Is there a social dimension of emotion? Using novel methodological approaches to revisit the structure of affect.

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BACKGROUND

Over the past century, great debate has ensued regarding the fundamental properties of emotions. The idea that two properties — valence and arousal — represent those fundamental properties has had substantial staying power in the literature (Russell, 1980; Barrett & Russell, 1999). Investigations supporting the two-dimensional claim typically evaluate the structure by having participants rate the similarity of a small number of emotion stimuli. Similarity judgments are then analyzed using multidimensional scaling (MDS) revealing fundamental dimensions of emotion. It is possible that small sets of emotion stimuli artificially limit the dimensions which may be identified. Moreover, there is theoretical justification (Hareli & Parkinson, 2008) for there to exist a social dimension to emotion. We explore this claim by including "social emotions" in the stimulus set.

OBJECTIVES

- Allow for larger stimulus sets in investigations of the structure of affect
- Explore whether there is evidence of a social dimension of emotion
- Demonstrate that model specifications yield different MDS solutions, which have different interpretations

METHODS I

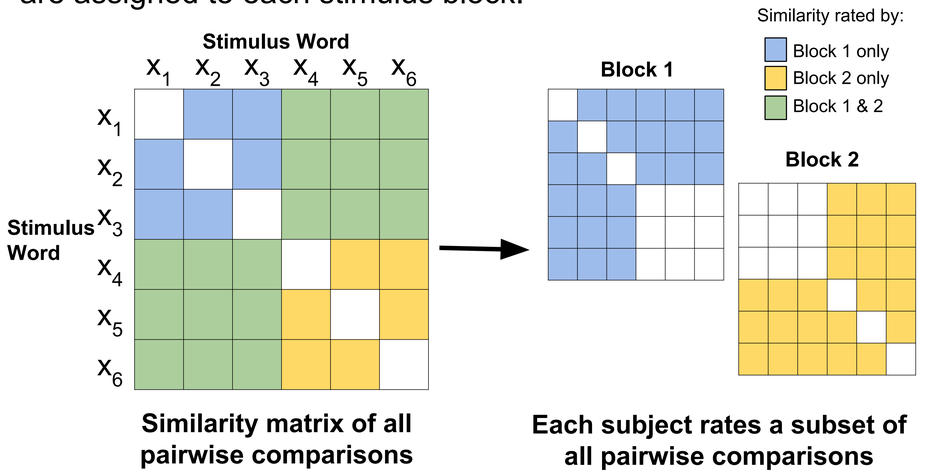
A total of 308 participants were recruited using Amazon's Mechanical Turk. Six respondents were removed from the analysis due to either missing data (n = 4) or significantly slower than average reaction time (n = 2), for a total N = 302.

Analyses were conducted in SAS version 9.4 using PROC MDS.

To download go to: http://goo.gl/WyT3yq or use the QR code at the top right of the poster.

METHODS II

For 41 stimuli, MDS requires 820 pairwise similarity comparisons. Rather than having subjects rate the similarity of each pair, they can rate a subset of the total comparisons and the rest of their data may be treated as missing and ignored during model fitting. The stimulus set may then be divided into blocks which contain overlapping comparisons. Multiple subjects are assigned to each stimulus block.



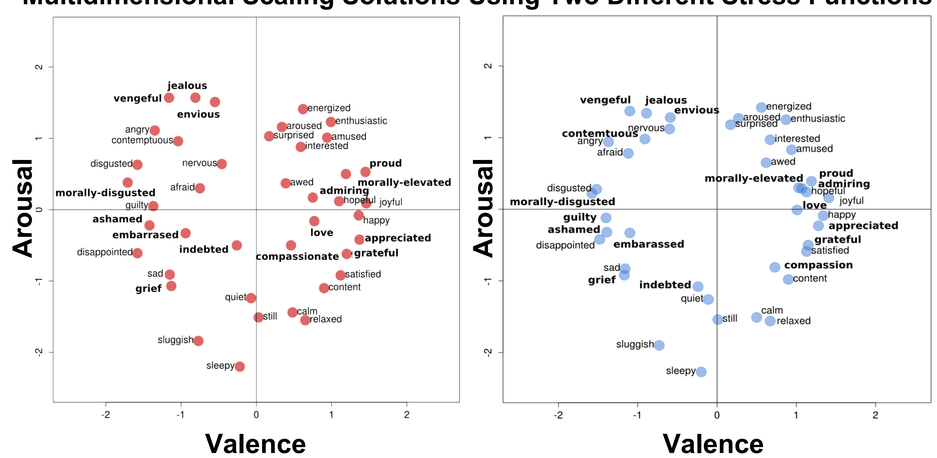
Similarity matrix of all pairwise comparisons

Each subject rates a subset of all pairwise comparisons

RESULTS

A two-dimensional solution fit the data best. The first dimension corresponded to "valence" and the second to "arousal."

Multidimensional Scaling Solutions Using Two Different Stress Functions



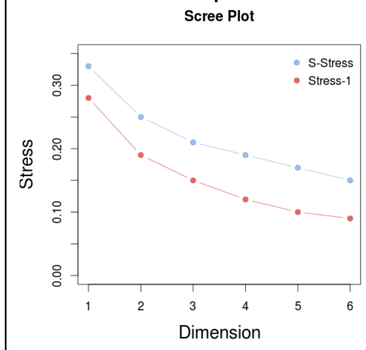
$$\text{Stress-1} = \sqrt{\sum_{i<j} \frac{(d_{ij} - \delta_{ij})^2}{d_{ij}^2}}$$

$$\text{S-Stress} = \sum_{i<j} \frac{(d_{ij}^2 - \delta_{ij}^2)^2}{d_{ij}^4}$$

d_{ij} = fitted similarity,
δ_{ij} = observed similarity

RESULTS (cont'd.)

Scree plots revealed a two dimensional representation (valence & arousal) of the data was the most parsimonious solution.



Moreover, the choice of stress function — a parameter one must specify when performing MDS — drastically altered the distribution of emotion words in psychological space. While Stress-1 does not yield a circumplex structure, it provides a more accurate representation of the stimuli in the reduced dimensional space compared to S-Stress (Borg & Groenen, 2005).

CONCLUSIONS

- Using a stimulus set of 41 emotion stimuli, 17 of which were social emotions, we did not identify a social dimension to emotion
- Stress-1 more truthfully represents the distribution of emotion terms in affective space
- Further research is needed to investigate the optimal way in which to subset the stimulus set
- Vierman et. al (2014) uncovered a 4 dimensional structure of emotion. They performed MDS on the average similarity judgments across all respondents, which has been demonstrated to yield artificially good fits to MDS data (Ashby, 1994) which may explain the extra dimensions.

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