

# The Role of Attachment Style in the Holistic Perception of Expression

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## Introduction

- Attachment theory proposes that early life interactions with parental figures will establish perceptions and beliefs of the self and others (Bowlby, 1969; Mikulincer & Shaver, 2007).
- Attachment style conceptualizes a two-dimensional spectrum of emotion regulation capacities (Mikulincer & Shaver, 2007).



- Anxious attachment style is associated with a hyperactivating response to emotional stimuli, including **face expressions** (Fraedrich et al., 2010).
- Avoidant attachment style is associated with a depressed or de-activating response to **face expressions**.
- Facial expressions tend to be perceived holistically, meaning that the impressions a facial expression is combined into an integrated percept, rather than perceived discretely (e.g., smiling mouth, angry eyes) (Tanaka et al., 2012).
- In attachment style modulation of expression perception, it is unclear what role the perceptual system plays in the behavioural and neurological responses to expressions.

## Objectives

- Validate the mixed emotions paradigm used by Tanaka et al. (2012)
- Determine the relationship between attachment style and holistic processing
  - We predict that anxious attachment style will correlate with increased holistic processing
  - We predict that avoidant attachment style will correlate with decreased holistic processing

## Materials

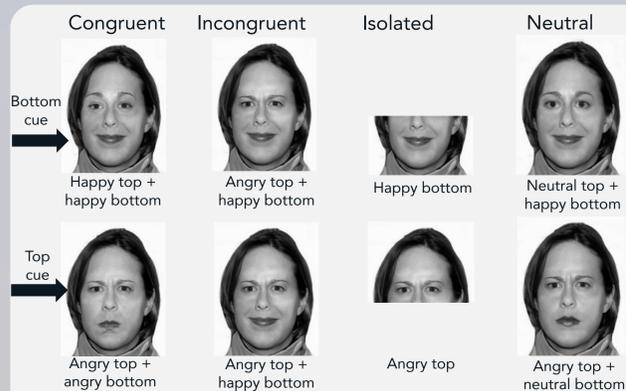


Figure 1. Examples of stimuli used in trials. A total of 4 composite identities were used. In addition to the trials shown, happy top cue trials, and angry bottom cue trials, were used to balance the stimuli presented (although they were not used in analysis).

## Methodology

### Participants

- Neurotypical University of Victoria students were recruited from a voluntary participation pool
  - N=61
  - 10 male participants
  - M<sub>age</sub> = 21.30 years (SD = 2.65)

### Attachment Style

- Revised Adult Attachment Style Questionnaire (RAAS), close relationships version, was administered to participants (Collins, 1996)
- Scores for dimensions of avoidant and anxious attachment style were created for each participant (range=1-5)

"I am uncomfortable when anyone gets too emotionally close to me."

- RAAS, avoidant attachment style probe

"I often worry that other people don't really love me."

- RAAS, anxious attachment style probe

### Expression Task

- 384 trials total, with each trial type repeated twice. Stimuli shown in Figure 1.
- Only trials where angry eyes or happy mouth were attended to were analyzed (196 in total).
- Accuracy and reaction time on accurate trials was analyzed.

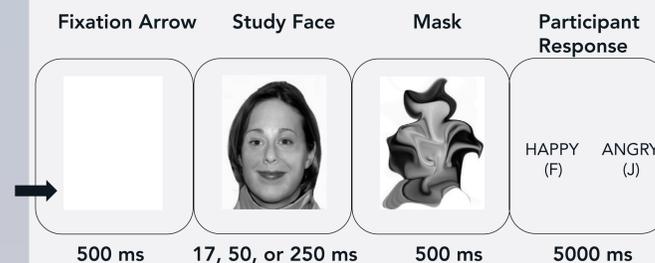
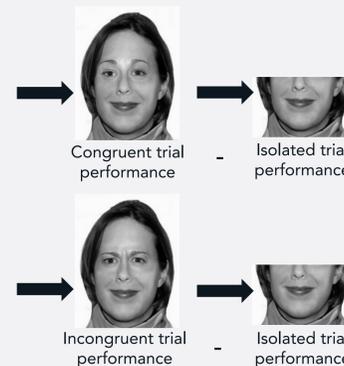


Figure 2. Participants were told before each block whether they would be identifying the top or bottom half expression. In each trial, they were first shown a fixation arrow, followed by a study face for a given exposure duration, followed by a diffeomorphic mask, and finally, a response screen in which they indicated the expression seen.

- To measure the relationship between attachment style and holistic processing, we created **holistic facilitation** and **holistic interference** scores.

**Holistic Facilitation**  
Extent to which information from the whole face improves performance (i.e. increased accuracy or shorter response times)

**Holistic Interference**  
Extent to which distracting information in a whole face hinders performance (i.e. decreased accuracy or longer response times)



## Results: Expression Task Analysis

- Accuracy analysis showed significant main effects of SOA, expression, and condition ( $p < .001$ )
- Two-way interactions between condition and expression; SOA and expression, were significant ( $p < .001$ )
- A three-way interaction between condition, expression, and SOA was significant ( $p < .001$ )

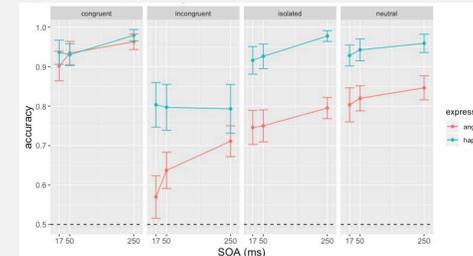


Figure 3. Mean accuracy across levels on the composite expression task. Error bars indicate standard error.

- Response time analysis showed significant main effects of expression ( $p < .001$ ) and SOA ( $p = .004$ ).
- The two-way interaction of expression and condition was significant ( $p = .03$ ), summarized in Figure 4.

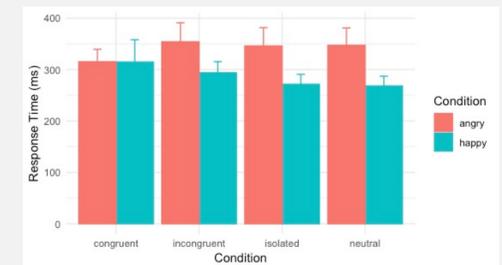


Figure 4. Mean response times for accurate trials on the composite expression task. Error bars indicate standard error.

## Results: Attachment Style

Table 1. Overall means of attachment style and holistic processing scores.

Variable	Mean	Standard Deviation
Anxious Attachment Score	3.04	1.01
Avoidant Attachment Score	2.52	0.72
Holistic Facilitation	0.02%	7.57%
Holistic Interference	2.80%	8.21%

### Holistic Facilitation

- No reliable relationships were found between holistic facilitation of response time and avoidant or anxious attachment styles.

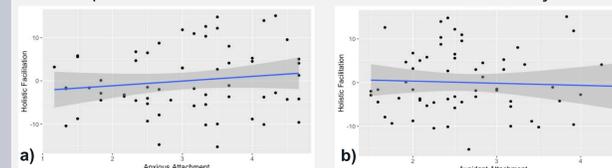


Figure 5. Relationship between holistic facilitation and anxious attachment (a) or avoidant attachment (b). The y axis describes percentage response time change with holistic facilitation, where increase in percentage indicates longer response time.

### Holistic Interference

- A reliable relationship was found between anxious attachment style score and percentage of response time increase in holistic interference ( $Rho = 0.33, p = 0.04$ )
- There was no relationship between avoidant attachment style score and the holistic interference measure.

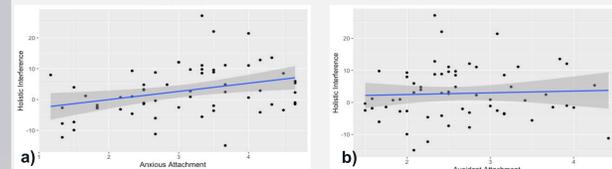


Figure 6. Relationship between holistic interference and anxious attachment (a) or avoidant attachment (b). The y axis describes percentage response time change with holistic interference, where increase in percentage indicates longer response time.

- Overall, these results indicate that more **anxiously attached individuals** are slower to filter out conflicting information in a face when attempting to correctly identify a target feature.

## Discussion

### Composite Expression Task

- Angry** congruent and incongruent expressions showed holistic processing, as evidenced by their differences in accuracy compared to the neutral/isolated conditions.
  - These results contrast with the findings of Tanaka et al. (2012), who did not find evidence of holistic processing in angry congruent expressions.
  - This discrepancy may be explained by important differences in stimuli; specifically, we used closed-mouth expressions, artificial composite faces (rather than natural identities), and diffeomorphic masking.
- While **happy** incongruent expressions showed holistic processing, we did not find evidence for holistic processing in happy congruent expressions (i.e. there was no difference in accuracy or response time).
  - These results suggest that happy expressions employ a more analytic-based approach, requiring only the smiling mouth to accurately identify a happy expression.

### Attachment Style and Holistic Processing

- A more anxious attachment style correlated with slower response times on incongruent expression trials, suggesting increased susceptibility to holistic interference.
  - The **hyperactivating** mechanisms invoked in anxious attachment style may involve holistic processing, with more anxious individuals showing increased tendency to take in and process all aspects of a face when attempting to identify its expression.

## Conclusions

- Angry expressions are processed holistically, while happy expressions are processed both holistically and analytically.
- The hyper-activating strategies used by an anxious attachment style in expression perception may involve holistic mechanisms of expression perception.

### References

- Bowlby, J. (1969). *Attachment and loss Vol. 1. Attachment*.  
Fraedrich, Eva M., Lakatos, Krisztina and Spangler, Gottfried (2010) 'Brain activity during emotion perception: the role of attachment representation', *Attachment & Human Development*, 12, 3, 231 – 248.  
Mikulincer, M., and Shaver, P. R. (2007). *Attachment in Adulthood: Structure, Dynamics, and Change*. New York, NY: The Guilford Press.  
Tanaka, J. W., Kaiser, M. D., Butler, S., & Le Grand, R. (2012). Mixed emotions: Holistic and analytic perception of facial expressions. *Cognition and Emotion*, 26(6), 961–977.