

# Low Spatial Frequency Filtering Reduces Ascriptions of Humanness and Mind Capacity

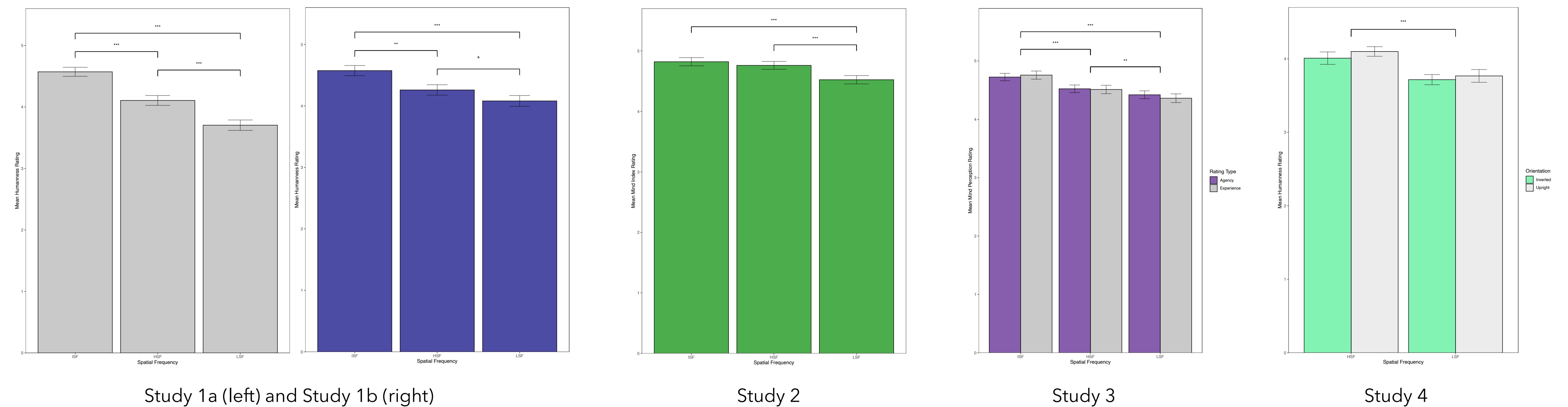
Ryan E. Tracy<sup>1</sup>, Jordan C. Wylie<sup>1</sup>, Steven G. Young<sup>2</sup>

<sup>1</sup>The Graduate Center at The City University of New York; <sup>2</sup>Baruch College (CUNY)

## Background

- Research on perceptual dehumanization is in a nascent stage
- Disrupting configural processing abilities leads to difficulty in granting full humanness to specific targets (e.g., Hugenberg et al., 2016; Young, Goldberg, et al., 2019) and difficulty in discriminating human faces from nonhuman foils (e.g., Young, Tracy, et al., 2019)
- High and low spatial frequencies are said to provide separate streams of information to perceivers' visual fields
- Low spatial frequencies (LSFs) support the integration of gist-level, coarse information, are primarily processed in the dorsal stream, and are processed rapidly (Bullier & Nowak, 1995; Chen et al., 2006)
- High spatial frequencies (HSFs) support the detection of fine-grained details, are primarily processed in the ventral stream, and are processed slowly (Lee et al., 1990; Tootell et al., 1988)
- Across five studies, we tested whether humanness perception is aided or impeded by these different levels of SF filtering, hypothesizing that LSF filtered faces would receive the lowest ratings relative to intact (ISF) and HSF filtered faces

## Results



Across five studies, we found significant reductions in all ratings of humanness and different types of mind perception (i.e., overall mind capacity, agency, experience) for LSF relative to ISF and HSF faces. ISF faces consistently received the highest ratings of all categories, followed by HSF and then LSF faces.

## Method



ISF Filtered Face

HSF Filtered Face

LSF Filtered Face

Across five experiments, participants rated the humanness (Studies 1a, 1b, & 4; 5-item index), mind capacity (Study 2; 5-item index), and agency and experience (Study 3; two 5-item indices) of 30 unique identities with applied SF filtering. Study 1a allowed unlimited exposure time while Studies 1b-4 constrained exposure time to 1000ms. Study 4 combined HSF and LSF filtering with upright and inverted face orientation to test whether these offer separable, additive, or interactive effects on perceptual dehumanization.

## Conclusion

- Removing high spatial frequencies (i.e., LSF filtering) leads to a reduction in the perceived humanness and mind capacity of a target to a much greater extent than when low spatial frequencies (i.e., HSF filtering) are removed.
- This research offers novel evidence that multiple streams of information are required for higher-order person perception to occur
- The current SF literature suggests that HSF information is essential for *featural* encoding (Goffaux & Roisson, 2006), while LSF stimuli are required for *configural* encoding (Vuilleumier et al., 2003), though some dispute exists as to the role of spatial frequencies in face perception in general (Rotshtein et al., 2007) and the role of LSFs in configural processing specifically (Richler & Gauthier, 2014)
- If LSF faces were configurally encoded, we would expect our data to mirror effects found in prior research on configural processing and dehumanization (e.g., Hugenberg et al., 2016; Young, Tracy, et al., 2019)
- We instead find the opposite effect, such that HSFs offer a separate, bottom-up perceptual cue to humanness than configural processing

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