

Implicit Bias: An Invisible Danger

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Abstract

Although race is an abstract concept, it can dictate one's social relationships and reactions. Implicit bias is the unconscious stereotyping one can possess. The stigmatization of Black Americans have been a serious issue for centuries. Many unarmed Black men have been shot by police. Perhaps there is implicit bias that elicits a physiologic response prompting officers to defend themselves. If a physiologic response is heightened in the presence of a Black criminal, this could help explain the psychological/physiological mechanisms that may underlie or contribute to police brutality. The present research sought to investigate how implicit bias affects the sympathetic response in the presence of a hypothetical threat. Specifically, this study was designed to answer the question: When adolescents aged 13-18 are prompted by a threat, is their physiologic response dependent on the perpetrator's race? After collecting baseline skin temperature, blood pressure, and heart rate (participants watched a neutral control video), a total of 17 participants were randomly assigned to watch an experimental video featuring either a White or Black criminal. Physiological responses were measured again after the experimental video played; then, participants completed a Likert (ranking) scale survey to assess their conscious perceptions of the criminal. Results revealed that students experience a less dramatic change in the presence of a perpetrator of the same race. Furthermore, students' (unconscious) physiological responses and (conscious) survey responses juxtapose one another. These findings have important implications for thinking about the current racial climate among adolescents--the stewards of America's egalitarian future.

Keywords: race relations, racism, stereotypes, implicit bias, sympathetic nervous system

Introduction

On the night of February 4, 1999, Amadou Diallo, a 22-year-old unarmed Black West African immigrant, was fatally shot by police officers. The police officers assumed Diallo was a crime suspect and fired a total of 41 shots (Correll, Park, Judd, & Wittenbrink, 2002). Did Diallo's Black skin don a persona of danger? Is there a physiological basis for the officers' decision to shoot? With the latter inquiries in mind, the present research investigated the autonomic mechanisms behind implicit bias, specifically with regards to the sympathetic nervous system. Through a quantitative investigation of the sympathetic nervous system, the research aimed to evaluate the presence of implicit bias in adolescents (ages 13-18 years old) in the southeastern United States.

The present research is paramount for three reasons. First, while various studies measure the extent of implicit bias towards Black individuals (Cunningham et al., 2004; Stanley et al., 2012; Kam, C. 2007; Akalis, Banaji, & Kosslyn, 2008; Phelps et al., 2000), they do so using the Implicit Association Test (IAT) (Hahn, Judd, Hirsh, & Blair, 2014). The IAT, measures implicit bias through the strength of one's associations between one group and negative characteristics or words. While participants are instructed and encouraged to answer the questions as quickly as possible, it is possible for participants to adjust their responses to mitigate biased results. In contrast, the present research evaluated implicit bias through autonomic physiological responses because it is much more difficult to self-regulate blood pressure, heart rate, and skin temperature than it is to self-regulate test answers. Thus, the design presents a more valid measurement of implicit bias. Second, the present research sought to evaluate implicit bias among high school adolescents; unlike other studies which evaluated college students (Contreras-Huerta, Baker,

Reynolds, Batalha, & Cunnington, 2013; Ramasubramanian, S. 2015; Gonsalkorale, Carlisle, & Von Hippel, 2007 ;Terbeck et al., 2012; Neblett & Roberts, 2013; Eddy & Sandor, 2011) or young children (Margie, Killen, Sinno, & Mcglothlin, 2005; Xiao et al., 2015; Pauker, Ambady, & Apfelbaum, 2010; Clark, K., & Clark, M., 1939; Dunham, Chen, & Banaji, 2013). It is crucial to analyze and measure the biases of high school aged adolescents, for some will become future police officers who will face racially sensitive situations and it is *their* biases that will drive life or death decisions. Third, a deeper understanding of the mechanisms behind implicit bias can allow for more effective cultural/racial sensitivity training in the workplace (Ramasubramanian, S. 2015; Xiao et al., 2015). Implicit bias can dictate an officer's irreversible decision to shoot or not shoot a suspect (Correll, Park, Judd, & Wittenbrink, 2002; Greenwald, Oakes, & Hoffman, 2003). As reflected in Amadou Diallo's case, uncontrolled implicit bias may lead to actions that can steal an innocent life. It is hypothesized that students will have more implicit bias towards Black perpetrators than White perpetrators (by viewing Black perpetrators more negatively) because of the derogatory stereotypical depictions of Black men present in the media (Mays, Johnson, Coles, Gellene, & Cochran, 2013).

The following question has driven this research: when adolescents, ages 13-18, are prompted by a threat, is their physiologic response dependent on the perpetrator's race?

Review of Literature

The Evolving Definition of Race

According to Pope-Davis and Liu (1998), race is a dynamic social construct that is heavily dependent on historical context. The concept of race has transformed to fit historical context. During slavery, race was primarily used to disambiguate Blacks from Whites (slaves

and non-slaves, respectively). As immigration boomed in the early 20th century, America became more diverse. As a result, definitions of race became more specific. For example, the possession of White skin did not necessarily mean that person was entitled to social benefits (employment, respect, protection from harassment), for that person could be Latin American with “White passing” features. Thus, racial definitions began to spill over into nationality, in order to alienate certain groups. Despite the fluid definition of race, the present study operated on the following definition: race is the color of one’s skin, independent of ethnic origin or culture. Race was defined in this manner to categorize and characterize the perpetrators in the videos. Furthermore, the participants were not given any background information (such as nationality or culture); therefore, a race definition purely based on an observable measure (skin tone) was utilized.

Racism and Police Brutality

Police brutality is “the use of excessive physical force or verbal assault and psychological intimidation (Walker, 2011, p. 579).” Through the National Police Misconduct Statistics and Reporting Project (NPMSRP), Chaney and Robertson (2013) assessed the prevalence of police brutality after the notorious Rodney King incident. The results concluded that most police misconduct was in the presence of Black individuals. While every incidence of police misconduct is not reported (especially in low-income neighborhoods), the NPMSRP still acted as a relevant guide for investigation of police misconduct instances. Correll et al. (2002) conducted an experiment to test people’s tendency to shoot a Black or White target face in a computer simulation. The targets held either a harmless object or a gun. Users had 850 milliseconds to decide whether to shoot or not shoot the target. The results revealed that participants were more

likely to shoot the Black target face, rather than the White one, regardless of the object held in the target's hand. Greenwald et. al (2003) found similar results. The latter study concluded that race was the deciding factor in the participant's decision to shoot (even if the target face was labeled as a police officer rather than a criminal or civilian.) The results from all three studies suggest there is a bias against Black individuals during police confrontation. Although the prior research provided novel insight into the injustices, they failed to identify or justify why Black individuals are more susceptible to police brutality. The present research sought to bridge the gap by investigating sympathetic nervous system influences on implicit bias.

Implicit Bias

Cameron, Payne, and Knobe (2010) offered two competing definitions of implicit bias. The first defines implicit bias as a series of unconscious ideas that result in discriminatory behavior. This definition asserts that implicit bias is an unconscious thought process; therefore, it suggests that the discriminatory behavior cannot be regulated because the person remains unaware of the biased ideas. Conversely, the second definition establishes implicit bias as a conscious idea that manifest itself automatically through one's actions. For the purpose of this research, parts of the former definition was adopted. Although the former definition provided a strong conceptual foundation for implicit bias, the definition was too narrow. Ergo, the present research expounds a nuanced definition: implicit bias is a series of unconscious ideas that result in discriminatory actions and or (physiologic) reactions. It is hypothesized that implicit bias and the sympathetic nervous system operate together. The sympathetic nervous system is involuntary; therefore, it is befitting to assert implicit bias is involuntary as well.

Eddy and Sandor (2011) conducted a study to assess whether light-skinned or dark-skinned Black criminals were judged differently when accused of a rape crime. The results concluded that the skin tone of the perpetrator did not matter when the participants judged the situation. Perhaps the Black men (in general, regardless of shade) elicited different responses in the participants due to “essentialist thinking” (Pauker, Ambady, & Apfelbaum, 2010).

Essentialist thinking is a notion that for all entities, there are essential characteristics used to categorize and understand that entity; therefore, essentialist thinking shapes how people form all biases (Phelan et al., 2014). If the essential attribute to characterize Black individuals was skin tone, then the darkness of the perpetrators skin tone did not matter because it was not essential the participants’ understanding of the situation. Interestingly, Pauker et. al. (2010) concluded that if children do not possess essentialist thinking (due to normal cognitive developmental constraints), then they cannot recognize or form racial biases/stereotypes. As reflected in Pauker's results, essentialist thinking is necessary when forming generalizations about a certain race (2010). In order to ensure participants were able to utilize essentialist thinking, the experiment compared Black vs. White perpetrators since they can be clearly categorized into two distinct racial groups.

Sympathetic Nervous System

The sympathetic nervous system can be used to indicate fear, according to Hsu et. al. (2012). Hsu and his colleagues conducted a true experimental study which measured variations in blood pressure (a reaction elicited by the sympathetic nervous system) after classical fear conditioning. The results revealed that when the rats experienced fear, their blood pressure increased. While rats are conditioned using lights, buzzers, or shocks, humans are conditioned by

the media. In American popular culture, there is a disproportionate number of Black men portrayed as “thugs” or “gangbangers” in the news or in movies. This threatening stereotype can influence people’s attitudes towards Black men (Mays, Johnson, Coles, Gellene, & Cochran, 2013). As concluded by Ramasubramanian (2015), exposure to negative stereotypes perpetuates negatives views about African Americans. In support of Ramasubramanian results, Trawalter and Hoffman (2015) found that prejudice was only invoked after exposure to a negative stereotype. Furthermore, Lin (2013) noted that when a person experiences violence, there is a (diastolic) blood pressure spike. Since there is evidence that humans are conditioned to believe negative stereotypes, it was hypothesized in the present study that humans will also experience blood pressure spikes when exposed to a video of a Black criminal in action.

Skin temperature also varies as a response to fear (Yoshihara et al., 2016). Yoshihara and colleagues found that fear, when triggered by a horror film, leads to the reduction of fingertip temperature. To further validate the correlations, the researchers used a Likert (ranking) scale to assess people’s fear quantitatively. Their self-reported fear and their reduction in skin temperature supported the notion that fear lowers dermal temperature. Contrastingly, Hahn, Whitehead, Albrecht, Lefevre, and Perrett (2012) found that in the presence of a male experimenter, female participants experienced a 0.1 increase in facial temperature (in degrees Celsius), perhaps indicating feelings of attraction/nervousness. The present research utilized facial skin temperature as a measure of sympathetic activity.

Heart rate variability can also indicate implicit bias. Terbeck et al. (2012) found that when propranolol, an adrenal inhibitor, was administered the expression of biased notions regarding Christians, Muslims, Blacks, Whites, homosexuals, and substance abusers decreased.

Since the adrenoreceptors help to regulate heart rate, the results show that when the heart rate is lowered, even artificially, biases can be diminished. While the present research did not attempt to artificially regulate the heart rate, heart rate was used as a measure of bias.

Method

Participants

Participants included 17 adolescents, ages 13-18, who are enrolled in an Advanced Placement Psychology course at a southeastern high school. Students can enroll this particular course regardless of grade, academic program, or academic level. There are no testing or prerequisites for this course. Thus, the AP Psychology course provided a general view of the student body population. The majority of the participants were female; only 29.41% being male. Most participants (70.59%) were sophomores followed by 11.76% who were juniors and 17.64% who were seniors. Racial distribution was as follows: 41.18% non-Hispanic Black, 35.39 % non-Hispanic White and 23.52% other. The student names from the roster were assigned a number and participants were randomly selected using an automatic random number assortment tool on Microsoft Excel. After students were randomly selected to participate in the study, consent forms were distributed to both students and parents. Participation in the study was entirely voluntary. No compensation was provided for participation in the study. Participants were purposefully deceived. Participants were told that purpose of the study was to evaluate how media violence affects adolescents. The true purpose of the study was concealed until the data collection was complete to avoid self-monitoring in an attempt to hid biases.

Materials

Microsoft Excel software was used for random assignment. The videos used to create an hypothetical threat were sorted and compiled into a series of videos featuring Black perpetrators (Surveillance Video of Convenience Store Robbery Suspect, 2014) or White perpetrators (Bank Robbery Surveillance Video, 2011). All videos were various scenes of an individual engaged in robbery. Although the perpetrators were not placed in the same exact conditions (i.e. same clothes, same store, same body movements), a compilation of videos ensure that the general theme is similar for both types of videos (Black perpetrator vs. White perpetrator). A single nature video was shown as a control and baseline measure (Beautiful Nature Video & Relaxing Music - Dream (HD), 2015). All videos were obtained from a public video sharing site. A pulse oximeter, sphygmometer, and forehead laser thermometer were used to gather heart rate, blood pressure, and skin temperature respectively. Automated devices were used to avoid reading discrepancies between subjects. Data were recorded in an Excel spreadsheet. All data were kept in a password protected computer to uphold confidentiality as established by HIPAA law as required by the institutional review board.

Design and Procedure

The present research utilized a true experimental research method; specifically, a multiple baseline design was used. A quantitative approach was utilized because people tend to report socially desirable answers when confronted with sensitive topics, such as race (Paulhus, 1991). Furthermore, the experimenter's race can confound qualitative results (Marx & Goff, 2005). It is difficult to self-regulate physiologic responses to stimuli because such reactions are carried out automatically by the sympathetic nervous system; thus, this study allowed for a more valid measurement of bias. After participants were randomly selected to participate in the study, they

were randomly divided into two groups. Group one watched the video that featured the Black perpetrator. Group two watched the video that featured the White perpetrator. In order to quantitatively measure the effects of possible implicit bias, the participants’ baseline heart rate, blood pressure, and skin temperature were measured. Baseline physiological values were gathered after the participants watched a neutral video (control) of a nature scene that featured no people. Both groups watched the control video in order to establish a baseline and eliminate any physiologic responses elicited prior to the study. After the baseline was measured and recorded, participants were shown their group-specific video. Immediately after the end of the videos, biometric data were collected. Subjects completed a general demographic questionnaire, which included items such as race, gender, grade, and age. Data were compared and analyzed using descriptive statistics. Table A outlines the important operational definitions of words that pertain to the present study.

Table A

Term	Operational Definition
Race	The color of a person's skin tone, independent of cultural or ethnic background
Threat	A person robbing a store
Implicit Bias	A series of <i>unconscious</i> ideas that result in discriminatory actions and or (physiologic) reactions
Adolescent	A person aged 13-18 years old
Sympathetic Nervous System	The body’s fight or flight response; measured through skin temperature, blood pressure, and heart rate. A biometric indicator of fear/discomfort.
Fear/Discomfort	Unfavorable changes in skin temperature, blood pressure, and heart rate; high scoring Likert scale responses

Results

Differences based on Race

The results indicated that participants who watched the White perpetrator video ($n=7$) experienced a greater change in facial temperature compared to those who watched the Black perpetrator video ($n=10$). Although facial temperature decreased for both groups, participants who viewed the White perpetrator video experienced an average decrease of 0.057 degrees ($\sigma=0.28$); whereas, those in the other group experienced an average decrease of 0.03 degrees ($\sigma=0.37$) (see Figure A).

The Black perpetrator group experienced an average systolic blood pressure decrease of 3.4 mmHg ($\sigma=6.75$), while the average change in systolic blood pressure for the White perpetrator group was static ($\sigma=4.51$). In terms of diastolic blood pressure, the Black perpetrator group had an average increase of 5.2 mmHg ($\sigma=4.44$). Furthermore, White perpetrator group increased by 0.14 mmHg ($\sigma=8.73$) (see Figures B and C).

Participants in the White perpetrator group experienced a greater change in heart rate than those in Black perpetrator group. Specifically, participants in White perpetrator group experienced an average increase of 3.86 bpm ($\sigma=6.28$) compared to Black perpetrator group who experienced an average increase of 2.2 bpm ($\sigma=6.29$) (see Figure D).

Differences between Black and White Participants

Due to the tension that erupts, primarily between Blacks and Whites, from police brutality and given the somewhat even racial distribution among participants (41.18% Black and 35.29% White), the data of the Black and White participants were compared and analyzed a

second time separate from the general population. The data were specifically analyzed on four different parameters: Black students who watched footage of a White perpetrator, Black students who watched footage of a Black perpetrator, White students who watched footage of a Black perpetrator, and White students who watched footage of a White perpetrator.

When Black students watched the video of the White perpetrator, they experienced an average temperature spike of 0.25 degrees ($\sigma= 0.35$). In contrast, Black students who watched the video of a Black perpetrator experienced a much smaller temperature spike of 0.02 degrees ($\sigma= 0.36$). Across both videos, White students experienced a decrease in temperature. White students who watched the video of the Black perpetrator experienced a decrease of 0.23 ($\sigma= 0.21$) degrees; while White students who watched the video of a White perpetrator experienced a decrease of 0.27 degrees ($\sigma= 0.06$) (See Figure A).

Black students who watched the video of the White perpetrator experienced a systolic blood pressure increase of 5.5 mmHg ($\sigma= 2.12$) and a diastolic blood pressure increase of 9 mmHg ($\sigma= 8.49$). Black students who viewed the video of the Black perpetrator had a 3.4 mmHg ($\sigma= 6.47$) average decrease in systolic blood pressure while they experienced an average increase of 5.4 mmHg ($\sigma=3.58$) in diastolic. White students who watched the video of the Black perpetrator experienced a systolic blood pressure decrease of 3 mmHg ($\sigma=10.58$) and a diastolic blood pressure increase of 3 mmHg ($\sigma=6.25$). White students who viewed the video of the White perpetrator had a 1 mmHg ($\sigma= 6.08$) average decrease in systolic blood pressure; while they experienced average decrease of 5.67 mm Hg ($\sigma=7.37$) (See Figure B and C).

Black students who watched the video of the White perpetrator had an average heart rate increase of 10.5 bpm ($\sigma=2.12$). However, Black students who watched the video of the Black

perpetrator experienced a much smaller increase of 2 bpm ($\sigma=3.94$). White students experienced a less dramatic change in heart rate. White students who watched the video of a Black perpetrator had a heart rate increase of 1 bpm ($\sigma=11.27$); whereas White students who viewed the video of a White perpetrator did not experience any change in heart rate, on average ($\sigma=6.93$) (See Figure D)

Likert Scale Responses

By comparing the average scaled value of each statement pertaining to how “threatening” or how “scary” each situation was perceived, the participants in the White perpetrator group scored higher on every instance. This indicates that students perceived the White criminal as “scarier” and “more threatening” than the Black criminal. On average, students rated the situation featuring a White perpetrator as more “dangerous” than the situation with the Black criminal. On average, students assert that they would feel more “scared” in a situation featuring a White perpetrator compared to the situation with a Black perpetrator. Across all groups, the responses from the control video were extremely similar and neutral (see Figure E).

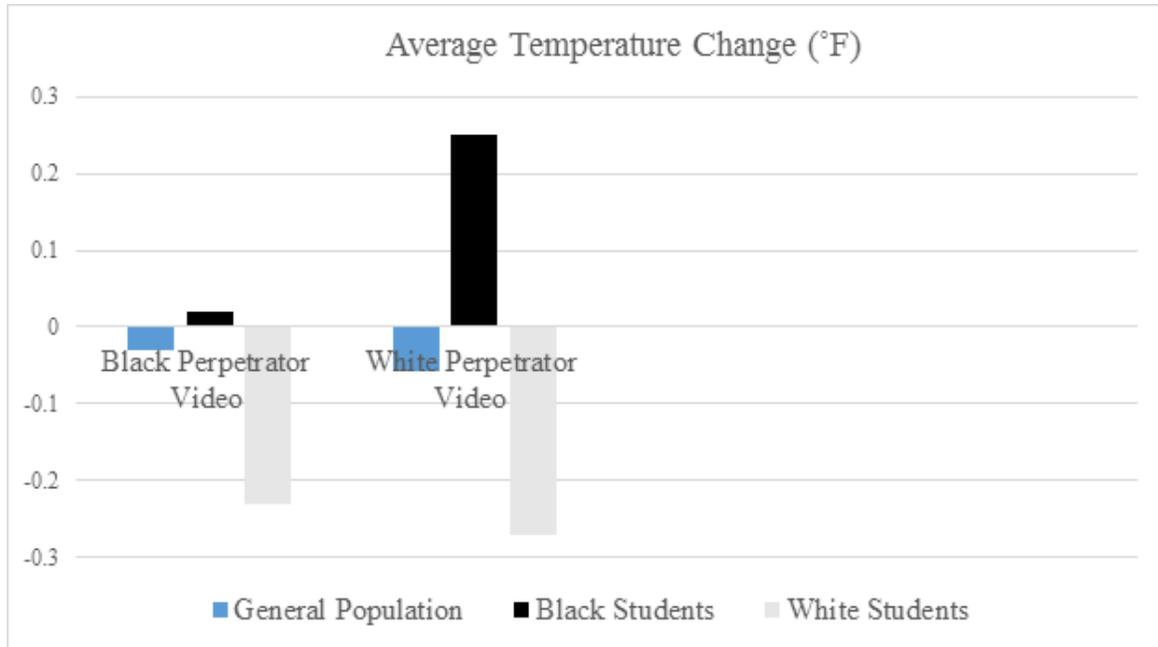


Figure A

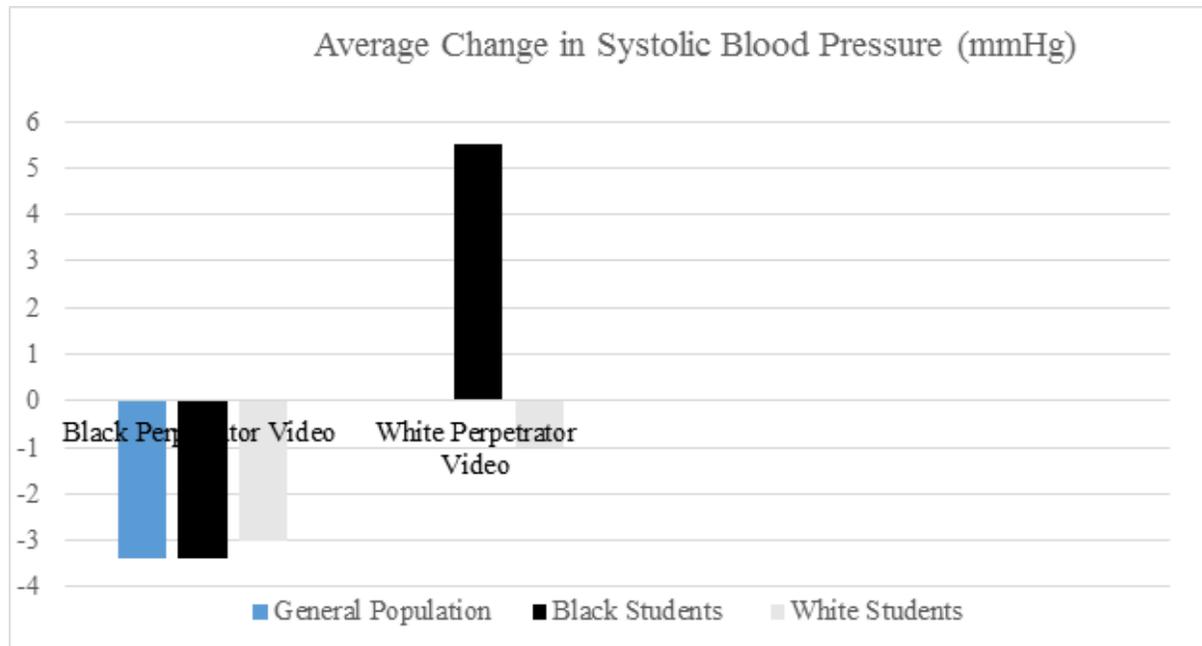


Figure B

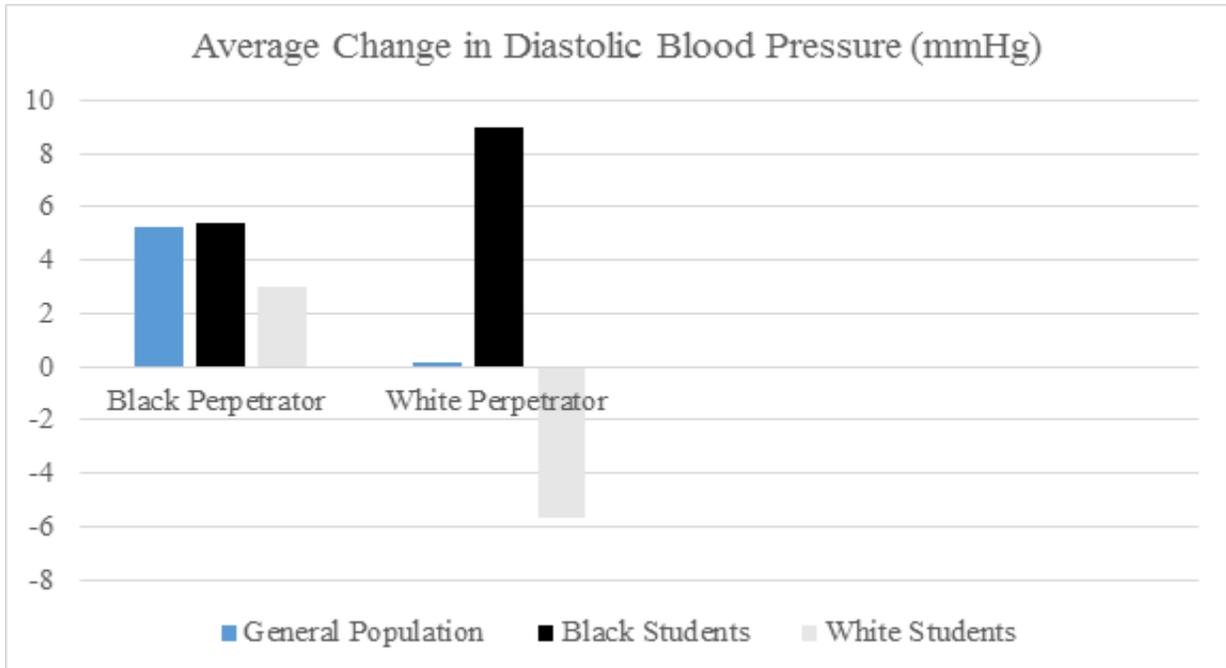


Figure C

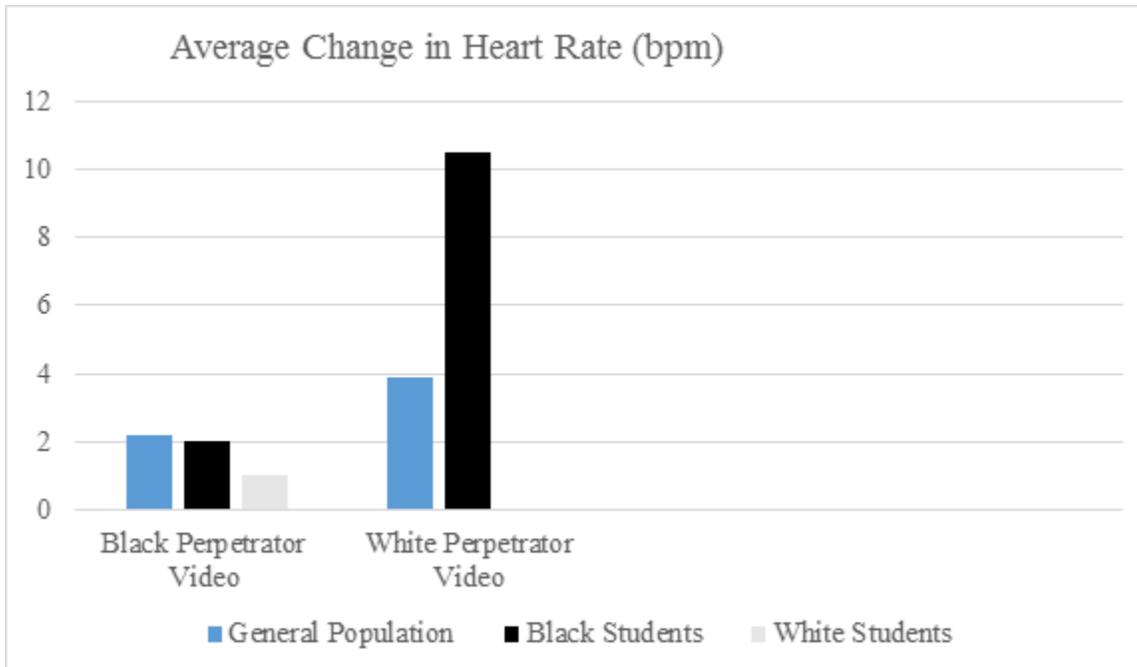


Figure D

Likert Scale Responses

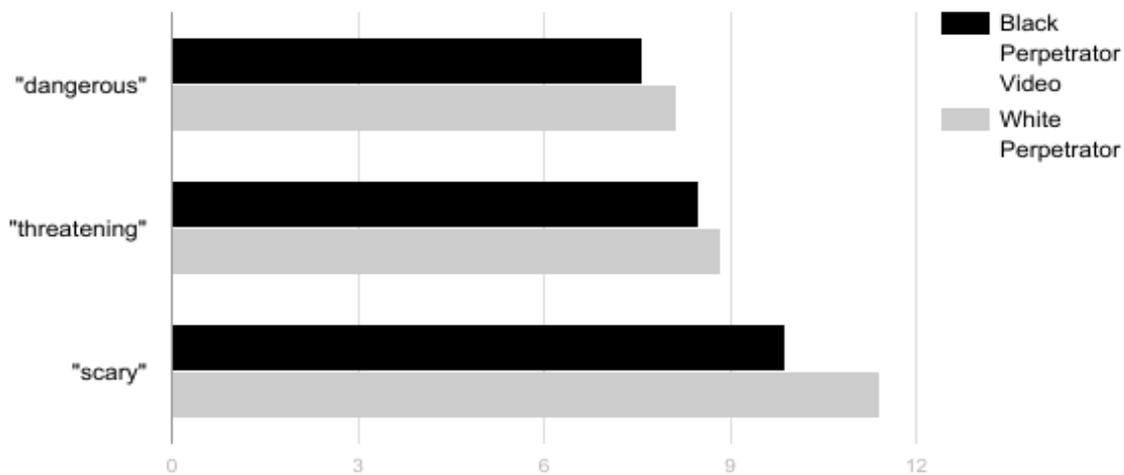


Figure E

Discussion

Relevance

Current findings do not support the hypothesis students would view Black perpetrators more negatively (in all measurements) than White perpetrators. Results reveal three novel points. First, students tend to experience less dramatic change in the presence of a perpetrator of the same race. Second, unconscious physiological changes (diastolic blood pressure only) tend to show bias against Black perpetrators. Third, conscious Likert scale responses tend to show bias against White perpetrators. The results reflect important disparities between how Black and White criminals are perceived by adolescents. These results provide key insights into race relations by primarily highlighting that students experience less discomfort in the presence of a perpetrator of the same race (marked by increased blood pressure when exposed to opposite race or decreased blood pressure when exposed to same race). As posited by cross-race theory, people recognize faces of their own race more easily than those of another race (Young, Hugenberg,

Bernstein, & Sacco, 2012). Perhaps this sense of familiarity, as suggested by the cross-race theory, contributes to the phenomenon revealed by this study: adolescent students tended to react less negatively towards a criminal if a criminal was of the same race. Additionally, the discrepancy between unconscious (implicit) bias and conscious (explicit) bias underscore the differences between the two and how the former influences physiological responses. These results provide opportunities to tailor job training to mitigate apparent discomfort in the presence of other races. This information acts as a launch pad for effective cultural sensitivity training that yields equal consequences and opportunities for all citizens, especially those involved in any confrontation with police.

Analyzing the Variances in Physiological Responses

Blood pressure spikes indicate fear/discomfort, as stated by Hsu et. al (2012). Perhaps, this fear or discomfort may have been a result of exposure to violence. Like Lin's results, the current study concluded that blood pressure did increase for some students when exposed to the violent video (2013). However, unlike Lin's results, participants in the current study experienced increases not only in diastolic blood pressure, but systolic as well.

Vasoconstriction, a feature of the sympathetic nervous system, increases temperature amid violence, fear, or discomfort (Levenson, 1992). Unlike results from Yoshihara et. al (2016), which concluded that participants' experience temperature reductions after a fear-inducing movie, results from this study's temperature readings show students experienced heightened temperature, and more discomfort, in the presence of the opposite race. The results of the current study mirror Hahn, Whitehead, Albrecht, Lefevre, and Perrett's (2012) study, which found that facial temperature increased when participants felt uncomfortable.

Terbeck (2012) concluded, the heart rate variability heightened during periods of discomfort or fear and decreases during periods of relaxation. The present research paralleled Terbeck's results in that, heart rate variability was dependent on whether participants watched the video of the perpetrator of the same or opposite race. However, unlike Terbeck study, heart rate was not influenced internally through medication. Instead, in the current study, heart rate was influenced externally through video.

Along with violence, implicit bias presumably played a role in physiological discrepancies. Students appeared to be keen on stereotypes surrounding Black and White perpetrators, therefore, possessing "essentialist thinking" as noted by Pauker, Ambady, and Apfelbaum (2010). This assumption is based on the finding that physiological and survey-based data contradicted each other at times, the same phenomena appeared in Cunningham's study (2004). This suggests that students may have consciously altered responses to prevent appearing discriminatory. However, in Hahn's (2014) study, participants were blatantly honest and accurate when acknowledging and predicting biases, yet participants may have altered their responses so that it would match their prediction, a tendency known as confirmation bias (Stangor, 2000).

Conclusion

Despite the limitations, this research gathered important information regarding race relations among adolescents--a realm previously unexplored. The current study found that students tend to be more comfortable in the presence of a criminal of the same race. Moreover, students tend to show bias against White perpetrators through survey responses; however, students show bias against Black perpetrators through their physiological responses. These

results fill an important gap in the literature on implicit bias. Without examining the body's autonomic physiological responses that play into implicit bias, researchers cannot realize a broad perspective on race relations. Furthermore, it is important to examine race relations between adolescents because their views and biases will dictate America's sociocultural future. The ways adolescents perceive themselves and others can either bolster egalitarianism or reinforce racism.

Limitations

Due to resource and time constraints, a small sample size ($n=17$) was used which limits the ability to generalize the results. Furthermore, blood pressure, skin temperature, and heart rate may have been influenced by confounding variables such as a student's weight or preexisting medical conditions, given it was not feasible to pre-screen for underlying health conditions that may have influenced responses. Lastly, physiological responses were not measured at the same time of day for each participant. Research has shown that time of day does affect blood pressure levels among adolescents, therefore the results may be affected by timing disparities (Burford, Low, & Matthew, 2013; Zadra & Proffitt, 2014).

Implications

The present research offers novel information that can help employers design job trainings programs that not only prepare a person for the task at hand, but also prepares them to work in a diverse world. Specifically, law enforcement units can use this research to make officers aware of the biases towards Black Americans through purposeful cultural sensitivity training initiatives. If officers are conscientious of their own biases, they may gain better control of their biases in crucial situations involving Black perpetrators.

Future Directions

To expand upon the research in the future, a larger sample size and neurological data is needed. A large sample size (n=1000), would offer more valid and generalizable results. Furthermore, functional magnetic resonance imaging (fMRI) technology could be used to measure brain activity during the control and experimental videos. The location of brain activity can indicate whether participants are scared or angered by the perpetrators. The levels of brain activity could be analyzed to examine whether bias exists (Lieberman, Hariri, Jarcho, Eisenberger, & Bookheimer, 2005).

Closing Remarks

The research posits the underlying mechanisms that may have contributed to the unjust fall of Amadou Diallo. Most importantly, the research challenges us to re-evaluate how we perceive one another. All men are created equally, yet are they treated equally? As we continue our centuries long racial tug-of-war, we come closer and closer to answering this grave question. Americans, particularly adolescents, will decide whether “liberty and justice for all” is an undeniable promise--or a lofty suggestion.

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APPENDIX A

Parental Consent

Parental Permission to Participate in Research Involving Minimal Risk

Information for parents to consider before allowing their child to take part in this research study

The following information is being presented to help you and your child decide whether or not your child wishes to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the research.

We are asking you to allow your student to take part in a research study called:

The person who is in charge of this research study is [REDACTED]. This person is called the Principal Investigator.

Title of the study: ***Media and the Mind: An Investigation of the Autonomic Nervous System*

****Some details of this project may not be made known to the participant until the session is completed. All responses will be analyzed anonymously. Participants will be thoroughly debriefed after the study.**

However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by [REDACTED].

The research will be conducted at school.

Why is this research being done?

The present research seeks to investigate the effects of violence and non-violent media on the sympathetic nervous system in adolescents. This information will bolster our understanding of the media's influence on adolescents.

Why is your child being asked to take part?

We are asking your child to take part in this research study because they are a student at the high school and are in the 13 to 18-year-old age range.

Should your child take part in this study?

This informed consent form tells you about this research study. You can decide if you want your child to take part in it. This form explains:

- Why this study is being done.
- What will happen during this study and what your child will need to do.
- Whether there is any chance your child might experience potential benefits from being in the study.
- The risks of having problems because your child is in this study.

Before you decide:

- Read this form.
- Have a friend or family member read it.
- Talk about this study with the person in charge of the study or the person explaining the study. You can have someone with you when you talk about the study.
- Talk it over with someone you trust.
- Find out what the study is about.
- You may have questions this form does not answer. You do not have to guess at things you don't understand. If you have questions, ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

The decision to provide permission to allow your child to participate in the research study is up to you. If you choose to let your child be in the study, then you should sign this form. If you do not want your child to take part in this study, you should not sign the form.

What will happen during this study?

Participants will watch a series of violent and nonviolent videos (violent videos will be school appropriate, a criminal robbing a store).

Biometric data will be collected from your student. Specifically, blood pressure, heart rate, and skin temperature will be collected. Demographic information will be collected via survey. A Likert-type scale (rating scale) will be used to gather threat perception. The biometric data will be collected using pulse oximeter (heart rate), thermometer (skin temp.), and sphygmomanometer (blood pressure). All devices are automatic. Results will be recorded in a spreadsheet (kept in a password protected computer). Demographic information will be collected via survey. Demographic information will include: age, grade, race, and biological sex.

The study will take place in a classroom.. The student will be absent from class for a maximum of 15 minutes. A student only needs to complete the study one time.

How many other people will take part?

The Principal Investigator ([REDACTED]) and the participant will be the only ones in the room during the study.

What other choices do you have if you decide not to let your child to take part?

If you decide not to let your child take part in this study, that is understandable.

Instead of being in this research study your child can choose not to participate.

Will your child be compensated for taking part in this study?

You will receive no payment or other compensation for taking part in this study.

What will it cost you to let your child take part in this study?

It will not cost you anything to let your child take part in the study.

What are the potential benefits to your child if you let him / her take part in this study?

The student will not necessarily benefit from the study.

What are the risks if your child takes part in this study?

There are no known risks to those who take part in this study. There is no more chance of risk as your child coming to school each day.

Privacy and Confidentiality

We will keep your child's information private and confidential. No names will be disclosed in the publication of this research. For example, a participant will be identified as Participant 1 The only people who will be allowed to see the pseudonyms and ages are:

- The Principal Investigator
- The Advanced Placement Capstone Research Program, in order to grade the research paper, the board will review the paper and read the pseudonyms and biometric data. This is only to evaluate the paper and is not in any way to obtain the information of your student.
- Academic professionals who will critique the paper

We may publish what we learn from this study. If we do, we will not include your child's name. We will not publish anything that would let people know who your child is.

What happens if you decide not to let your child take part in this study?

You should only let your child take part in this study if both of you want to. You or child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call [REDACTED] at [REDACTED] or email at [REDACTED]

If you have questions about your child's rights, general questions, complaints, or issues as a

person taking part in this study, call the school at [REDACTED].

Consent for My Child to Participate in this Research Study

It is up to you to decide whether you want your child to take part in this study. If you want your child to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to let my child take part in this study. I understand that by signing this form I am agreeing to let my child take part in research.

Signature of Parent of Child Taking Part in Study Date

Printed Name of Parent of Child Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the parent of the child taking part in the study what he or she can expect from their child’s participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

- What the study is about;
- What procedures will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. The parent signing this form does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. The parent signing this form is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give permission to allow their child to participate in this research

study.

This part of the consent form is to be signed by the Principal Investigator.

Signature of Person Obtaining Informed Consent Date

Printed Name of Person Obtaining Informed Consent

APPENDIX B

Child Consent

Assent to Participate in Research Involving Minimal Risk

We are asking you to participate in a research study called:

The person who is in charge of this research study [REDACTED] This person is called the Principal Investigator.

Title of the study: ***Media and the Mind: An Investigation of the Autonomic Nervous System*

****Some details of this project may not be made known to the participant until the session is completed. All responses will be analyzed anonymously. Participants will be thoroughly debriefed after the study.**

However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research [REDACTED].

The research will be conducted at school.

Why is this research being done?

The present research seeks to investigate the effects of violence and non-violent media on the sympathetic nervous system in adolescents. This information will bolster our understanding of the media's influence on adolescents.

Why am I being asked to take part?

We are asking you to take part in this research study because you are a student at the high school and are in the 13 to 18-year-old age range.

Should I in this study?

This informed consent form tells you about this research study. You can decide if you want to take part in it. This form explains:

- Why this study is being done.
- What will happen during this study and what your child will need to do.
- Whether there is any chance your child might experience potential benefits from being in the study.
- The risks of having problems

Before you decide:

- Read this form.

- Have a friend or family member read it.
- Talk about this study with the person in charge of the study or the person explaining the study. You can have someone with you when you talk about the study.
- Talk it over with someone you trust.
- Find out what the study is about.
- You may have questions this form does not answer. You do not have to guess at things you don't understand. If you have questions, ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

The decision to participate in the research study is up to you. If you choose to participate, then you should sign this form. If you do not want to take part in this study, you should not sign the form.

What will happen during this study?

Participants will watch a series of violent and nonviolent videos (violent videos will be school appropriate, a criminal robbing a store).

Biometric data will be collected from your student. Specifically, blood pressure, heart rate, and skin temperature will be collected. Demographic information will be collected via survey. A Likert-type scale (rating scale) will be used to gather threat perception. The biometric data will be collected using pulse oximeter (heart rate), thermometer (skin temp.), and sphygmomanometer (blood pressure). All devices are automatic. Results will be recorded in a spreadsheet (kept in a password protected computer). Demographic information will be collected via survey. Demographic information will include: age, grade, race, and biological sex.

The study will take place in a classroom.. The student will be absent from class for a maximum of 15 minutes. A student only needs to complete the study one time.

How many other people will take part?

The Principal Investigator ([REDACTED]) and the participant will be the only ones in the room during the study.

What other choices do you have if you decide not to take part?

If you decide not to take part in this study, that is understandable.

Instead of being in this research study you can choose not to participate.

Will your you be compensated for taking part in this study?

You will receive no payment or other compensation for taking part in this study.

What will it cost you to take part in this study?

It will not cost you anything to take part in the study.

What are the potential benefits to you take part in this study?

The student will not necessarily benefit from the study.

What are the risks if your part in this study?

There are no known risks to those who take part in this study. There is no more chance of risk as coming to school each day.

Privacy and Confidentiality

We will your information private and confidential. No names will be disclosed in the publication of this research. For example, as participant will be identified as Participant 1 The only people who will be allowed to see the pseudonyms and ages are:

- The Principal Investigator
- The Advanced Placement Capstone Research Program, in order to grade the research paper, the board will review the paper and read the pseudonyms and biometric data. This is only to evaluate the paper and is not in any way to obtain the information of your student.
- Academic professionals who will critique the paper

We may publish what we learn from this study. If we do, we will not include you name. We will not publish anything that would let people know who you are.

What happens if you decide not to take part in this study?

You should only take part in this study if you want to. You should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call [REDACTED] at [REDACTED]

If you have questions about your child's rights, general questions, complaints, or issues as a person taking part in this study, call the school at [REDACTED].

Consent to Participate in this Research Study

It is up to you to decide whether you want your child to take part in this study. If you want your child to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to take part in this study. I understand that by signing this form I am

agreeing to take part in research.

Signature of Student Taking Part in Study Date

Printed Name of Student Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the parent of the child taking part in the study what he or she can expect from their child’s participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

- What the study is about;
- What procedures will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. The parent signing this form does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. The parent signing this form is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give permission to allow their child to participate in this research study.

This part of the consent form is to be signed by the Principal Investigator.

Signature of Person Obtaining Informed Consent Date

Printed Name of Person Obtaining Informed Consent

APPENDIX C**Demographic Information****Participant Number** _____

PLEASE WRITE CLEARLY

- ❖ Age: _____ years old
- ❖ Race/Ethnicity: (Please circle *one*)
 - Black (African-American, African, Afro-Caribbean)
 - White (European Descent)
 - Asian (South Asian, East Asia, Southeast Asian)
 - Hispanic/Latino(a) (South American Descent, Caribbean)
 - Multiracial/Multiethnic (The parents have distinct, different races/ethnicities)
- ❖ Grade: (Please circle *one*)
 - 9th
 - 10th
 - 11th
 - 12th
- ❖ Gender: (Please circle *one*)
 - Male
 - Female

APPENDIX D

Post Video Survey

Please answer the following statements. Please circle one response per statement.

PARTICIPANT NUMBER: _____

Statement #1: The first video (nature scene video) was scary.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #2: The second video (store robbery video) was scary.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #3: If I was in the first video (nature scene video), I would be scared.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #4: If I was in the second video (store robbery video), I would be scared.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #5: If I was in the first video (nature scene video), I would feel threatened.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #6: If I was in the second video (store robbery video), I would feel threatened.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #7: The robber in the second video (store robbery video) was scary.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Statement #8: The robber in the second video (store robbery video) was threatening.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Scale 1: Rate the situation presented in the second video (store robbery video) on a scale from 1-10.

1 2 3 4 5 6 7 8 9 10

Not Dangerous

Moderately Dangerous

Very Dangerous

Scale 2: Rate the situation presented in the first video (nature video) on a scale from 1-10.

1 2 3 4 5 6 7 8 9 10

Not Dangerous

Moderately Dangerous

Very Dangerous

mean age	grades	% black	% white	% asian	% hisp./lat	% multi	% male	% female
15.75 y/o	(9th) 0%	41.18%	35.29%	17.64%	0%	5.88%	29.41%	70.59%
1 person	(10th) 70.59%							
didn't	(11th) 11.76%							
report	(12th) 17.64%							
age								
so,								
average								
was								
divided								
by								
16								

Black student watching video of a White perpetrator												
Temp final	Temp initial	Temp change	Sys final	Sys initial	Change Sys	Dia final	Dia initial	Change Dia	HR final	HR initial	Change HR	
96.9	96.4	0.5	116	109	7	83	68	15	81	72	9	
96.8	96.8	0	129	125	4	83	80	3	90	78	12	
		Avg: 0.25 (σ=0.35),			Avg: 5.5 (σ=2.12)			Avg: 9 (σ=8.49)			Avg: 10.5 (σ=2.12)	
White student watching video of a White perpetrator												
Temp final	Temp initial	Temp change	Sys final	Sys initial	Change Sys	Dia final	Dia initial	Change Dia	HR final	HR initial	Change HR	
97.5	97.8	-0.3	119	116	3	60	63	-3	69	65	4	
97.8	98	-0.2	120	128	-8	54	68	-14	68	64	4	
97.5	97.8	-0.3	131	129	2	61	61	0	55	63	-8	
		Avg: -0.27 (σ= 0.06)			Avg: -1 (σ= 6.08)			Avg: -5.67 (σ= 7.37)			Avg: 0 (σ=6.93)	
Black student watching video of a Black perpetrator												
Temp final	Temp initial	Temp change	Sys final	Sys initial	Change Sys	Dia final	Dia initial	Change Dia	HR final	HR initial	Change HR	
97.3	97.5	-0.2	118	114	4	68	68	0	61	64	-3	
97.7	97.3	0.4	93	99	-6	62	56	6	95	94	1	
96.6	97.1	-0.5	120	118	2	73	67	6	74	72	2	
98.4	98.2	0.2	124	129	-5	78	68	10	80	72	8	
97.7	97.5	0.2	100	112	-12	63	58	5	56	54	2	
		Avg: 0.02 (σ= 0.36)			Avg: -3.4 (σ= 6.47)			Avg: 5.4 (σ= 3.58)			Avg: 2 (σ=3.94)	
White student watching video of a Black perpetrator												
Temp final	Temp initial	Temp change	Sys final	Sys initial	Change Sys	Dia final	Dia initial	Change Dia	HR final	HR initial	Change HR	
97.5	97.8	-0.3	117	132	-15	64	68	-4	81	93	-12	
97.3	97.7	-0.4	104	99	5	69	61	8	78	71	7	
98.4	98.4	0	100	99	1	64	59	5	88	80	8	
		Avg: -0.23 (σ= 0.21)			Avg: -3 (σ= 10.58)			Avg: 3 (σ=6.25)			Avg: 1 (σ= 11.27)	

Temp. Black vid				
Final temp.	Initial temp.	Change in temp	Average change in black temp.	Standard deviation
96.6	97.1	-0.5	-0.03	0.37
98.4	98.4	0		
97.7	98	-0.3		
98.4	98.2	0.2		
97.5	96.9	0.6		
97.7	97.3	0.4		
97.5	97.8	-0.3		
97.7	97.5	0.2		
97.3	97.7	-0.4		
97.3	97.5	-0.2		

BP Black vid									
Final Sys	Initial Sys	Change sys	Average change sys	Standard deviation	Final Dia	Initial Dia	Change Dia	Average change in A dia	Standard deviation
120	118	2	-3.4	6.75	73	67	6	5.2	4.44
100	99	1			64	59	5		
113	120	-7			85	74	11		
124	129	-5			78	68	10		
107	108	-1			68	63	5		
93	99	-6			62	56	6		
117	132	-15			64	68	-4		
100	112	-12			63	58	5		
104	99	5			69	61	8		
118	114	4			68	68	0		

HR Black Video				
Final HR	Initial HR	Change HR	Average change HR	Standard deviation
74	72	2	2.2	6.29
88	80	8		
63	55	8		
80	72	8		
94	93	1		
95	94	1		
81	93	-12		
56	54	2		
78	71	7		
61	64	-3		

Temp. White Vid									
Final temp.	Initial	Change in temp.	Average change in temp.	Standard deviation					
96.8	96.8	0	-0.057	0.28					
97.5	97.8	-0.3							
97.5	97.8	-0.3							
97.8	98	-0.2							
97.7	97.8	-0.1							
96.9	96.4	0.5							
98	98	0							

BP White vid									
Final Sys	Initial Sys	Change sys	Average change sys	Standard deviation	Final Dia	Initial Dia	Change Dia	Average change in A dia	Standard deviation
129	125	4	0	4.51	83	80	3	0.14	8.73
119	116	3			60	63	-3		
131	129	2			61	61	0		
120	128	-8			54	68	-14		
106	108	-2			65	68	-3		
116	109	4			83	68	15		
96	99	-3			69	66	3		

HR White Video									
Final HR	Initial HR	Change HR	Average change HR	Standard deviation					
90	78	12	3.86	6.28					
69	65	4							
55	63	-8							
68	64	4							
96	92	4							
81	72	9							
71	69	2							

APPENDIX F

Raw Data of Likert Survey

White perpetrator video									
statement #1 scaled value		statement #2 scaled value		statement #3 scaled value		statement #4 scaled value		statement #5 scaled value	
1		3		1		5		1	
1		3		2		4		2	
1		2		1		5		1	
1		2		1		4		1	
1		5		1		5		1	
1		3		1		5		1	
1		3		3		5		2	
Avg: 1	$\sigma=0$	Avg: 3	$\sigma=1$	Avg: 1.43	$\sigma=0.79$	Avg: 4.71	$\sigma=0.49$	Avg: 1.29	$\sigma=0.49$
statement #6 scaled value		statement #7 scaled value		statement #8 scaled value		scale 1		scale 2	
5		4		5		8		1	
5		3		4		8		2	
5		4		4		8		1	
4		4		5		8		1	
5		4		5		10		1	
4		4		3		7		1	
5		3		3		8		3	
Avg: 4.71	$\sigma=0.49$	Avg: 3.71	$\sigma=0.49$	Avg: 4.14	$\sigma=0.90$	Avg: 8.14	$\sigma=0.90$	Avg: 1.43	$\sigma=0.79$

Black perpetrator video									
statement #1 scaled value		statement #2 scaled value		statement #3 scaled value		statement #4 scaled value		statement #5 scaled value	
1		2		1		3		1	
1		2		1		4		1	
1		3		1		5		1	
1		3		2		5		1	
1		3		2		4		1	
2		3		1		4		1	
1		5		1		4		1	
1		2		1		4		1	
1		3		1		3		1	
1		1		1		5		1	
Avg: 1.1	$\sigma=0.32$	Avg: 2.7	$\sigma=1.06$	Avg: 1.2	$\sigma=0.42$	Avg: 4.1	$\sigma=0.74$	Avg: 1	$\sigma=0$
statement #6 scaled value		statement #7 scaled value		statement #8 scaled value		scale 1		scale 2	
4		3		4		9		2	
4		1		3		8		2	
5		4		4		8		1	
5		3		4		8		1	
5		3		2		8		1	
4		3		5		5		1	
5		4		4		7		1	
5		3		4		10		1	
3		2		5		7		7	
5		5		5		6		2	
Avg: 4.5	$\sigma=0.71$	Avg: 3.1	$\sigma=1.10$	Avg: 4	$\sigma=0.94$	Avg: 7.6	$\sigma=1.43$	Avg: 1.9	

APPENDIX G

Debriefing Statement

Thank you so much for participating in this study. Your participation was very valuable to me. I know you are very busy and I appreciate the time you devoted to participating in this study. There was some information about the study that I was not able to discuss with you prior to the study, because doing so probably would have impacted your responses and thus skewed the study results. I would like to explain these things to you now. In this study, I was interested in understanding the impact of implicit bias on the autonomic nervous system. According to Webster's dictionary, implicit bias is defined as "...the bias in judgment and/or behavior that results from subtle cognitive processes (e.g., implicit attitudes and implicit stereotypes) that often operate at a level below conscious awareness." Based on prior research, we expect to find that people tend to have bias against Black individuals. You were told that the study would investigate how violent media affects the autonomic nervous system; however, the study focused on how people react to a Black criminal vs. a White criminal. This deception was necessary because people tend to avoid race-related discussions/topics and tend to hid biases in efforts to be socially acceptable. We hope this clarifies the purpose of the research, and the reason why deception was used. It is very important that you do not discuss this study with anyone else until the study is complete. Our efforts will be greatly compromised if participants come into this study knowing what is about and how the ideas are being tested. If you have any questions or concerns, you may contact [REDACTED] at [REDACTED] or [REDACTED]