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Supplementary Information for

The conceptual structure of face impressions

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Supplementary text

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Supplementary Information

Data, analysis code, and results are all available and hosted by the Open Science Framework (https://osf.io/z23kf/).

Study 1 Methods

Face trait space task protocol. Our specific instructions to participants were, "In this task, we ask you to indicate how [TRAIT STIMULUS] a number of different people look. You will see a person's face, and are asked to judge their likely personality traits merely from their face. Importantly, go with your gut feeling. We all make snap judgments of others constantly, so feel free to report what you think about the person based on their face. Please respond quickly with your gut feeling. There are no right or wrong answers."

Conceptual trait space task protocol. Our specific instructions to participants were, "In the following task, you will be presented with a series of adjective pairs. These are human personality traits. You will be asked to rate the likelihood that individuals with one of the traits possess the other trait." After several clarifications and examples of the task, participants began the task. Each trial item asked, "Given that an individual possesses one trait, how likely is it that they possess the other?", then presented the two trait stimuli for that trial separated by a hyphen (e.g., 'trustworthy – dominant').

Data preparation and analysis. In Study 1, to perform representational similarity analysis, we created a similarity matrix for each of our models – one for face trait space, one for conceptual trait space. Here we outline specific calculations underlying these matrices, which are also visible and reproducible in analysis scripts on the manuscript OSF page. To create our face trait similarity model (i.e., matrix), we calculated the average of each trait rating for each of the 90 face stimuli (leaving us with 13 trait ratings per each of 90 face stimuli). Then, we calculated the Pearson correlation between each vector of face ratings per trait condition, giving us the correlation (i.e., similarity) between each trait-pair in face trait ratings (Fig. 1a,b). Next, we created the conceptual trait similarity model (i.e., matrix). The pairwise similarity between each trait pair was simply calculated as the average rating of each unique trait-pair combination within and across subjects (i.e., average rating of participant belief that traits are likely shared in people; e.g., average of 'trustworthy – dominant' and 'dominant – trustworthy' within and across subjects). From this we create a similarity model between all trait-pairs as measured conceptually (Fig. 1a,b). To perform our analysis, we correlate the face trait and conceptual trait similarity models with one another. First, we obtain the unique similarity values from the diagonal of the similarity matrices (omitting redundant values from the symmetrical matrices, as well as the diagonal, in which each trait is always perfectly similar to itself). This creates a vector of similarity values per model. Next, we perform a Spearman rank correlation between the two models (as this is robust to similarity measurement idiosyncrasies across measurement modalities, e.g., face evaluations and conceptual trait ratings). (Figure 1 provides a conceptual illustration of this).

Study 2 Methods

Data preparation and analysis. In Study 2, we estimated face and conceptual trait associations per participant. Here we outline specific calculations underlying these matrices, which are also visible and reproducible in analysis scripts on the manuscript OSF page. To estimate their face trait association, we calculated the Pearson correlation coefficient between both trait evaluations of the face stimuli within each participant (between the vectors of their impressions of all face stimuli one each of the two traits they were assigned). To estimate their conceptual trait associations, we averaged the two conceptual trait items. Therefore a single dataset was created including data from participants across all trait-pair combinations.

Study 3 Methods

Data preparation and analysis. In Study 3, per participant we calculate their face trait vectors' correlation, and conceptual trait associations. Here we outline specific calculations underlying these matrices, which are also visible and reproducible in analysis scripts on the manuscript OSF page. To estimate their face trait vectors' correlation, we first calculated for each participant the two face trait vectors (per trait assigned to a participant) resulting from the four image classification tasks (each face trait vector combining information from the shape and color task per trait). To review, in each trial participants were presented with two faces: the same single average base face (which is represented as a vector of facial feature values), one adding and one subtracting the same random manipulation to its facial features (by applying a random noise facial feature vector to that of the base face, thus changing the appearance of the face in two directions along a random set of features in each trial). To calculate each trait vector, we averaged across the noise feature vectors (across 100 shape and 100 color vectors) that corresponded to the faces each participant selected. This provided a face trait vector per each trait assigned to a participant, comprised of the values for each feature participants had been tracking as belonging to the trait they sought to classify in the task. Finally, as a measure of similarity between individuals' face trait vectors, we calculated the Pearson correlation coefficient between the two extracted vectors. Thus, this correlation value is a measure of the similarity in facial features participants used to classify each trait, where a higher value signifies the participant used similar features to identify each trait. To estimate their conceptual trait associations, we averaged the two conceptual trait items. Therefore, a single dataset was created including data from participants across all trait-pair combinations.