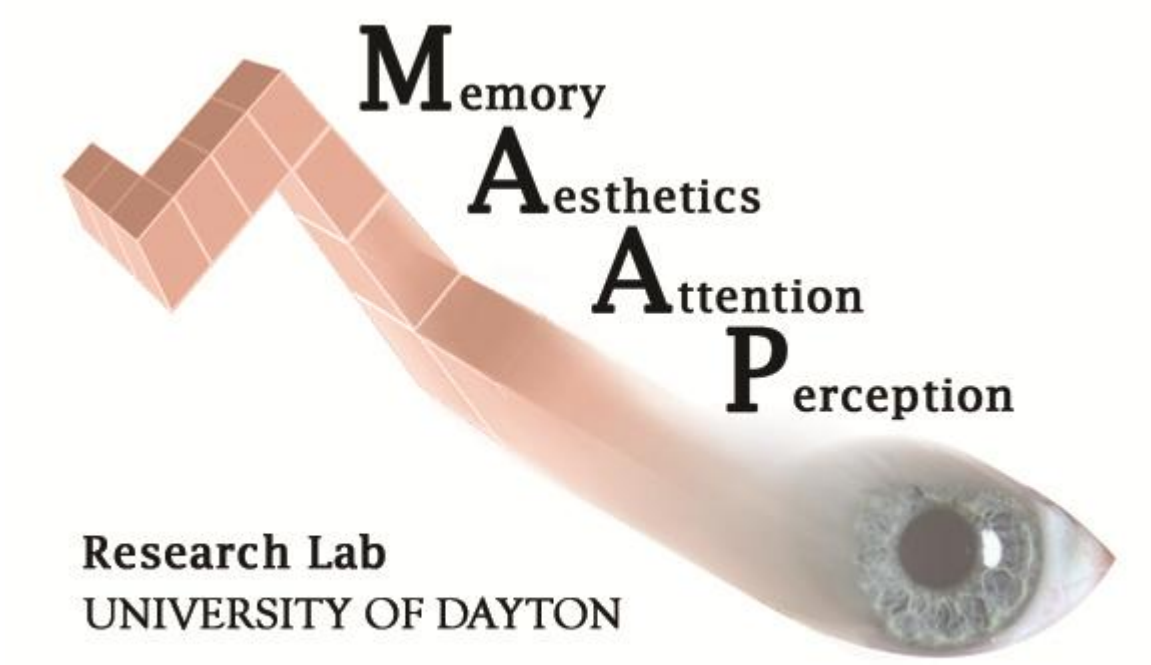


# The Impact of Social Awareness, Empathy, and Confidence on Blindness to Change in Facial Emotions

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## Background

*Change blindness* is a phenomenon occurring when an individual is unable to detect changes in a visual stimulus. Previous studies have measured an observer's ability to detect changes in images separated by some sort of disruption, for example a gorilla walking among basketball players on a court while a game is in play (Simons & Chambris, 1999). It seems impossible to believe that observers would not notice the gorilla. However, since their attention is directed to following the ball on the basketball court instead of the players, the majority of observers report no awareness of the presence of the gorilla.

The present study investigates change blindness, specifically variations in facial indications of emotion. Previous studies have shown that gradual changes of facial emotion produce substantive levels of change blindness when observers are instructed to report the changes verbally (David et al., 2006). It has also been noted that observers express high levels of confidence in their ability and accuracy to detect a change in a stimulus if it were to take place even though they consistently fail to detect changes (Blackmore et al., 1995).

Other research (e.g., Busch, 2010) has shown that physiological measures, such as measures of ocular gaze (i.e., visual scan paths, fixation times, and pupil dilations) assessed by eye-tracking equipment, reveal that more attention is focused on features of a face that are thought to be more indicative of a change in emotion (i.e., eyes) than on non-facial stimuli (Davies & Hoffman, 2003). Consequently, we used eye-tracking equipment, such as the headband and its cameras, as shown in Figure 1, to measure visual scan paths, gaze fixation times, and pupil dilations to detect whether this type of physiological information is consistent with subjective responses

## Hypotheses

First, we hypothesize that gradual changes in the facial emotion of an actor in a video will attract more gaze and fixation time, as measured by an eye-tracker, and be detected more frequently than gradual changes in a neutral stimulus (e.g., changing the color of a shirt).

Second, changes in facial emotion will be detected more often by observers who have greater social awareness and empathy.

Third, observers who are unable to detect changes in facial emotions will express, *a priori*, more overconfidence in their ability to do so compared to observers who are able to detect changes in facial emotions.

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References are available on separate handout. Please ask.

## Method

Participants viewed eight, 48-second videos (from David et al., 2006) and reported changes that they observed. Each video showed gradual changes in either facial expressions of the actors (e.g., from happy to neutral; see Figure 2) or in non-facial stimuli (e.g., from dark to light blue in the color of a shirt; see Figure 3). Presentation order of the eight videos was randomized. Half of the facial changes represented positive emotional expressions (i.e., happy), and the other half represented negative emotional expressions (i.e., sad); half of the participants saw videos that began with the neutral expression and the other half saw videos that began with the emotional expression.

After each video presentation, participants completed a questionnaire to assess whether they observed any change in the video. The *About your Experience 1 Questionnaire* also asked participants to identify the nature of any observed change and how confident they were that they had noticed a change. Following the presentation of all eight videos, participants completed a modified version of the Social Awareness Inventory (SAI; Sheldon, 1996; see Figure 4), the Questionnaire of Cognitive and Affective Empathy Scale (QCAE; Reniers et al., 2011; see Figure 5), and the *About your Experience 2 Questionnaire*, a set of questions designed to assess manipulation awareness, change blindness, attention to change in facially-expressed emotions, and confidence in the assessment of the facial expression change.

Figure 1. EyeLink II Eye-Tracker



A second experiment will be methodologically identical to the first experiment; however, it will include the use of an EyeLink II eye-tracker in an effort to obtain physiological measurements (e.g. gaze patterns, fixations, etc.) to compare with the results of Experiment 1.

Figure 2. Example of Expression Change



Figure 3. Example of Color Change



Figure 4. Example question from SAI

1	2	3	4
Not at all			Very much
1. I often try to come up with my own explanation for why people feel or think a certain way, rather than accepting theirs.			
	1	2	3 4

Figure 5. Example question from QCAE

People differ in the way they feel in different situations. Below you are presented with a number of characteristics that may or may not apply to you. Read each characteristic and indicate how much you agree or disagree with the item by ticking the appropriate box. Answer quickly and honestly.		Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	I sometimes find it difficult to see things from the 'other guy's' point of view.				

## Results

The graph below depicts the participants' accuracy and confidence in detecting changes in facial emotions (*emotional*) and in neutral objects (*non-emotional*). More people in Experiment 1 accurately detected an emotional change, but were under-confident in their ability to detect emotional changes and overconfident in their ability to detect non-emotional changes. Data from participants indicated that participants who were more socially aware (cognizant of what is needed by others in a social situation) and empathic (sensitive to others' emotions) more readily detected changes in facial emotions. Additionally, these data indicate that participants who were least likely to detect changes in facial emotions expressed, *a priori*, more overconfidence in their ability to do so.

Accuracy and Confidence in Detecting Change

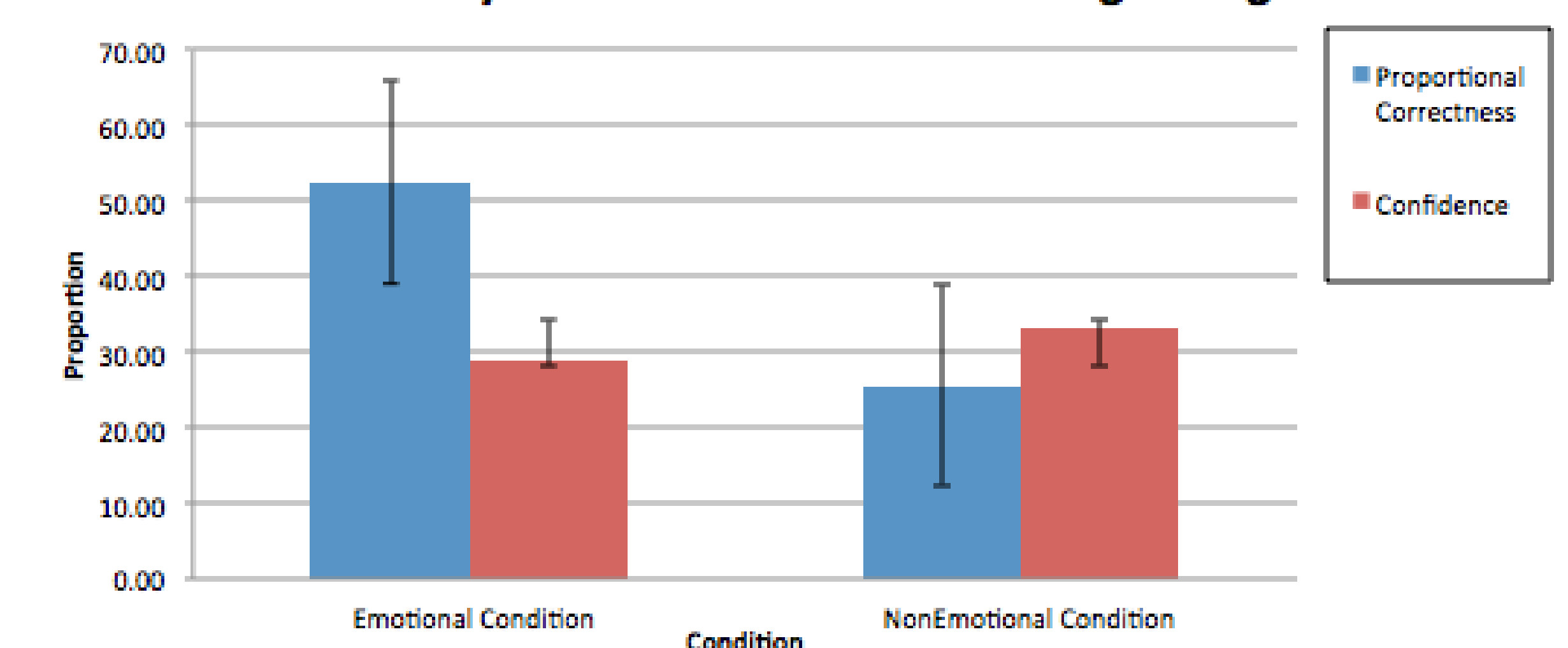


Figure 6 shows pilot data from Experiment 2 showing one participant's eye fixations and the amount of time spent fixating on each area of a frame in a stimulus video. It presents tentative support for the hypothesis that gradual changes in the facial emotion of an actor in a video (woman on the right) will attract more gaze and fixation and be detected more frequently than gradual changes in a neutral stimulus (e.g., the color of the sweater, in this case).

Figure 6. Physiological Data from Pilot of Experiment 2

