

## ABSTRACT

The Thatcher Illusion occurs when a face with an inverted mouth and eyes is turned upside down and distortion is no longer noticed. Two happy faces from Eckman and Friesen's "Unmasking the Face" were chosen. Of sixty-four faces, half were distorted using the Thatcher Illusion. All were presented in the right or left visual fields at various angles (0, 15, 45, 90, 105, 135, 150, 180) for 0.20 seconds. A fixation dot was centered on each slide. Participants rated the happiness of each face from 0 (none) to 10 (extreme). Results indicated that faces presented to the left visual field (right hemisphere) were perceived as happier in the normal faces, and, less susceptible to the Thatcher illusion. These results support the theory that the right hemisphere is more "global" in face perception, and the left hemisphere is more focused on individual facial features.

## BACKGROUND

In 1980, Thompson discovered the Thatcher Illusion. Named for Maggie Thatcher, who's face was used in the original, the illusion occurs when the eyes and mouth are both rotated 180° on an inverted face. The resulting phenomenon is that the distortion of the eyes and mouth goes unnoticed. The prevailing theories for this occurrence are that faces are processed either locally (featural) or globally (configural). By inverting the faces, the configural processes cannot function adequately, therefore, changes made to individual features are difficult to identify (Anstis 2009). Though the mouths on Thatcherized faces should appear as a frown as the mouth is inverted, it is still perceived as a smile. In perceiving the face, the mouth is judged separately from the rest of the gestalt. As Thompson mentions in his original paper, if an inverted face is seen a smiling, it is being judged by configural context of the face. In contrast, if the face is viewed as a scowl, it is being judged as an isolated feature.

## OBJECTIVE

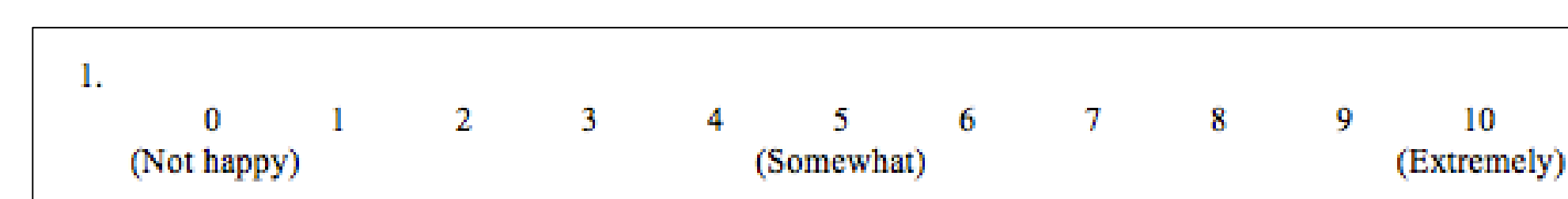
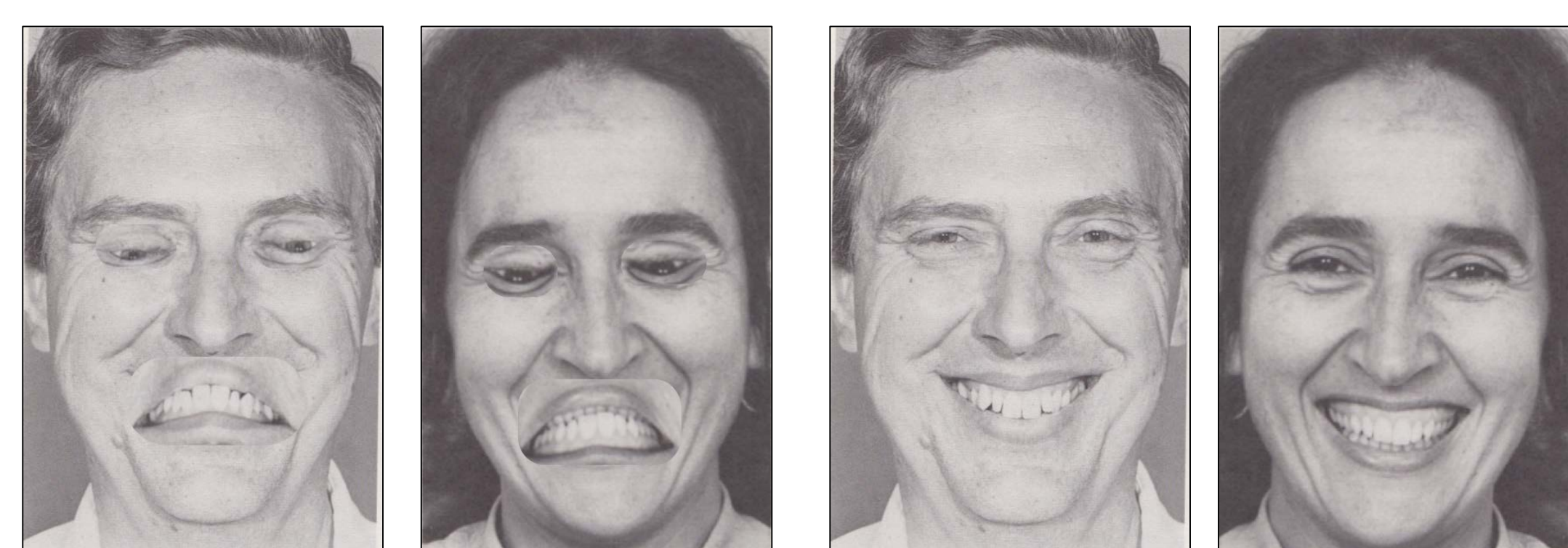
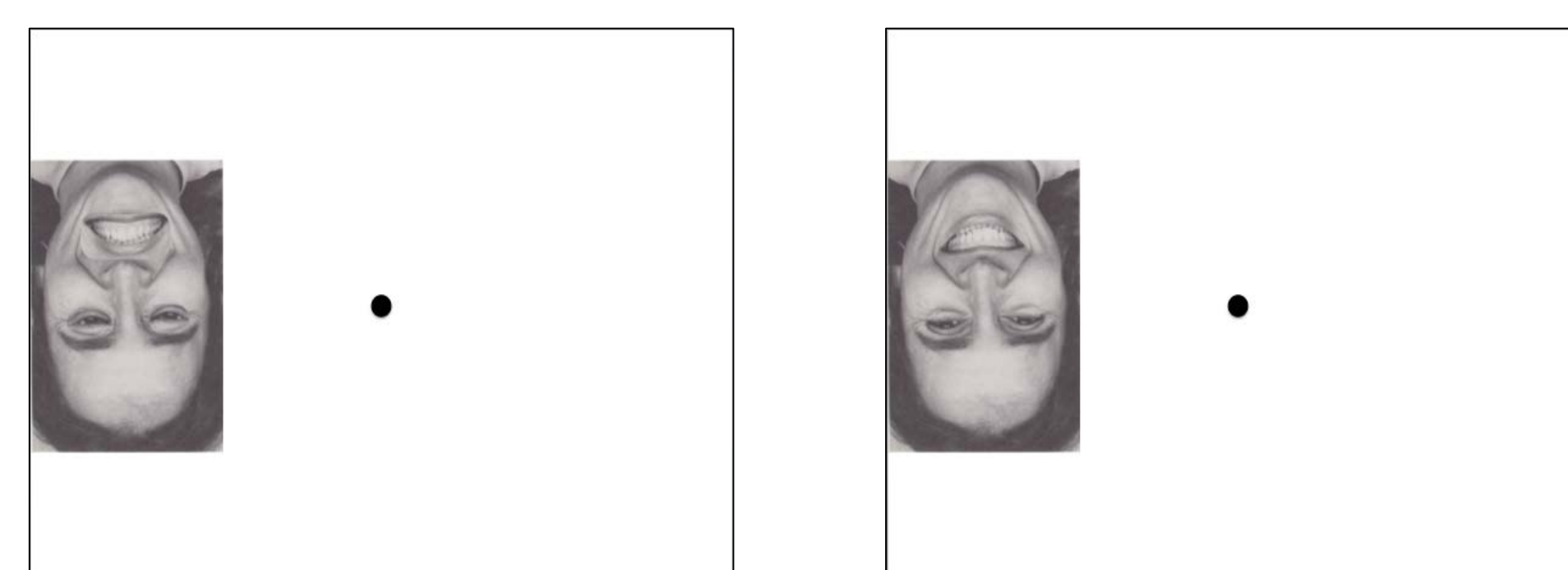
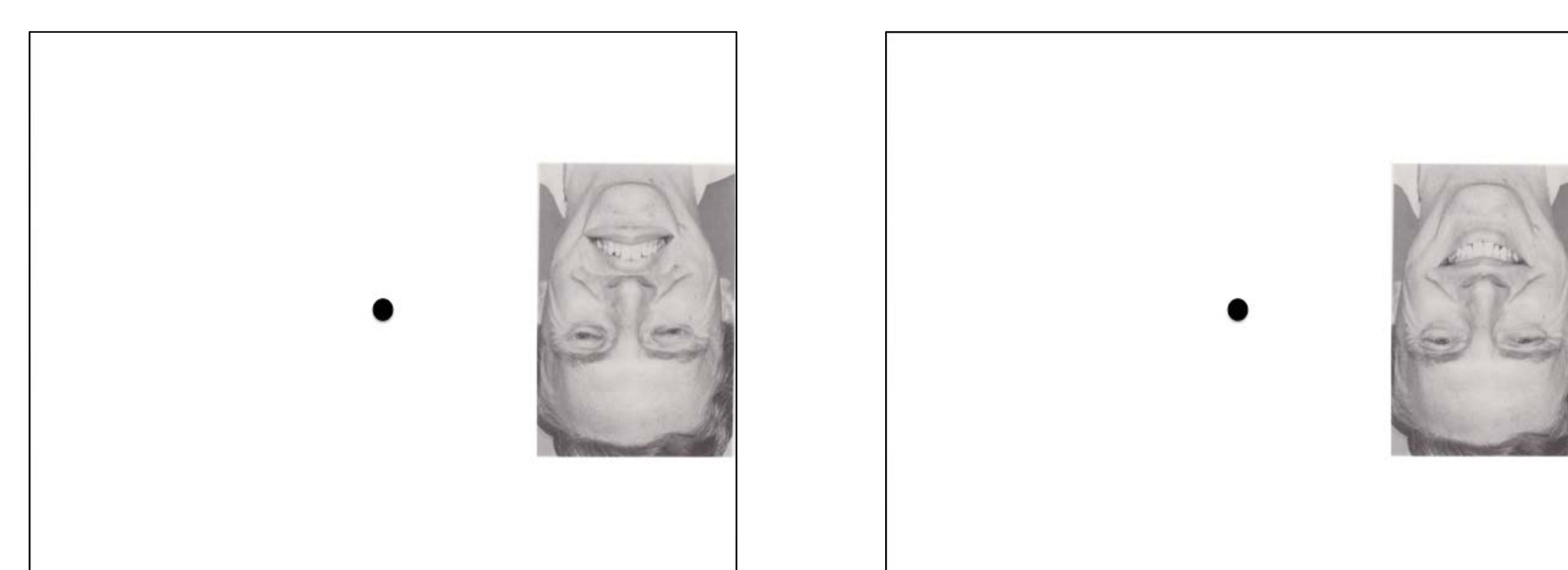
The goal in researching the Thatcher Illusion is to look for hemispheric effects on emotional perception as well as identify the angle at which the distorted face shifts from unnoticeable to grotesque in appearance. It is hypothesized that faces from the left visual field (right hemispheres) will be more accurate in face perception, seeing more emotion in the left visual field and being less susceptible to the Thatcher Illusion.

## METHOD

Faces presented on left or right of slides for 0.20 seconds each. A black fixation point was centered on the screen and participants were instructed to focus on the point. They were asked to rate the happiness of each face from 0 (no happiness) to 10 (extreme happiness). Faces were presented at 8 angles, 0, 15, 45, 90, 105, 135, 150, 180 degrees respectively. Sixty-four faces presented total, 32 normal, 32 distorted.

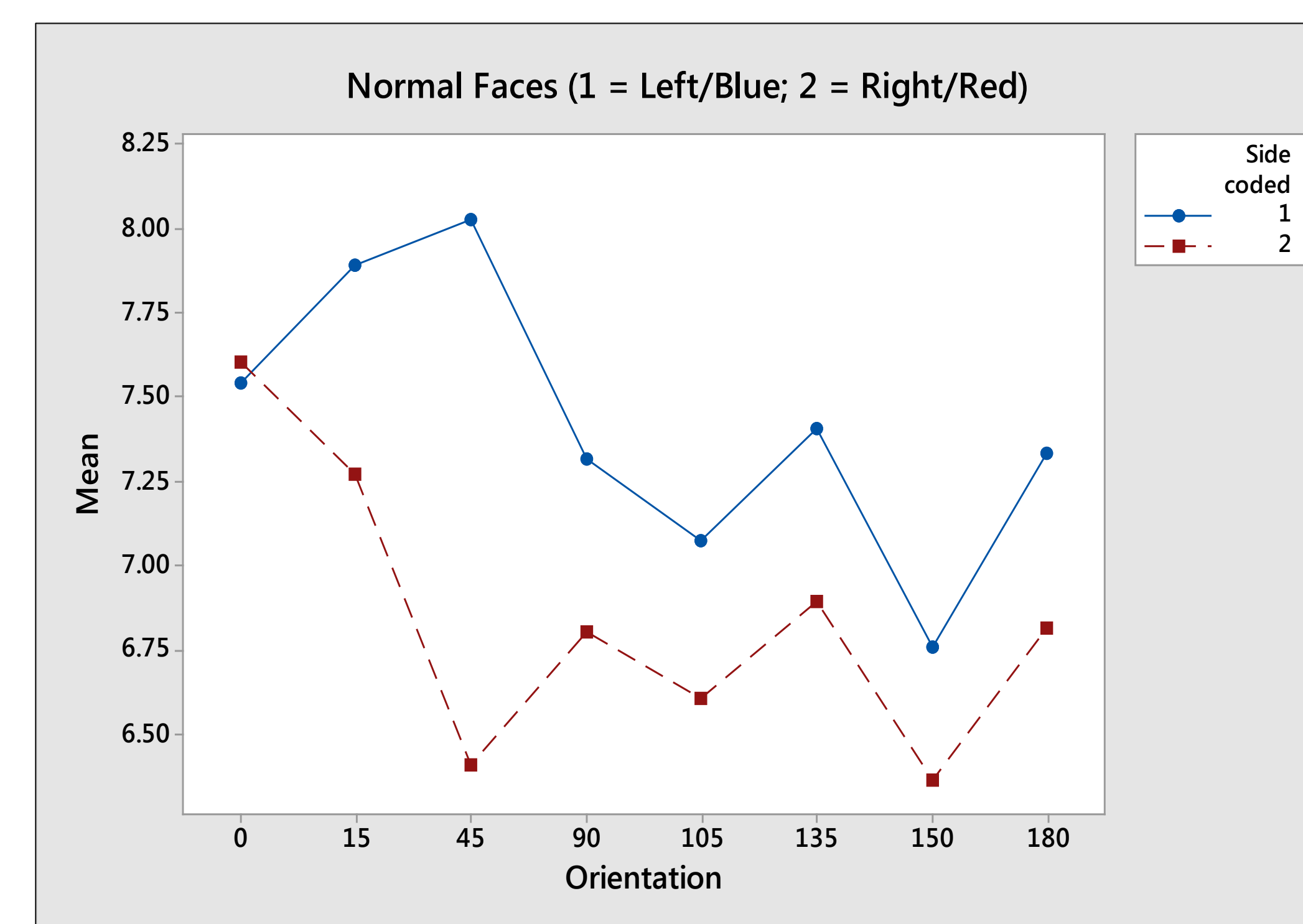
Participants were undergraduate students at Plymouth State University. Students signed up for the study online through SONA, on which the study was posted. Students received 1 research credit for which they were given extra credit in Psychology courses. Students were not required to participate and were given alternative assignments they could complete for extra credit other than research participation.

Participants were run one at a time. The presentation was shown on a Dell 22 Monitor and participants hit the down-arrow key of a keyboard to show the faces.

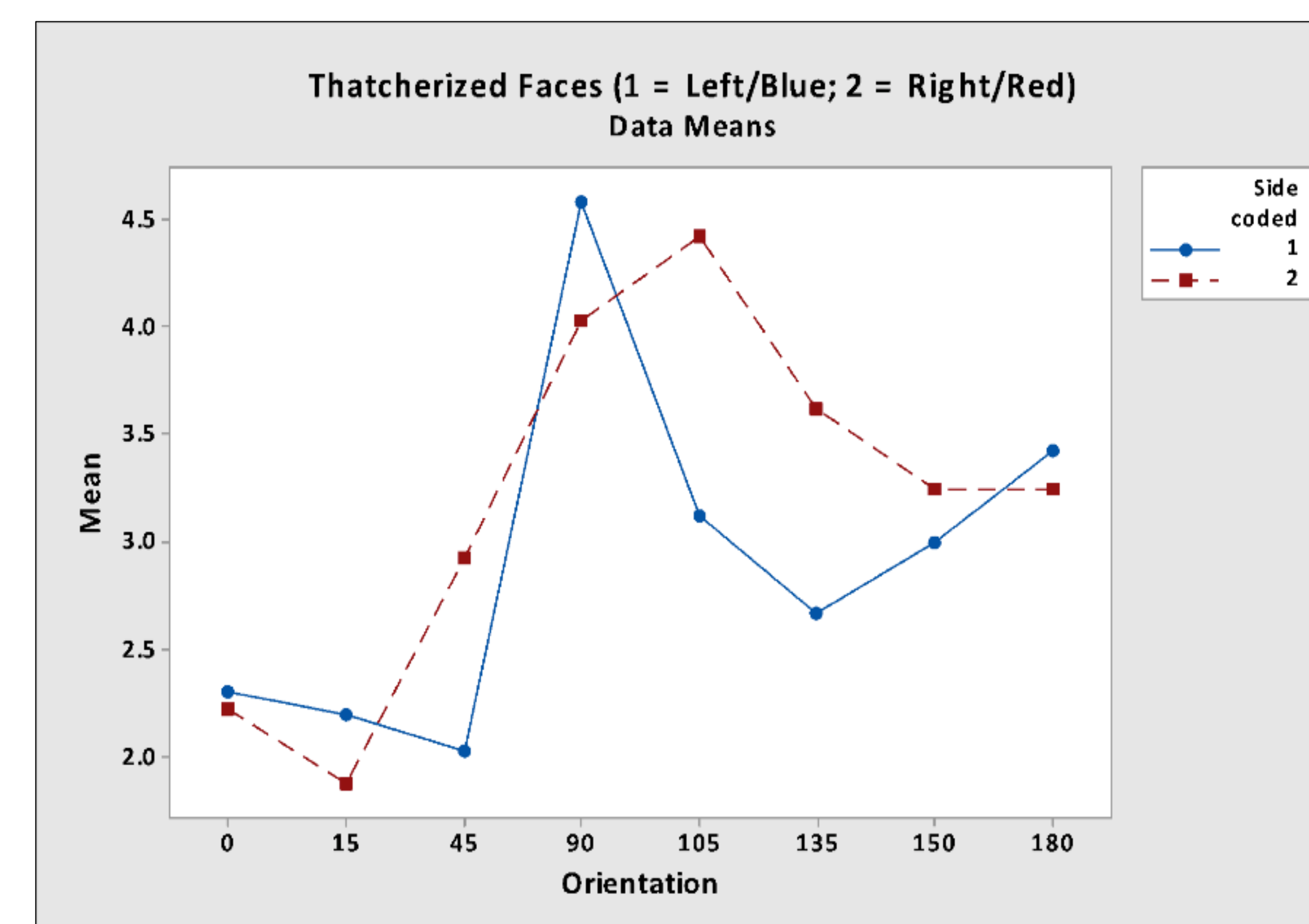


This Likert scale was used to score the happiness of each presented face. Participants audibly reported their scores and the administrator recorded the number on either a printed answer sheet numbered 1-64 or directly input the ratings into an Excel file.

## RESULTS



For the normal faces, a main effect of Side and an interaction of Side x Orientation were found. In general, faces in the Left Visual Field (blue) were perceived as happier than those in the Right Visual Field (red) ( $F(1,33)=29.31; p=.000$ ). Additionally, faces at 0 degrees were seen as virtually the same level of happiness, but as Orientation changed, faces in the Left Visual Field were perceived as happier ( $F(1,32)=2.47; p=0.016$ ).



For Thatcherized or distorted faces, main effects of Side and Orientation were found. In terms of Orientation, the faces at the extremes (0 and 180 degrees) were rated lower than the angles in the middle (90 and 105 degrees) ( $F(1,32)=19.88; p=.000$ ). The main effect of Side is such that faces in the Left Visual Field (blue) are perceived as less happy than those in the Right Visual Field (red) ( $F(1,32)=5.36; p=0.021$ ).

The normal faces were overall perceived as happier than the distorted ( $F(1, 32) = 1969.75, p=.000$ ).

## DISCUSSION

These findings support the Right Hemisphere Hypothesis, that emotions are primarily perceived in the Left Visual Field/Right Hemisphere (Bowers, Bauer, Coslett, & Heilman, 1985). For the normal faces, those in the Left Visual Field/Right Hemisphere were perceived as happier, indicating that the Right Hemisphere has higher aptitude in detecting emotions. Not only this, but the hemispheres seem equal in detecting happiness at 0 degrees, but when the angle is changed, the faces in the Right Visual Field/Left Hemisphere are perceived as less happy. This finding suggests that the Left Hemisphere is fooled by changes in orientation whereas the Right Hemisphere still perceives the underlying emotion despite the change. This holds true in the distorted faces. In general, the distorted faces presented in the Left Visual Field/Right Hemisphere were perceived as less happy in comparison with those presented in the Right Visual Field/Left Hemisphere. The Right Hemisphere detects the distortion of the face and in general is able to see the face as unhappy, despite the angle. In contrast, the Left Hemisphere is unable to detect the distortion at most angles and sees the face as happier. It was expected that there would be a jump in scores of the distorted faces near the 180 degree mark as the illusion suggests. This was not the case, instead a spike in scores near 90 degrees occurred for both visual fields. This was an unexpected finding, and one that will require further research to investigate and explain. In short, a hemispheric effect was found: the Right Hemisphere is less susceptible to the Thatcher Illusion.

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