Attention Directs Emotion: Directed Attention Drives Emotional Intensity and Distinctiveness of Facial Perception

Ashley Marie Schuett
University of Colorado Boulder, ashley.schuett@colorado.edu

Follow this and additional works at: https://scholar.colorado.edu/honr_theses
Part of the Social Psychology Commons

Recommended Citation
https://scholar.colorado.edu/honr_theses/1072

This Thesis is brought to you for free and open access by Honors Program at CU Scholar. It has been accepted for inclusion in Undergraduate Honors Theses by an authorized administrator of CU Scholar. For more information, please contact cuscholaradmin@colorado.edu.
Attention Directs Emotion:

Directed Attention Drives Emotional Intensity and Distinctiveness of Facial Perception

Ashley M. Schuett

University of Colorado Boulder

Department of Psychology and Neuroscience

Defended April 1, 2016

Examining Committee:

Dr. Leaf Van Boven, Thesis Advisor
Department of Psychology and Neuroscience

Dr. Mark Whisman, Honors Council Representative
Department of Psychology and Neuroscience

Dr. Tracy Ferrell, Honors Council Representative
Program of Writing & Rhetoric
Abstract

Does attention affect how you feel about someone? Researchers have shown that there may be a relationship between attention and emotion. However, less research has been done to investigate the relationship between the level of attention and the impact on the perception of others. Given that, this study was conducted to test two hypotheses. First, that directing attention towards a face increases threat and decreases trustworthiness one feels towards that person. Second, that attention increases emotion because it increases distinctiveness. To test these hypotheses, 43 participants underwent a computer simulation and viewed six sets of slideshows that contained white and black male faces that expressed happy, neutral, and angry emotions. Attention was manipulated by randomly assigning one target image per set that the participant was instructed to direct their attention towards during each slideshow. After the slideshow, participants indicated how threatening, trustworthy, and distinctive the target image was compared to non-target images. Results suggest that target images, overall, increased threat perceptions compared to non-target images. Results also support the hypothesis that attention will increase emotional intensity because of distinctiveness. However, attention did not seem to have an effect on trustworthiness. Furthermore, the significance and intensity of threat perception differed in response to which race and which emotional expression the participant was exposed to in each slideshow. These findings contribute to a growing body of literature on how attention affects emotion and elaborate on the social and clinical implications that exist because of this relationship.

*Keywords:* attention, emotion, distinctiveness, threat, trust
Attention Directs Emotion:

Directed Attention Drives Emotional Intensity and Distinctiveness of Facial Perception

Imagine you are a Transportation Security Administration (TSA) agent whose job it is to decide who is suspicious and if they need to be searched further. How do you decide which people are potentially threatening and who would require additional questioning? Although you will try to evaluate threat objectively, research shows that many features will capture your attention such as race, angry facial expression, and distinctive facial features (Shapiro, Ackerman, Neunberg, Maner, Becker, Kendrick 2009; Öhman, Lundqvist, Esteves, 2011; Carrasco, 2006). The mere fact that these people capture your attention may bias your decision. A person who is actually threatening but who looks very typical and blends in may go unnoticed, while a person who is actually trustworthy but is wearing bright colors or who happens to be distinctive in appearance may be perceived as threatening.

Everyday people are forced to make decisions in convoluted and ambiguous social environments. The attention that people allocate towards certain stimuli can have profound implications on the decisions that they make. Studying how attention affects emotion can help explain why people make the decisions they do.

Past research has illustrated that threatening faces capture attention. Humans preferentially orient their attention towards threat and more accurately detect threatening faces when compared to other faces (Öhman, Lundqvist, Esteves, 2001). This “threat advantage” is attributed to an evolved module of fear and fear learning (Öhman, Mineka, 2001). The fear module is automatically activated by fear-relevant stimuli with no conscious cognitive control (LeDoux, 1996). This automatic response to threatening stimuli has helped humans quickly analyze their surroundings in order to survive in times of danger.
Other factors have been shown to capture attention as well. For example, the onset of sudden motion attracts attention (Abrams & Christ, 2003). Interpreting this finding from an evolutionary perspective, one’s survival could depend on a rapid detection of predators, prey, or competition and therefore could be the difference between life and death. Attention and emotion are fundamental components of every day human interactions and warrant further study of their consequences in modern social environments.

We hypothesize that directed attention towards a person makes that person seem more threatening. Previous research provides indirect support for this prediction. Research has demonstrated that directed attention in search of objects that lack emotionally evocative attributes increases their emotionality (Mrkva, Westfall, & Van Boven, 2015; Fenske & Raymond, 2006; Pessoa, Padmala, & Morland, 2005). Attention increases emotion, particularly for otherwise neutral stimuli (but not only for neutral stimuli). This research suggests that directed attention increases emotional intensity because it increases distinctiveness. This results in otherwise neutral and unemotional objects embodying more emotionally evocative properties than they would have without the directed attention.

Attention has also been shown to increase extremity of evaluations (Krajbich, Lu, Camerer, & Rangel, 2012). Past research suggests that attention makes positive things more positive and negative things more negative. For example, if the TSA agent has a negative stereotype about a certain population and then proceeds to pay more attention towards an individual from that population, the TSA agent will be more likely to exhibit more negative emotions towards that individual.

Based on the research summarized above, we also hypothesize that attention will increase emotional intensity through distinctiveness. This study defines distinctiveness by the object’s
fundamental property of vividness (Reyes, Thompson, & Bower, 1980), and the object’s relational property of being salient in comparison to other objects (Thomson & Milliken, 2012). For example, if someone has a distinguishing characteristic that deviates from the norm, more attention will be allocated towards that characteristic.

Research has demonstrated that attention has been specifically shown to increase contrast, salience, and distinctiveness (Carrasco, 2011; Fuller & Carrasco, 2006; Liu, Abrams, & Carrasco, 2009). Furthermore, distinctive faces are perceived to be more threatening (Sofer, Dotsch, Wigboldus, & Todorov, 2014). This research explains that face typicality is the foundation for the social perception of others. It affects trustworthiness such that more typical faces are judged to be trustworthy and more atypical and distinctive faces are judged to be threatening. If attention dictates distinctiveness, and distinctiveness dictates facial interpretation, then the amount of attention dedicated to a face should therefore impact our feelings about that person. In all, the amount of attention dedicated to a face and how distinctive that face is plays a significant role in our interpretations of others and our environment.

In summary, this study has two hypotheses. First, we believe that increased attention on a face will increase the perceived threat and decrease the trustworthiness that one feels towards that person. In particular, we suspect that targets will increase perceived threat for angry faces more than other faces (i.e. neutral and happy faces). Second, attention will increase emotional intensity because of distinctiveness.

**Method**

**Participants**

University of Colorado at Boulder undergraduates (N=43; 15 males, 28 females) participated individually for course credit. Other specific demographic information was not
recorded for purposes of confidentiality. Participants sat at a private computer in a secluded room for the forty-five minute experiment. All participants provided informed consent as per the University of Colorado Institutional Review Board.

**Design**

The design of this study consisted of a 2 (Race) x 3 (Emotional Expression) within-participant factorial design. Race referred to either white or black facial images. Emotional expression referred to the type of facial expression exhibited in the image, which was classified as either a neutral, happy or angry expression (see Table 1).

**Stimuli.** The stimuli used in this study consisted of images of male-only faces that were classified as expressing a neutral, happy, or angry emotion. The stimuli were collected from the Chicago Face Database (Ma, Correll, & Wittenbrink, 2015) and were divided into six sets of images based on the race and emotional expression of the face (i.e., black neutral, black happy, black angry, white neutral, white happy, and white angry). Each set contained 35 images from which each participant viewed a random sample of ten. With six total combinations in the experimental design, the total number of required images equaled 210 (see Table 1).

**Stimuli Standardization.** The creators of the Chicago Face Database adhered to a very strict stimuli standardization process for all of the models’ pictures. The models’ head positions were held constant, all models wore the same grey shirt, and three photo lamps were used to control lighting conditions. Faces were only selected for the Database based upon the following criteria: the model’s head needed to be as vertical as possible and the faces had to be turned directly towards the camera such that both ears could be seen equally. From there, two independent judges rated the quality and believability of the emotional expressions and rated the accuracy of the head positioning on a 1-9 Likert scale (1 = not at all believable; 9 = very
believable). Once the top images were selected, neutral and emotional expression image files were digitally modified using Adobe Photoshop in order to remove facial hair, earrings, or facial piercings. Finally, all images were placed onto a plain white background in order to equate for color temperature. All faces were 532 pixels x 400 pixels in size and were centered on the screen. See Figure 8 for all potential faces used in this study.

**Target and control images: procedure**

Prior to the initial presentation of the first trial, participants learned that the experiment would consist of six segments, each containing ten different images of faces. Participants were instructed that the task was to quickly and accurately judge an individual’s traits based only on the presented image. At the beginning of each segment, participants were presented with a randomly selected “target face” that was highlighted in yellow. During the slideshow ten images, including the target image, were presented for 1 second each. Following the presentation of each image, an “X” was presented for 0.5 seconds. Participants were told to press the “J key” if the presented image matched the target image presented at the beginning of the trial. If the image did not match the target image, the participant was instructed to press the “F key.” See Figure 1 and Figure 2 for visual representations of the slideshow.

Following the presentation of the ten images, the target image was shown followed by five questions. The first four were intended to assess the perceived threat and/or trust of the individual in the image. The fifth question was intended to determine the focus that the participant exhibited to the target and non-target image. Once the five questions were answered, a randomly selected image from the current trial was selected and the same five questions were asked again for that particular image. The four questions related to trustworthiness and threat consisted of; “How threatening did this person seem?” “How threatening is this person?” “How
trustworthy did this person seem?” and “How trustworthy is this person?” The participants were instructed to answer each question using a 9-point scale, with 0 representing “not at all” threatening/trustworthy and 9 representing “extremely” threatening/trustworthy. The fifth question, intended to measure focus, was “During the slideshow, to what extent did you focus your attention on this picture?” and used a 6-point scale with 0 representing “not at all” and 6 “a great deal”.

The participants repeated the same procedure for each of the other five sets of images. Participants were randomly assigned to view the white faces first or the black faces first. Within each set, the order of the three emotion sets was counterbalanced. See Table 2 for an example of the procedure that a participant may have experienced in this study.

**Results**

Each of the hypotheses were tested using a paired-samples t test. First, we compared target faces to non-target faces overall (across all six sets). Then we computed paired-sample t tests which compared targets to non-targets for each of the six sets individually: white angry faces, white neutral faces, white happy faces, black angry faces, black neutral faces, and black happy faces. Because of the nested/crossed nature of the design, we also analyzed the data using linear mixed effect models with the supervision of a doctoral student. For the ease of the interpretation and presentation, only the paired-sample t-tests will be summarized.

**Manipulation check.** The directed attention manipulation did affect visual attention. A paired-samples t test revealed that participants reported focusing more attention on target faces \((M = 5.72)\) compared to non-target faces \((M = 4.24)\), \(t(42) = 5.04, p < .001\). We also tested the simple-effects of directed attention on the manipulation check question for each face set individually. Targets were higher than non-targets for all six sets of faces (all \(ts > 2\), all \(ps < .05\),
and the effects were similar in size for each set (see Figure 4). These significant results indicate that the manipulation of the independent variable had its intended effect on the participants; participants do indeed focus more attention on the target faces.

**Overall judgments of threat.** When comparing target faces \((M = 4.25)\) to non-target faces \((M = 3.70)\) overall, the target faces significantly increased threat for angry faces \(t(42) = 2.27, p = .029\). This overall analysis supports the first hypothesis that directed attention increases perceptions of threat.

**Judgments of threat and trust.** When comparing target faces to non-target faces of different races and emotions, directed attention did not significantly alter how threatening the faces were perceived to be by the participants. Simple-effects tests revealed somewhat different patterns for each set. For the white angry set, target faces \((M = 4.31)\) were perceived to be more threatening than non-target faces \((M = 3.62)\), \(t(42) = 1.92, p = .062\). For the black angry set, target faces \((M = 4.10)\) were non-significantly more threatening than non-target faces \((M = 3.72)\), \(t(42) = 1.17, p = .248\). For the white neutral set, target faces \((M = 3.68)\) were rated about equal in threat compared to non-target faces \((M = 3.64)\), \(t(42) = 0.13, p = .898\). For the black neutral set, target faces \((M = 3.07)\) were rated less threatening than non-target faces \((M = 3.64)\), \(t(42) = -2.29, p = .027\). For the white happy set, target faces \((M = 3.71)\) were non-significantly more threatening than non-target faces \((M = 3.37)\), \(t(42) = 0.93, p = .361\). Finally, for the black happy set, target faces \((M = 3.19)\) were about equal in threat compared to non-target faces \((3.27)\), \(t(42) = -0.33, p = .745\). In summary, this analysis suggested that threat perception ratings increased more for target images than non-target images (with the exception of black neutral faces).

Although these results were not significant by themselves, it is still interesting to note the increase in threat perception ratings due to directed attention on a target (see Figure 5).
Next, we conducted a paired-samples t test to examine the effects of directed attention on perceived trustworthiness. Contrary to our hypothesis, targets ($M = 4.40$) were not perceived to be less trustworthy than non-targets overall ($M = 4.29$), $t(42) = 0.98, p = .332$. Simple-effects tests showed that black angry targets were rated to be somewhat more trustworthy ($M = 4.79$) than black angry non-targets ($M = 4.18$), $t(42) = 1.83, p = .075$. Targets were not appreciably different from non-targets in trustworthiness for any of the other five sets. (all $ts < 1.30$, all $ps > .20$) (see Figure 6).

We also tested the effects of directed attention on distinctiveness. This is a test of the mediating process; we expected attention to affect distinctiveness. Overall, directed attention increased distinctiveness such that targets ($M = 5.72$) were rated as more distinctive than non-targets ($M = 4.24$), $t(42) = 7.17, p < .001$. Targets were higher than non-targets for all six sets of faces (all $ts > 2$, all $ps < .05$), and the effects were similar in size for each set (see Figure 7). There was a significant correlation between distinctiveness and threat $r = 0.09, p < .001$. The linear effects model confirms this result, which is not presented here for ease of interpretation. These results provided support for our second hypothesis: attention will increase emotional intensity because of distinctiveness.

**Discussion**

Previous literature makes it clear that attention and emotion are fundamental components of human nature and experience. While past research illustrates that emotion directs attention (Öhman, Lundqvist, Esteves, 2001) and that distinctive faces are perceived to be more threatening (Carrasco, 2006), the present research demonstrated that the reverse is also true: directing attention towards certain faces makes them more emotional and distinctive.
The present study used a novel face perception and directed attention task to examine how attention affected emotion and if attention had any effect on increasing facial distinctiveness. The data supported our predictions that increasing attention on a face will increase the perceived threat; this increase in emotion will be the result of distinctiveness. However, the data did not support our second prediction that increased attention on a face will decrease the trustworthiness one feels towards that person. This section will also address the surprising finding that black neutral faces were the only set that went against the overall results. In all, these results speak to the importance of understanding the consequences associated with directing attention towards certain people in our daily environments.

**Judgments of threat**

Our results suggest that directing attention towards angry faces overall significantly increases threat response. These results are consistent with previous literature that suggests that angry faces are more quickly and accurately detected than other negative faces such as sad or scheming (Öhman, Lundqvist, Esteves, 2001). Evolutionary psychologists have attributed this phenomenon to a fear module that, over time, has been subconsciously inbred into humans. Research has traced this phenomenon to the area in the brain called the amygdala (Öhman, Minkea, 2001). This area of the brain receives processed input from the thalamus and the cortex of the brain and its role is to decide and then send the emotional output via hypothalamic and brain stem nuclei (Öhman, Minkea, 2001). This is the neurologic roadmap of the fear module that dictates our emotions without much cognitive control. This pathway makes decisions about who is safe and who is dangerous in our environments and therefore determines whom we interact with and whom we avoid. We believe that our results expand this literature by suggesting that directing attention towards threatening faces will increase this fear response.
Our results also suggest a simple intervention that could allow you to take back control over this evolutionary and subconscious response. Because our study illustrates that directing more attention towards a threatening face increases threat response, the reverse should also be true: intentionally diverting attention away from a threatening face should allow you to not experience the same heightened emotional reaction. This highly speculative suggestion could have a real world impact in both social and clinical contexts.

A real world clinical context can be found in people who have a social anxiety disorder. According to the Diagnostic Statistical Manual V for Psychological Disorders, people with social anxiety disorders experience a persistent, excessive, and unreasonable fear of social or performance situations in which one is exposed to unfamiliar people or to the possible scrutiny of others (American Psychiatric Association, 2013). This can result in panic attacks, avoidance, anxious anticipation, or disruption in someone’s normal and occupational routine. Our findings are consistent with previous research that has illustrated that it is possible to train people to disattend from threatening stimuli; this in return can reduce social anxiety symptoms (Schmidt, Richey, Buckner, & Timpano, 2009). Perhaps by intentionally diverting attention away from seemingly threatening stimuli, one could have more control over his or her emotional response. This training could give back the control and power to create an alternative pathway for emotional regulation that is separate from the deeply ingrained fear modulate that, when it is triggered, operates without cognitive control.

As optimistic as this overall result is, our results comparing target faces to non-target faces across all six sets did not significantly alter how threatening or trustworthy the faces were perceived to be by the participants. Each set had different patterns depending on the race of the face and the emotional expression. In particular, white angry faces received the highest non-
significant threat response compared to all other faces and emotions. Our results of the white angry faces differ from previous literature about racial judgments. Past research has indicated that white people attend preferentially to black faces (Eberhart et al., 2004) and when black male targets display heuristic cues to danger (e.g., angry facial expression) they are encoded more efficiently by white perceivers (Ackerman et al., 2006; Trawalter, Todd, Baird & Richeson, 2008). We speculate that our results differ from previous literature due to our sample consisting of a majority of white college participants and their considerations of current events surrounding police brutality among ethnic minorities and college campus racial conflicts. During the time of our study, many college campuses were experiencing racial protests and many universities were openly addressing issues of racial tension on their campus. Perhaps the white participants in our study felt more comfortable rating their fellow white males as more threatening than they did rating black males as more threatening. This speculation is in line with previous research on people’s motivation to respond in a socially desirable manner. This speculation is further discussed below.

One result in particular was the most surprising: black neutral faces significantly decreased in threat when more attention was directed towards them. This was counter to our predictions and is an outlier to the rest of the results indicating that attention increases threat response. We believe that this result is due to participants responding in a socially desirable manner. Considering the fact that participants came from a majority Caucasian sample (there were no African-Americans who signed up for our study), we believe participants might have been trying to respond in a socially desirable manner and may have overcompensated in order to not appear racist.
Previous literature supports our reasoning as to why this occurred. According to a study titled *Following in the Wake of Anger: When not Discriminating is Discrimination*, white and black targets are inherently evaluated differently (Shapiro, Ackerman, Neunberg, Maner, Becker, Kendrick 2009). This study had a relatively homogeneous sample as well and they came to the conclusion that certain people are motivated to respond without prejudice. They determined that certain individuals who score high on internal motivation (IMS) might try to respond without prejudice by strongly avoiding any endorsement of negative stereotypes of black targets. These individuals try to respond to black targets as if they were to respond to white targets. It is possible for individuals to overcompensate because of their motivation to not blatantly discriminate. However, this study also revealed that people who score low on levels of IMS respond to black targets more stereotypically and therefore have increased threat ratings. In our study, we did not evaluate individual levels of IMS; however, we believe our study endorses this idea that certain people are motivated to respond without prejudice and may overcompensate on their assessment of threat ratings.

During our experiment, participants only saw one race within each set but saw both races during the experiment. In fact, participants either saw the three sets of all white faces followed by the three sets of all black faces or vice versa. Because of this finding and the research supporting our assumptions behind it, we are going to focus on the participants who saw white faces first in order to discuss those who were uncontaminated by racial bias. In fact, targets seemed to increase threat for people who saw the white faces first (see Table 3). This is more consistent with our hypothesis. People who saw black faces first may have resisted these effects due to concerns about social desirability and may have assumed that the purpose of the experiment was to assess racial biases.
Judgments of trust

Our results do not support the hypothesis that attention will decrease perceived trustworthiness. Targets were not significantly different than non-targets in trustworthiness for the following sets: white happy, white angry, white neutral, black happy, and black neutral. However, black angry targets were rated to be somewhat more trustworthy than black angry non-targets. Again, this could further support our assumption and the previous literature that suggests that people are motivated to not endorse negative stereotypes of black targets. This may have resulted in participants overcompensating and increasing their ratings for trustworthiness for the target black angry faces.

Distinctiveness

These results suggest support for our second hypothesis: attention will increase emotional intensity via distinctiveness. Overall across the sets, directed attention did significantly increase distinctiveness more for targets than non-targets. These results hold true across all six sets of faces and generally had the same level of effect for each set. Previous research has suggested that distinctive faces are perceived to be more threatening (Sofer, Dotch, Wigboldus, & Todorov, 20). This study suggests that attention, distinctiveness, and emotion work together in order to evaluate our environment and form our perceptions of others. Attention increases emotion through enhancing distinctiveness. These interactions feed off one another and serve as foundations for our decision-making processes.

Limitations and Future Directions

This study had several limitations and the present investigation should be interpreted while understanding them. First, our participants lacked ethnic diversity. The participants were undergraduate students from The University of Colorado Boulder and were a very homogeneous
sample. The majority of our participants were Caucasian and the rest were Asian and Indian. We did not have any African-American participants in our study. Because this study involved race, the results could have been limited or skewed due to this homogeneous sample. These results might not generalize to ethnic minority groups because individual racial/ethnic groups were unable to be analyzed separately and individually. It would be interesting future research to run this same study with a majority of African-American participants to see if there would be a different pattern of results.

Second, we relied on the use of static photos collected from the Chicago Face Database, which could potentially question this study’s ecological validity. This proposes a possibility for future research to include more ecologically valid tasks with real-world dynamics such as naturalistic social interactions with participants. This future research could produce a more robust response with more pronounced effects. For example, future research could utilize actors who are trained by the researchers to portray certain emotions while interacting with participants. We speculate that this could produce more intense emotionality experiences that would address more ecologically valid emotional reactions. This future research could examine if different results emerge when utilizing real social interactions versus static computer simulations.

Conclusion

This study plays a significant role in understanding our social perceptions and decision-making processes. There are consequences to our judgments of threat and trustworthiness of those around us. These implications are important for who or what stands out in our environment. How we perceive others has a direct impact on our life and whom we choose to trust or whom we perceive as a threat. Let’s go back to the TSA agent example. At the beginning of this paper, you may have thought that the TSA agents can filter their decision-making by
evaluating the environment objectively. However, you now know that this decision-making process will be a reflection of how their attention is directed. This will ultimately influence their emotions and determine what face stands out in the crowd. Our study highlights the importance of understanding the consequences that those who stand out in our society face. These implications play an everyday role in our lives and the lives of others.
References


Acknowledgements

I would like to thank the EDJI Lab, Dr. Leaf Van Boven and Kellen Mrkva for their support and guidance throughout this process.
Table 1. Design of the study.

<table>
<thead>
<tr>
<th>Race</th>
<th>Emotional Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td>White</td>
<td>35</td>
</tr>
<tr>
<td>Black</td>
<td>35</td>
</tr>
</tbody>
</table>

*Note.* This table displays the 2 (Race) x 3 (Emotional Expression) within-participant factorial design. There were 35 possible images for each race/emotion of which the participant only saw a random sample of ten per set.
Table 2. Example of the procedure a participant may have encountered.

<table>
<thead>
<tr>
<th>Set</th>
<th>Black Neutral</th>
<th>Black Happy</th>
<th>Black Angry</th>
<th>White Neutral</th>
<th>White Happy</th>
<th>Black Angry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Target + 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Target + 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>Target + 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Target + 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Target + 9</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Target + 9</td>
</tr>
</tbody>
</table>

*Note.* Each set had a total of ten images (one target image and nine non-target images) that contained the same emotion and race.
Table 3. Differences in Racial Order for Means for Target vs. Non-Targets

<table>
<thead>
<tr>
<th></th>
<th>Angry</th>
<th>Neutral</th>
<th>Happy</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Target</td>
<td>4.07</td>
<td>3.62</td>
<td>4.77</td>
</tr>
<tr>
<td>White Non-Target</td>
<td>3.21</td>
<td>3.46</td>
<td>3.62</td>
</tr>
<tr>
<td>Black Target</td>
<td>3.67</td>
<td>2.31</td>
<td>3.53</td>
</tr>
<tr>
<td>Black Non-Target</td>
<td>2.75</td>
<td>3.08</td>
<td>3.08</td>
</tr>
</tbody>
</table>

Note. This table is comparing means of targets and non-targets for the people who saw white faces first. These means illustrated that there was indeed racial effects on the results. Therefore, we believe that the order in which participants saw race is important in this study. By looking at the participants who saw the white faces first, the results are untouched by any racial bias.
Note. This is an example of the instruction screen that participants saw at the beginning of each set. Participants were first given instructions about which face to direct their attention to in the slideshow. Instructions read as follows: “The highlighted image is your target image. Every time you see this face, press the ‘J’ Key. When you see any other face, press the ‘F’ key.”
Note. During the slideshow ten images, including the target image, were presented for 1 second each. Following the presentation of each image, an “X” was presented for 0.5 seconds. Participants were told to press the “J key” if the presented image matched the target image presented at the beginning of the trial. If the image did not match the target image, the participant was instructed to press the “F key.”
**Figure 4.** Manipulation Check.

![Bar chart showing manipulation check results](chart.png)

**Note.** Targets were higher than non-targets for all six sets of faces (all $t > 2$, all $p < .05$), and the effects were similar in size for each set.
Figure 5. Threat Perception of Target vs. Non-Target Images.

Note. Results are not significant.
Figure 6. Trust Perception of Targets vs. Non-Targets

Trust Perception of Targets vs. Non-Targets

Note. Targets were not appreciably different from non-targets in trustworthiness for any of the other five sets. (all ts < 1.30, all ps > .20).
Figure 7. Distinctiveness for Targets vs. Non-Targets.

Note. Overall, directed attention increased distinctiveness such that targets ($M = 5.72$) were rated as more distinctive than non-targets ($M = 4.24$), $t(42) = 7.17$, $p < .001$. Targets were higher than non-targets for all six sets of faces (all $t$s > 2, all $p$s < .05), and the effects were similar in size for each set.
Figure 8. The faces potentially used in this study that were collected from the Chicago Face Database
ATTENTION DRIVES EMOTION AND DISTINCTIVENESS