



The Effect of Assessment Format on the Emotional Structure of Valence and Arousal

Rasika Rajagopalan, Neika Sharifian, Yanhua Cheng, Engin Kapkin, & Daniel Gröhn



Theoretical Background

Emotions can be evaluated along valence - ranging from highly positive to highly negative - and arousal - ranging from calming/soothing to exciting/agitating (Russell, 1980 ; Lang et al., 1992). However, there are mixed findings regarding the relationship between valence and arousal. Some studies found a U-shaped pattern (e.g. Lang, Bradley & Cuthbert, 1997), that is, extremely positive and negative events both elicited high arousal, while neutral stimuli elicited lower arousal.

These studies usually assessed valence and arousal simultaneously for each stimulus. In contrast, other studies found a more linear relationship between valence and arousal (e.g. Gröhn & Scheibe, 2008), that is, positive events elicited low arousal while negative events elicited high arousal. In these studies, stimuli typically were first evaluated on valence and then on arousal. The goal of the present study was to investigate in an experiment whether the type of assessment - simultaneously or separately - influenced the relation between the two dimensions.

Sample: N = 41

Participants were recruited from two sources:

- PSY 200 summer classes (n = 4)
 - Amazon's Mechanical Turk (n = 37)
- ...who were assigned at random to either the simultaneous evaluation condition (n = 19) or the separate evaluation condition (n = 22).
- 16 to 62 years, $M_{age} = 32.7$, $SD_{age} = 13.29$
 - 56.1% females
 - 95.3% European Americans, 4.7% African Americans

Research Questions

- Does the assessment method influence the perceived emotional structure of valence and arousal in images?

Specifically, simultaneous assessment of valence and arousal will yield a more quadratic association whereas the separate assessment will yield a linear relationship.

Methods

- Participants rated 288 images
- 144 IAPS images (Lang et al., 1997), and
 - 144 Affective Image Database (Gröhn, 2014).

Images were rated on valence – ranging from Unhappy (1) to Happy (7) – and arousal – ranging from Calm (1) to Excited (7) accompanied with a Self-Assessment Manikin (SAM) illustrating the emotional state.

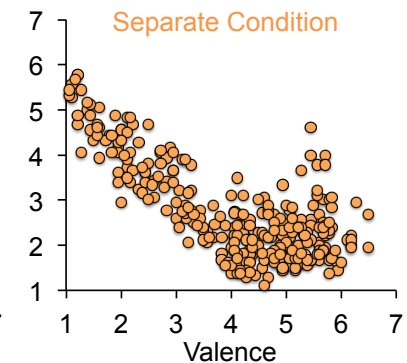
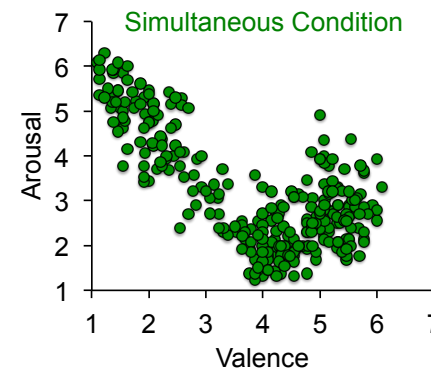
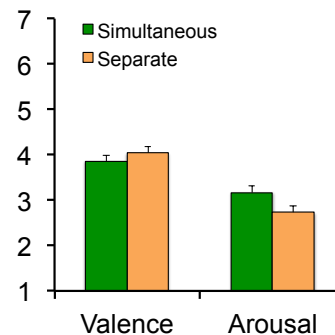
In the simultaneous evaluation condition, participants saw an image and both rating scales underneath the image. Thus, both rating scales were completed simultaneously. In the separate evaluation condition, participants saw first all 288 images and rated them on valence. Then, participants saw all 288 images again and rated them on arousal.

Results

Across the 288 images, means for the two conditions differ significantly for

- valence, $F(1,287)=95.7$, $p<.01$, $\eta^2=.25$
- arousal, $F(1,287)=228.7$, $p<.01$, $\eta^2=.44$

Consistent with expectations, the distribution was more linear for the separate assessment condition ($R^2=55\%$) than for the simultaneous assessment condition ($R^2=49\%$), whereas the quadratic effect was stronger in the simultaneous condition ($\Delta R^2=23\%$) than for the separate condition ($\Delta R^2=17\%$).



Discussion & Conclusion

Although both assessment methods showed a U-shaped pattern between valence and arousal, images in the separate evaluation condition showed a much stronger linear association between valence and arousal than the simultaneous condition. These initial findings are consistent with the idea that the assessment method influences the observed structure of emotions.

This finding questions the reliance on the widely-used IAPS norms (simultaneous assessment) as THE standard for selection image material given that ratings could substantially changed by changing the assessment method slightly. Further research would benefit from a larger sample size and a broadening of other variations of assessing the emotional structure.