

The Fear Response to African Americans: A Summary of an fMRI Study on Amygdala Activation and Race

Phelps EA, O'Connor KJ, Cunningham WA, Funayama WS, Gatenby JC, Gore JC, Banaji MR. Performance on indirect measures of race evaluation predicts amygdala activity. *J Cogn Neurosci*. 2000;12:1-10.

Study Summary by Kimberly Papillon, Esq., for the National Center for Cultural Competence Georgetown University

Through their academic background, physicians are uniquely positioned to understand that scientists can isolate neurophysiological reactions to stimuli. Through their experience as practitioners, physicians recognize that people react differently to one another in ways that have physiological effects. Can science reveal ways that we react to one another? Do our brains react differently to people based on their race?

Validated studies have consistently shown that specific areas of the amygdalae (small subcortical nodes in the brain) activate when subjects feel fear, anxiety, threat, and distrust. Scientists isolated the amygdalae as a fear center by scanning people's brains while they looked at certain frightening images. For instance, people with diagnosed arachnophobia (fear of spiders) and ophidiophobia (fear of snakes) show a significantly higher level of amygdala activation. This result occurs when they view pictures of spiders and snakes in comparison with pictures of other animals (e.g., tigers, bears).

For years, scientists have used functional magnetic resonance imaging (fMRI) to determine what other thoughts and images cause the amygdalae to activate. Studies have shown there is increased neural responsivity in the amygdalae to African American faces. A key study in this area showed a measurable increase in left-superior amygdala activation when subjects viewed African American male faces versus White male faces. (Note: All of the study participants were White.)

The study also showed an intersection between neuroscience and implicit or unconscious associations. The study revealed a fascinating correlation to a test, called the Implicit Association Test (IAT), which shows unconscious or implicit bias and preference. The study's authors noted that while the differential activation was unimpressive, the level of amygdala activation correlated with the level of unconscious or implicit bias shown on the Race IAT.

The IAT is an online computerized test (<https://implicit.harvard.edu>) that is validated with an overwhelmingly statistically significant sample. People have completed more than 4.5 million IAT's online and had their data recorded by Project Implicit. The IAT measures mistakes made in matching words and pictures to categories. It also measures, in milliseconds, the time that it

takes to match the words and pictures to the categories. The amount of delay and the number of mistakes are assessed, and the result demonstrates the strength of the implicit association between the words and the categories.

The level of amygdala activation in the study correlated directly with the level of bias demonstrated on the Race IAT. The study participants who showed greater amygdala activation when viewing the African American faces had more difficulty with the categories “Black or Good” and “White or Bad” and much less difficulty with the categories “White or Good” and “Black or Bad”:

The subjects:

- made many errors and took much more time to match the pictures of African American people and positive words to the category “Black or Good”;
- made many errors and took much more time to match the pictures of White people and the negative words to the category “White or Bad”;
- easily matched the pictures of White people and the positive words to the category “White or Good”; and
- easily matched the pictures of African American people and the negative words to the category “Black or Bad.”

Subjects with higher levels of amygdala activation for African American faces have increasingly shown higher levels of racial bias against African Americans on the Race IAT.

Disturbingly, the participants were not different from the overwhelming majority of the White population tested in the United States. Of the White population in America who has taken the Race IAT, 87% show unconscious or implicit bias against African Americans and preference for Whites. Many people assume that racial bias is because of a lack of exposure or a lack of education. However, the level of education does not seem to change the results. For instance, although 87% of the general population shows bias against African Americans on the IAT, 88% of White judges also show bias against African Americans on the IAT. On the other hand, one-third of African Americans score with an implicit bias against Whites, one-third with no implicit bias, and one-third with an implicit bias against African Americans on the Race IAT.

Additionally, the study used another implicit measure for racial bias, the “Startle Blink” reaction, which measures the reactions of the muscles around the eyes. The startle blink reaction is a measurable indication of fear. Just as with the IAT, researchers found a direct correlation between the level of amygdala activation and the Startle Blink reaction when subjects were presented with pictures of African American compared with White male faces.

Suggested Additional Readings Studies

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