Dyad arrangement affects perceived emotional intensity

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Background

- There is growing interest in the visual perception of social interactions [1,2]. Some research suggests that dyads presented in a social interaction arrangement (i.e. facing each other, as if they are engaged in an interaction) are processed holistically, and enjoy preferential processing compared to the same individuals presented in a way that is not interpreted as a social interaction (i.e. facing away from each other) [3].
- In emotional categorization tasks, facial [4] and bodily [5] expressions of one interactant influence the perceived expression of another when they are presented face-to-face, but not when they are presented back-to-back.
- Emotion categorization tasks can tell us if the emotion itself is perceived differently, but it is also important to consider emotional intensity. For example, interactions might be categorized as happy when they are perceived as just slightly happy or extremely happy.

Research question: Does dyad arrangement affect perceived emotional intensity?

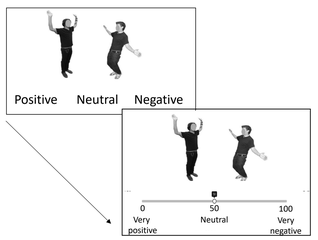
Experiment 1

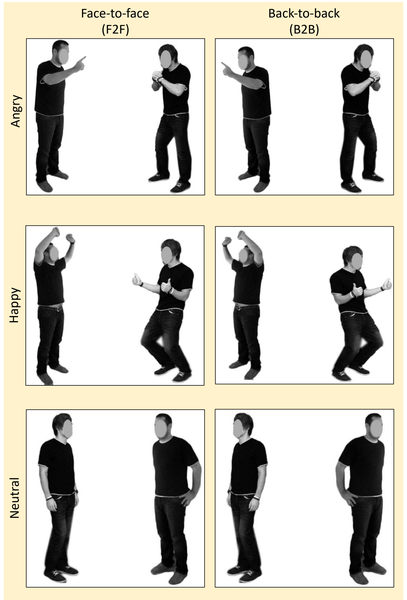
Participants: N = 74, recruited using Prolific.co in an online experiment using Gorilla [6].

Stimuli: Standardized emotional body postures (BESST[7]) rotated 45° to the camera.

Design:
- 3 emotions - Angry, Happy, and Neutral.
- Presented within 2 arrangement conditions – Face-to-Face (F2F), and Back-to-Back (B2B).

We first asked participants to categorize the emotion of the interaction as a whole, then we asked them to rate the emotional intensity of the interaction.



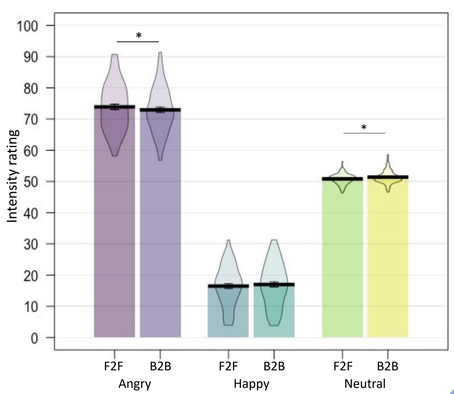


Accuracy:
- Main effect of Emotion, [$F(2, 146) = 68.74$, $p < .001$], where Happy > Neutral > Angry
- No main effect of or interaction with Arrangement

RTs:
- Main effect of Emotion, [$F(2, 146) = 27.08$, $p < .001$], where Angry slower than Happy and Neutral
- No main effect of or interaction with Arrangement

Intensity ratings:
- Main effect of Emotion, [$F(2, 146) = 1529$, $p < .001$], where Angry > Neutral > Happy
- No main effect of Arrangement [$p = .84$]
- Emotion x Arrangement interaction, [$F(2, 146) = 6.92$, $p = .002$]

Angry interactions were rated as more negative, and neutral interactions as more positive, when presented F2F than B2B.



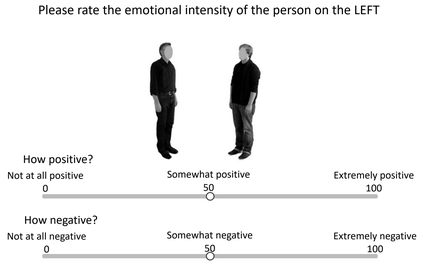
Experiment 2

We made two changes to this Experiment:
1. The rating response scale was changed such that participants were asked to provide ratings for both how positively and how negatively they perceived the stimuli, thus allowing us to capture whether there was ambiguity over the stimuli's valence.
2. We asked participants to report on their perception of one of the interactants only (i.e. left, or right), such that an attentional cue control experiment would be more comparable (see below).

All design details were the same as Experiment 1, unless mentioned:

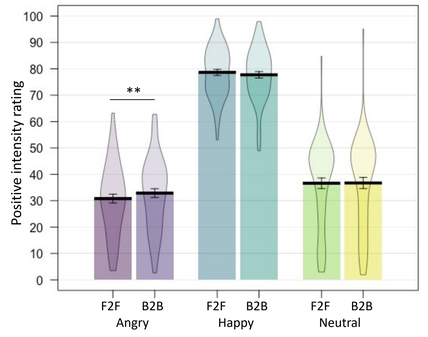
Participants: N = 68

Design:
- Two response scales, for positive and negative valence separately
- Asked to report on the emotion of one of the interactants (left, or right)



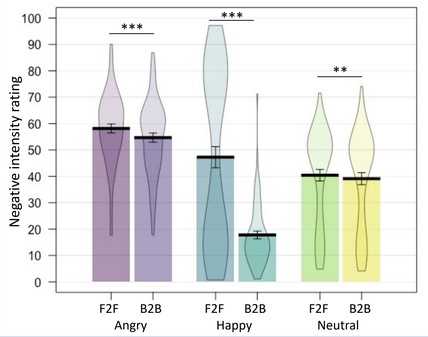
Positive intensity rating:
- Main effect of Emotion, [$F(2, 134) = 337.48$, $p < .001$], where Happy > Neutral > Angry
- No main effect of Arrangement
- Arrangement x Emotion interaction, [$F(2, 134) = 7.08$, $p = .001$]

Angry interactants were rated as significantly less positive when presented F2F vs B2B.



Negative intensity rating:
- Main effect of Emotion, [$F(2, 134) = 48.62$, $p < .001$], where Angry > Neutral > Happy
- Main effect of arrangement, [$F(1, 67) = 68.0$, $p < .001$], where F2F > B2B
- Arrangement x Emotion interaction, [$F(2, 134) = 37.92$, $p < .001$]

Angry, Happy, and Neutral interactants were rated as significantly more negative when presented F2F vs B2B. The effect was larger for Happy than Angry or Neutral interactants.



Experiment 3

Recent studies have highlighted the importance of directional cues when investigating the perception of F2F vs B2B interactions [8, 9].

When presented F2F, not only are dyads afforded the interpretation of a social interaction, but also there are strong directional cues that modulate attentional allocation [8, 9]. These attentional cues are not the same in B2B dyads [8, 9].

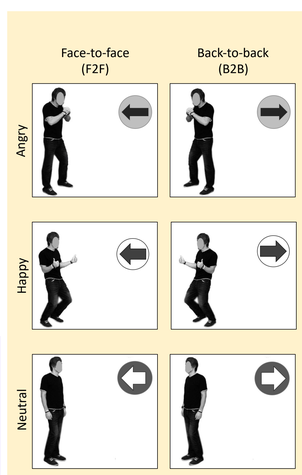
In this Experiment, we replaced one of the interactants with an arrow (also a robust directional cue [9]).

If directional cues drive the emotional intensity effects found in Experiment 2, we would expect to find the same pattern of results in Experiment 3.

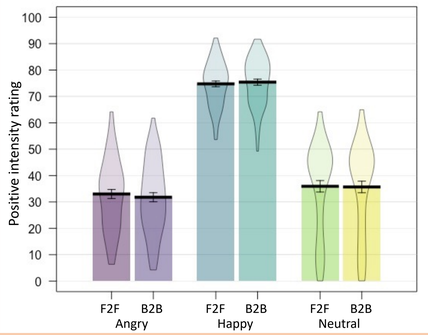
All design details were the same as Experiment 2, unless mentioned:

Participants: N = 64

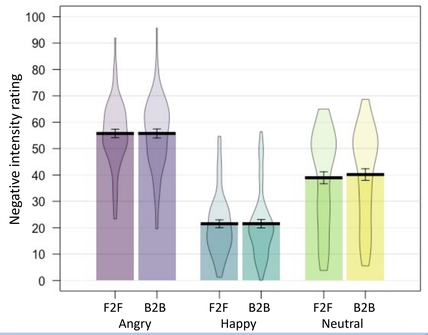
Stimuli: One interactant in each image replaced with an arrow pointing towards or away from the body.



Positive intensity rating:
- Main effect of Emotion, [$F(2, 126) = 276.25$, $p < .001$], where Happy > Neutral & Angry
- No main effect of Arrangement
- Arrangement x Emotion interaction, [$F(2, 126) = 4.24$, $p = .021$]; no pairwise comparison survived Bonferroni correction.



Negative intensity rating:
- Main effect of Emotion, [$F(2, 126) = 161.41$, $p < .001$], where Angry > Neutral > Happy
- No main effect of or interaction with Arrangement



Conclusions

- In two experiments, we found that emotional intensity ratings of F2F dyads differed from the same stimuli presented B2B.
- This is unlikely to be driven by the directional cueing properties of the F2F dyads, as we failed to replicate the effect in Experiment 3 using arrows.
- Most strikingly, F2F dyads tended to be rated as more intensely negative than B2B dyads, suggesting that groups of individuals interacting may be interpreted as more negative than the same individuals when not interacting.
- These findings may help inform how we make approach and avoid decisions when we encounter groups of people in everyday life.

References

[1] Isik, L., Koldewyn, K., Beeler, D., & Kanwisher, N. (2017). *PNAS, 114* (43), E9145 – E9152.
[2] Vestner, T., Tipper, S.P., Hartley, T., Over, H., Rueschemeyer, S.A. (2019). *JEP: General, 148*(7), 1251.
[3] Papeo, L., (2020). *Cortex, 132*, 473 – 478.
[4] Gray, K.L.H., Barber, L., Murphy, J., & Cook, R. (2017). *Emotion, 17*(4), 567.
[5] Abramson, L., Petranker, R., Marom, I., & Aviezer, H. (2021). *Emotion, 21*(3), 557-568.
[6] Anwyl-Irvine A. L., Massonnié J., Flitton A., Kirkham N., Evershed J. K. (2019). *Behavior Research Methods*, 52(1), 388–407.
[7] Thoma, P., Bauser, Denise, S., & Suchan, B. (2013). *Psychiatry Research, 1*(30), 98-109.
[8] Vestner, T., Gray, K.L.H., Cook, R. (2020). *Cognition, 200*, 104270.
[9] Vestner, T., Over, H., Gray, K.L.H., & Cook, R. (2022). *JEP: General*, 151(1), 161-171.