“How do eye gaze and facial expression interact?”

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The relationship between eye gaze and facial expression has been of interest to many researchers for years. A recent study challenged all previous work on this subject by introducing a variety changes to earlier experiments (Bindemann, Burton, Langton 2008). Bindemann, Burton, and Langton conducted six experiments to test the theory that faces with direct eye gaze cause a longer reaction time to detecting expression than faces with averted eye gaze. One goal of this study was to test this theory by essentially repeating what was done in past studies (conducted by Ekman and Friesen in 1976 and Adams and Kleck in 2003) with some changes to increase the credibility of the experiment. Another goal was to expand from their findings and test the intensity of emotion and using “blended expressions” (Bindemann et al., 2008). It was anticipated that the results would be the same as it was from past research, being that direct gaze would require a longer time to detect emotion in expression than averted gaze (Bindemann et al., 2008).

In the first experiment, thirty pictures of five white males with happy and sad expressions were displayed on a computer. The pictures were shown at random and included direct and right and left averted gaze. The goal was to have 22 people with “normal to corrected to normal vision” to identify if the expression was happy or sad (Bindemann et al., 2008). Before the experiment started, eight of the participants confirmed that the emotions were accurate with the facial expressions. Each participant completed three sets of 80 randomly arranged pictures after completing a brief introductory exercise (Bindemann et al., 2008). The results did not match their hypothesis, finding that averted gaze had a longer reaction time with a small percent error that was slightly higher with happy expression than sad expression. There was a possible error in the method that could lead to fallible results, being that there was twice as many averted gazes than direct gazes (Bindemann et al., 2008).

Experiment two repeated the method of the first, but it used the pictures of happy and sad expressions from the Ekman and Friesen 1976 study on eye gaze and facial expression. The gaze on the faces was digitally averted instead of the naturally averted gaze in the first experiment, ensuring the exact same facial expression for every emotion (Bindemann et al., 2008). Thirty new subjects were used, all with standard vision, and were instructed to identify the emotion of faces in a practice test as well as three sets of 80 randomly ordered tests. In this test, more errors were made in identifying happy emotions and fewer errors were made identifying sad emotions. However, the results also contradicted the hypothesis and were parallel to the first experiment (Bindemann et al., 2008).

The third test expanded emotion to anger and fright instead of happiness and sadness. Using the same method as first two experiments, the third employed Ekman and Friesen’s digitally edited facial expressions to test 24 participants’ judgments of emotion (Bindemann et al., 2008). An increase in error for both anger and fright was recorded when gaze was to the left or right. Averted gaze increased the perception time in these facial expressions relative to direct gaze, as was found with happy and sad expressions (Bindemann et al., 2008).

In the fourth experiment, 20 subjects identified the intensity of the facial expression on a scale of one to three, one being the least intense and three being the most intense. Stimuli from experiments two and three were used, all with digitally edited eye gaze. The reason for conducting this test is to see how eye gaze affects the perception of facial expressions in detail (Bindemann et al., 2008). It was expected that the participants would take a longer time classifying the amount of emotion in the expressions, possibly leading to further explanations in the relationship between expression and gaze (Bindemann et al., 2008). The stimulus was presented for 2 seconds and participants were asked to respond to the stimuli within 2.5 seconds after the stimuli departed. Forty pre-test exercises were given to all participants and then four sets of 80 pictures were presented for experimentation (Bindemann et al., 2008). Little error was recorded in this trial; less than 1% answered beyond the 2.5-second response allowance. The response times for this experiment were slower across all emotions and directions of gaze. Also, fearful facial expressions showed a wide margin of intensity with higher intensity ratings with direct gaze (Bindemann et al., 2008).

Experiment five employed 18 participants to observe the stimuli from the Adams and Kleck 2003 study on the correlation between eye gaze and facial expressions. All stimuli was digitally revised to turn eye gaze to the left or right and included 15 male and 15 female angry and frightened facial expressions. Also included in this stage of the study was facial “blends,” which were produced by altering sixteen “pure” faces in exact amounts (Bindemann et al., 2008). It was predicted that the participants would take more time determining the emotion in a direct gaze for fearful expressions and less time discriminating emotion in angry expressions with averted gaze (Bindemann et al., 2008). Subjects were instructed to determine if a face is angry or afraid in 304 randomly ordered pictures. It was found that angry facial expressions were identified faster than fearful expressions, but gaze was not a determining factor. The “blends” showed similar results to the “pure” faces, presenting a longer response time for direct gaze and frightened expression than an averted gaze, and a longer response time to the angry averted gaze. This experiment replicated the results found by Adams and Kleck, but it conflicts with the results of the preceding experiments (Bindemann et al., 2008).

The last experiment combined the stimuli from experiment five as well as the happy and sad stimulus from Adams and Kleck’s study, omitting all “blends.” The expectations were that the results would not compare to the results found from experiment five due to the increase in variety of facial expressions, paralleling the results found by Adams and Kleck (Bindemann et al., 2008). Thirty-two new participants were used for this study and were asked to determine the emotion the stimulus presented. Each participant completed a trial test before beginning the experiment of eight sets of stimuli (Bindemann et al., 2008). What they found was that averted eye gaze increased the response time in all four facial expressions. Interestingly, time was significantly increased in facial expressions implicating anger and fear, questioning the results achieved by experiment five (Bindemann et al., 2008).

This study provides an excellent look at research in the psychology of sensation and perception. The subject matter of eye gaze and its affects on facial expression recognition can give us insight to how emotions are communicated and how important eye gaze is in communication and attention (Bindemann et al., 2008). As discussed in class, perception can affect behavior. Studying the effects of eye gaze on the perception of facial expression can lead to a better understanding of human behavioral psychology.

Although this study was carefully completed and based on previous successful studies, there could have been some changes to ensure a more valid outcome (Bindemann et al., 2008). One aspect that could have been changed is the participant variety. This study used new subjects in several stages of the experiment, which can lead to varied results due to knowledge, personal experience, and individual behavior. Using the same subjects for each experiment may result in more consistent conclusions. Also, this may change cross culturally, so utilizing individuals from several different cultural backgrounds can increase chances for inconsistency.

Overall, this study proves that there needs to be more research conducted on this subject. Research has shown that eye gaze influences the observation of facial expression, but the defining line to determine why and how the perception of emotion is affected is undetermined.

Reference

Binderman, M., Burton, A. M., & Langton, S. R. H. (2008). How do eye gaze and facial expression interact? *Visual Cognition, 16*(6),708-733.