is on top of the screen, sender on the bottom (Terminology was explained to participants).

	Emoji skintone matches sender	Emoji skintone matches recipient
<i>Thumbs-up Matrix clause</i>	Your speech was excellent + 🍷 matches sender	Your speech was excellent + 🍷 matches recipient
<i>Strong arm Matrix clause</i>	Your speech was excellent + 💪 matches sender	Your speech was excellent + 💪 matches recipient
<i>Thumbs-up "I thought"</i>	I thought your speech was excellent + 🍷 matches sender	I thought your speech was excellent + 🍷 matches recipient
<i>Strong-arm "I thought"</i>	I thought your speech was excellent + 💪 matches sender	I thought your speech was excellent + 💪 matches recipient

Table 1. Example item (Yellow emoji used here for ease of presentation only. All targets used skintone modifiers on emoji, as shown in Fig. 1.)

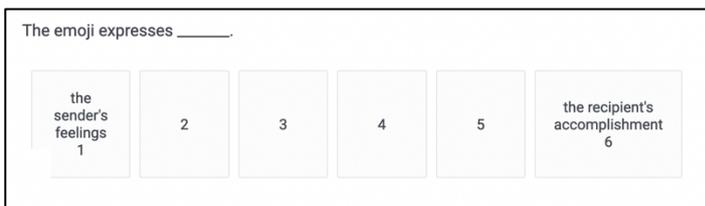


Fig.2. Rating scale

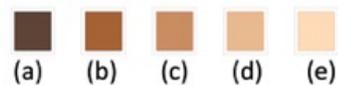


Fig.3 Fitzpatrick scale used for emoji skintone (<https://unicode.org/emoji/charts/full-emoji-modifiers.html>)

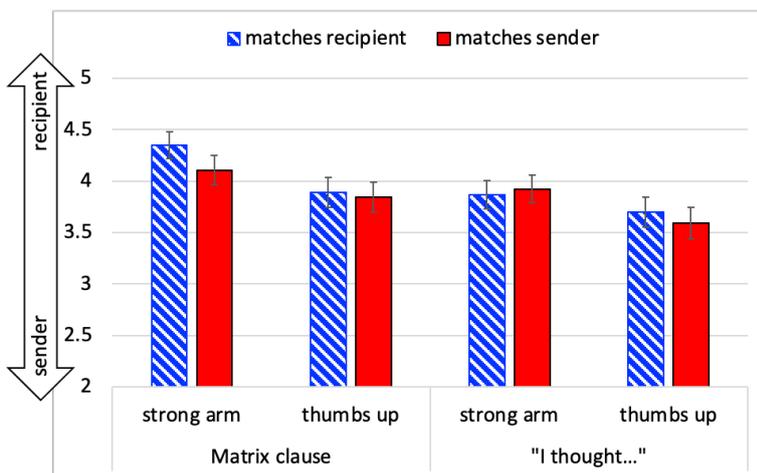


Fig. 4. Emoji interpretation data (1= emoji expresses sender's feelings, 6 = emoji expresses recipient's accomplishments)

Blue bars: emoji & recipient skintone match, **red bars:** emoji & sender skintone match (Two targets excluded from analysis due to error with adjective-noun pairing; pattern looks the same if they are included)