Emotional Responses to Racially Disparate Policing

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Abstract

We conceptualize adverse interactions between police and the minority communities they sometimes serve as racially traumatic stressful events (RTSEs) and seek to measure public response to them. We implement two experimental studies, one on a white college campus and another with subjects recruited from a historically black campus in the deep south. We then measure galvanic skin levels while exposing the subjects to an array of photos, including photos of police conducting traffic stops. Our findings suggest the need for more research into the gender and racial differences in how individuals perceive such interactions. Further, we explore intra-racial differences in response among blacks, showing that attitudinal predispositions, in particular previous experiences with police brutality, violent encounters with law enforcement, linked fate, assessments of the public regard of blacks in society, and economic and legal disillusionment shape individual responses to police as well as to threatening images. The fact that mere photos of police conducting traffic stops generate responses similar in some groups to photos taken from the International Affective Picture System (IAPS) threatening photo series should be taken as a sign that these are important problems in need of more study. The IAPS threat photos we used included an attacking dog, attacking snakes, and a man with a gun in his mouth, a masked man with a knife, and a street scene with shooting soldiers.

Background

The recent deaths of unarmed blacks at the hand of white police officers have sparked protests across the nation. Based on media images of these protests, protesters were visibly angered by these shootings, and understandably so. We conceptualize these events as racially traumatic stressful events (RTSEs) and argue that exposure to RTSEs results in negative psychophysiological responses. We further explore whether the simple exposure to a photo of a police officer conducting a traffic stop may have effects similar to an RTSE.

Prior research has associated trauma with racial discrimination and racism. Carter (2006), for example, has used the term race-based traumatic stress (RBTS) in associating trauma with racism. Similarly, Smith (2011) argues that the accumulation of exposure to racism and discrimination can lead to what he has termed racial battle fatigue. These effects should of course be stronger among racial minorities than among whites, who are less likely to experience RTSEs. Also, some police interactions are more stressful than others; a routine traffic stop may be stressful, but a pretextual and potentially racially motivated event is more so to a minority citizen. According to Epp and colleagues (2014), drivers can tell the difference between a legitimate, well justified traffic stop (for example, being caught while driving much faster than the speed limit) and one with a flimsy legal justification. For minority drivers, repeated such incidents can give rise to a feeling of second-class citizenship, unfairness, and frustration with the police. In a recent study, Elizabeth Maltby (2017) shows dramatic declines in feelings of trust in government, voting, and other indicators of democratic and community engagement among educated blacks living in areas with higher criminal justice system intrusions. Scholars including Meares (2009), Burch (2013), Lerman and Weaver (2014), Tyler and colleagues (2014), and Glaser (2015) have addressed various troubling aspects of legitimacy, perception, and

democratic inclusiveness inherent in the interactions between police and the public, in particular those members of the public most likely to come into involuntary contact with the police: young men of color.

There are many reasons to believe that interactions with the police might be experienced differently by members of the public with different demographic characteristics. We focus on physiological responses to photographs depicting police-citizen interactions, comparing these with standard images from the psychological literature on threat. We analyze galvanic skin levels (GSL), or skin conductance, a standard measure in the field. Given the saliency of negative relationships between police officers and blacks, we expect that the mere presence of police officers may generate higher GSL among blacks. Our focus here is therefore on psychophysiological responses to one specific type of police interaction: traffic stops. And we argue that differences in psychophysiological responses are of real consequence politically – they matter not just to real-world reactions to policing, but to citizens' policy preferences and political support. They may also have under-appreciated public health consequences. If even a routine traffic stop induces significant stress among minority drivers, we should question whether such things as police stops and questionings are merely "momentary inconveniences" as the courts have considered, or if they have greater negative consequence.

We use a lab-experimental research design to examine reactions to traffic stops among two samples, one collected from a mixture of faculty, staff and students at a predominantly black university and one at a predominantly white university. We hypothesize that responses will vary systematically by both gender and race. But our paper is not solely about the expected inter-racial differences between black and white responses to police. Rather, we seek to probe deeper to examine how the structure of attitudes among blacks and how intra-racial differences in those

attitudes might be understood by variability in experiences and identities. A priori, we expect blacks who possess high levels of racial identity to be aroused when exposed to stimuli of police conducting traffic stops when compared to blacks with low levels of racial identity. The thinking behind this argument is that because of blacks' shared experiences and their belief that what happens to other blacks will affect their own life (Dawson 1993), blacks will empathize with blacks who have been shot by police and thus be threatened when they see images of the police.

In recent years, the political science literature has relied almost exclusively on one variable, linked fate, to measure racial identity. Given that this variable is measured using only one question, the research here borrows from psychology to employ multiple dimensions of racial identity. In addition to racial identity, the research here also employs variables to tap blacks' disillusionment as it relates to the American dream. Those blacks who possess high levels of legal disillusionment are not expected to be aroused when they see images of police because they have become immune to a failed legal system. We do not, however, have any a priori expectations regarding a relationship between those blacks who believe that the economic system has failed poor people and physiological responses to traffic stop images, as the item used to operationalize the economic disillusionment variable is not race-specific. Closing out our expectations related to intra-racial attitudes, we do not expect blacks who resent other blacks to be aroused by police images because they may subscribe to conservative views such as the police upholding law and order and the belief that blacks who are killed by police are killed because of their own wrongdoings. Lastly, we investigate blacks' physiological responses to traffic stop images as a function of attitudes toward the police. We argue that blacks who have experienced violent encounters with police will be aroused when they see images of police making traffic

stops. Likewise, we expect blacks who mention that police brutality or the lack of social justice makes them angry to be aroused when they witness police making traffic stops.

Thus, we have a number of cross-racial expectations, and a deeper set of intra-racial questions that we explore below. Accordingly, one part of our analysis compares our black sample with a smaller sample of whites. Then, using the larger sample of blacks, we explore the intra-racial differences in response to police encounters. We outline the related literatures briefly below, before turning to a description of our experimental design. We then review preliminary results, and interpret them in light of the current context in the United States.

In recent years, the field of political science has witnessed a growth of research employing psychophysiological methods in the study of political phenomena. Despite this growth, scholars have failed to explore the potential differences in responses that may exist between or within groups, particularly as it relates to race.[1] The failure to make these distinctions leaves a gap in our full understanding of political attitudes and behavior. Arguably, one reason for this gap is simply data limitations. For example, in their research of physiological responses and political attitudes, Oxley et al. (2008) report that only white subjects were included because only two of the 46 subjects were non-white. The research here seeks to build on the extant literature by assessing a unique data set that encompasses an oversample of African-Americans.

Blacks' Responses to Racially Traumatic Stressful Events (RTSEs)

One does not have to be physically present to be impacted by a traumatic event. For example, people who were indirectly exposed via the media or who personally witnessed events such as 9/11 or the Boston Marathon bombings have been found to have been psychologically affected.

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[1] There are some exceptions, including Osmundsen et al. 2017; Soroka, Fournier and Nir 2017.

Holman, Garfin and Silver (2014) administered acute stress inventories to test the relationship between stress and both the direct and indirect consumption of media-based exposure to the Boston bombings and exposure to prior traumatic events such as 9/11 and the Sandy Hook Elementary School shootings. The findings reveal that prior media exposure to traumatic events are significantly correlated with increased levels of acute stress.

More specific to the research here, another body of literature has associated trauma with racial discrimination and racism. Smith, et al. (2011) argues that the accumulation of exposure to racism and discrimination can lead to what he has termed racial battle fatigue. He compares racism and discrimination to the constant pressure faced by soldiers on the battlefield. Along these lines, Williams (2015), relying on the Diagnostic Manual of Mental Disorders 5 (DSM-5) associates racial trauma with symptoms associated with post-traumatic stress disorder (PTSD). She writes "PTSD develops after a terrifying ordeal that involved physical harm or the threat of physical harm. The person who develops PTSD may have been the one who was harmed, the harm may have happened to a loved one, or the person may have witnessed a harmful event that happened to loved ones or strangers" (Williams 2015, xxx)

For many blacks, simple images of police officers might trigger such anger. Indeed, blacks have been observed on many occasions expressing anger in the aftermath of events associated with police officers. From the verdict in the Rodney King case to the aftermath of the Ferguson, Missouri case, anger has been at the root of the uprisings that occurred among large segments of the black population.

In addition to the psychological measures, a wide body of literature has found a relationship between laboratory analogues of perceived discrimination and physiological activity (Soto Dawson-Andoh and BeLue 2011; Lincoln, Chatters, Taylor and Jackson 2007). Neblett

and Roberts (2013), however, expand this literature by examining the role of racial identity as a mitigating factor in explaining the impact on physiological activity. These authors employ audio vignettes of racist comments made by black and white police officers as stimuli to examine the impact of perceived discrimination on the autonomic nervous system. Unlike prior work, they include physiological responses that reflect reactions driven by both the parasympathetic and sympathetic nervous systems. Their findings are mixed. They find that those blacks with high racial identities who were exposed to racist comments by white police officers were better able to cope when compared to those with low identities. The opposite, however, occurred when the perpetrator was a black police officer. That is, blacks with high racial identities experienced physiological responses that was reflective of them perceiving police officers to pose a threat.

A recent study analyzing transcripts from officer body cameras from traffic stops in Oakland California documented, in fact, that officers are more respectful when dealing with white drivers and less so when interacting with blacks (see Voigt et al. 2017). If officers behave differently systematically when dealing with individuals of different racial groups, it stands to reason that members of those groups would have different expectations when they know they are going to be approached by an officer.

We seek to build on the extant literature by examining the impact of intra-racial attitudes on blacks' physiological responses when they observe police making traffic stops. We regard this work as exploratory, in part because the existing literature points in different directions. Where the literature on anger is concerned, for many blacks, simple images of police officers might trigger anger. From the verdict in the Rodney King case to the aftermath of the Ferguson, Missouri case, anger has been at the root of the uprisings that occurred among large segments of the black population. Insofar as GSL reflects anger (and it may or may not), we might expect

comparatively high GSL among blacks in reaction to police photos. At the same time, work on

PTSD suggests that blacks may exhibit comparatively low GSL in reaction to traffic stop photos

– prior negative experience with policy might serve to dampen physiological responses.

The Contours and Dimensions of Black Ideologies

Given the findings of Neblett and Roberts (2013), we turn our attention to the political science

research on intra-racial differences among blacks. Traditionally, the political science literature

has measured African-American group identification using items asking about feelings of

closeness toward blacks (Tate 1993). Variables used to measure racial identification, as a

construct, have taken on almost as many labels as there are researchers on the topic. These labels

include: linked or common fate (Tate 1993 and Dawson 1994), black consciousness (Gurin and

Epps 1975; Miller, Gurin, Gurin and Malanchuk 1981; Gurin, Miller and Gurin 1980; Gurin,

Hatchett and Jackson 1989; Shingles 1981; Reese and Brown 1995), and black nationalism/black

autonomy/racial solidarity (Welch et al 2002; Brown and Shaw 2002; Davis and Brown 2002;

Dawson 2001).[2] The common denominator between all of these labels is the shared experiences

and worldview possessed by blacks. In recent years, Linked Fate has been used the most to

conceptualize racial identity.

In our research, we turn to the psychology literature to test the validity of competing

variables used to explore racial identity. Specifically, we employ the Multidimensional Inventory

of Black Identity–Short Form (MIBI-S; Martin, Wout, Nguyen, Gonzalez, & Sellers, 2010). The

items used in this inventory are used to create four categories of racial identity. Here we focus on

only three of those categories: Racial Regard, Racial Centrality, and Ideology. Racial regard is

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[2] To be sure, Black Consciousness is not conceptually isomorphic with racial identity. It does, however, include racial identity as a sub category.

measured using two variables. Private regard is how people feel towards African Americans or being an African American themselves. Public regard is how people feel that others view African Americans. Here, we only use public regard. Racial Centrality is the degree to which African Americans identify themselves with their race when compared to competing identities (e.g., gender, class…). This dimension is hierarchical and illustrates whether individuals implicitly rank their racial identity higher than other identities in their self-identification. Ideology includes individual's beliefs, opinions, and attitudes related to how the racial groups should behave, live and interact with society. The general model includes four ideological philosophies. Here we focus solely on the nationalist ideology, which emphasizes that the African-American experience is unique when compared to other groups. According to this philosophy, African Americans should control their own life and participate in African American organizations in pursuing social changes.

Save for the work of Allen, Dawson and Brown (1989) and Dawson (2001 and 2004), research on black political attitudes has focused almost exclusively on racial solidarity within the black community. Additionally, much of the research on racial attitudes has focused solely on white racist attitudes toward blacks. The work of Cohen (1999) proves instructive here. Cohen's work is appropriate because it moves beyond the dominant paradigm of studying race relations as a function of the dominant group's regulation of the marginal group to a discussion of the marginal group's regulation of their own group members (e.g., blacks vs. blacks). Cohen (1999) states that white stereotypes of blacks "have great staying power" (43). The argument there is that blacks are socialized by the same media as other racial groups, and are also likely to embrace negative stereotypes of blacks. Indeed, scholars from other disciplines have long argued and provided empirical support for this position (see e.g., Jost and Banaji 1994). Prior research

by Orey and his colleagues addresses this issue by using the literature's current explanations of white racism and resentment toward blacks to measure internalized racism and intra-racial resentment among blacks. Internalized racism is operationalized based on survey items that measure the differences of blacks' negative stereotypes of other blacks (e.g., lazy and unintelligent) when compared to whites. Intra-group resentment is operationalized using items designed to measure white racial resentment, that is, the notion that blacks fail to subscribe to the American ethos of individualism and other traditional values in tandem with an anti-black affection (e.g., Kinder and Sanders 1996). Orey and his colleagues test the validity of internalized racism and intra-racial resentment, when applied to blacks, and find that blacks who possess these attitudes tend to oppose progressive policies such as affirmative action, reparations, and welfare (Orey, King, Titani-Smith and Ricks 2012; Orey, Craemer and Price 2013; Orey, King, Lawrence and Anderson 2012).

Disillusionment and Black Rage

> Now, after a long-enduring faith and patience, without parallel, I think, in human history, the black citizen has lost his patience—and his fear—and is, I am afraid, also losing his faith in the American establishment and system insofar as their promises to him are concerned. He is demanding, not appealing, nowadays, and his demands begin to take unexpected courses—courses which could only be born out of profound frustration and complete disillusionment (Ralph J. Bunche, as cited in Dawson 2001, 273).

Media coverage of police violence toward blacks powerfully reinforces prior incidents that have triggered criticisms of America by blacks. Indeed, during the final weeks of the Democratic presidential primaries in 2008, then presidential candidate Barack Obama endured heavy criticism from the media based on comments made by his former pastor, Reverend Dr. Jeremiah Wright. This flap emerged shortly after incendiary comments were released by the media concerning Dr. Wright's criticism of the American government as being the culprit/root of the poor life-chances faced by many blacks. Specifically, he stated, "[t]he government gives

them the drugs, builds bigger prisons, passes a three strikes law, and then wants us (African Americans) to sing 'God Bless America.' No, no, no; not 'God Bless America,' God damn America… for killing innocent people; God damn America for treating its citizens as less than human…" These inflammatory remarks, although clearly much more extreme, are consistent with Ralph Bunche's epigraph above. In each case, a clear sense of frustration is key. Both Bunche and Wright allude to America's failure to live up to its own principles of equality. Such sentiments capture what Dawson (2001) has conceptualized as a disillusioned-liberal ideology— the belief that America has failed to fulfill its promise of equality. This disillusionment is rooted in the many observations of racial inequalities witnessed by blacks on a daily basis. Such observations arguably produce a frustration, whereby blacks either blame blacks for their failure, or they blame the system. The current research examines blacks' response to police killings by employing experimental research designs. In addition to the psychological impact that these events might have on blacks, it is also possible that these RTSE's can trigger negative physiological responses. These negative reactions can serve as an antecedent to negative political attitudes and behavior.

In addition to Dawson's (2001) finding that disillusioned liberalism serves as one of the contours and dimensions of black ideology, specifically noting that blacks are disillusioned with racial progress in America, Hochschild (1995) criticizes various tenets of the American Dream as possibly being out of reach for the average American. Her criticism is based on the fact that the American Dream places focus on individualism and competition, thereby resulting in a false sense of hope. Hochschild's point is crucial to understanding one of the key arguments in this paper. That is, despite the pessimistic tone expressed during the course of her argument, it is this sense of hope that affords the disillusioned liberal to continue embracing America. Empirically,

the work of Dawson (2001) proves to be the most rigorous effort at measuring and testing disillusionment among blacks. Using the concept disillusioned liberalism, Dawson reports that over 75 percent of blacks believe that they live in a country that is "racially unjust" (2001, 280; see also Block 2010).

Expectations and Hypotheses

No driver wants to be pulled over for speeding, and no one can be expected to enjoy a traffic stop, much less are more aggressive encounter with the police such as a k-9 unit or an armed officer with gun pointing. Our baseline expectation is thus that reactions to photos of traffic stops will elicit heightened GSL, *ceteris paribus*.

We nevertheless anticipate a good degree of heterogeneity in responses to traffic stop photos. We explore that heterogeneity in two separate experiments. In the first, our interest is in differences across race and gender. Recall that the literature points to different possibilities: blacks may feel anger, and exhibit higher GSL; or they may already be so sensitized that there will be little to no reaction in GSL.

In the second study, we expect heterogeneity among blacks based on a number of psychological characteristics. Here, we hypothesize that exposure to police making traffic stops will increase arousal among blacks who possess high levels of racial identity. At the same time, we do not expect arousal among blacks who possess high levels of disillusionment or intra-group resentment. Blacks who possess high levels of disillusionment may expect government to fail them. Moreover, blacks who resent other blacks will be unaffected by images of police making traffic stop because they may blame blacks for negative encounters with the police and/or they may see police as maintaining law and order, a code word that has often been associated with racial conservatism.

Experiments

Our analysis proceeds in two stages. The first stage provides a comparison between blacks' and whites' responses to images of traffic stops and threatening images. The second stage of the research probes deeper in examining blacks' physiological responses as a function of black intra-racial attitudes. Methods and results are discussed, in turn, below.

Study 1

Our first exploration takes the form of a relatively simple experimental protocol. In short: subjects are exposed to a random set of 20 still images, including 5 images of traffic stops, while we monitor galvanic skin levels (GSL) using biosensors attached to two finger on their non-dominant hand. Our aim, then, is to examine "activation" levels while viewing traffic stop photos, in comparison with other photos from three categories in the International Affective Picture System (IAPS) – threat, positive, and neutral.

Galvanic skin levels are among the most straightforward, and most used, physiological measures of activation, or arousal. There is a growing body of work across the social sciences using GSL; most pertinent to this work are the literatures using GSL to capture reactions to political media stimuli (e.g., Grabe and Kamhawi 2006; Grabe et al. 2000; Soroka and McAdams 2015; Soroka, Gidengil, Fournier and Nir 2016) and to explore links between physiology and political ideology (e.g., Dodd et al. 2012; Hibbing, Smith, and Alford 2014; Oxley et al. 2008; Smith et al. 2011). GSL is measured using sensors attached to two fingers, which send and receive very weak electrical impulses. The rate of conductance captures the constantly varying amount of liquid (i.e., sweat) in respondents' hands. Variations in moisture (and thus conductance) are regulated by the sympathetic nervous system, and are an indication of arousal (negative or positive).

The advantage of using IAPS photos is that they provide a baseline for psychophysiological reactions. There is a large body of work that relies on IAPS stimuli, including recent work on psychophysiology and politics (including the political ideology literature, cited above). We know from past work that participants tend to show low activation for positive and neutral photos, and high activation for threat photos. Our analysis here is focused on activation in response to traffic stop photos, in comparison with these three IAPS categories.

Traffic stop photos were selected by the authors based on a Google search of actual traffic stop photos, and with an eye on capturing traffic stops which are (a) point-of-view, so that respondents can picture themselves in that situation, and so that the race of the person being stopped is not visible, and (b) varying in the nature of the traffic stop, i.e., inside and outside the car, or including and not including dogs and guns. We also hold the race of the police officer constant, so that every case involves white officers. The race of the officer is no doubt of interest – reactions to white officers may well differ from reactions to black officers. Our aim here is to not have too many moving parts, however; and so we view race of officer as an important manipulation in future work. Traffic stop photos used in the experiment are included in Appendix Figure 1. IAPS photos cannot be distributed, but are readily available to researchers from the Center for the Study of Emotion and Attention at the University of Florida. For the sake of clarity, however, note that our IAPS photos include the following: *Positive*: dog, baby, flowers, waterfall, ice cream cone; *Neutral*: mushrooms, basket, iron, dustpan, fork; *Threat*: street scene with shooting soldiers, man with gun in his mouth, masked man with knife, attacking dog, attacking snake.

The experiment itself is straightforward. Following a one-minute gray screen, each participant is exposed to twenty randomly-ordered photos, separated by 10-second gray screens, known as interval stimulus intervals (ISI). The ISI serves as a baseline for comparison to the stimuli – we are focused on the change in GSL from ISI to stimulus, for each stimulus, comparing across our four categories: positive, neutral, threat, and traffic stops. We conducted the experiment in a quiet laboratory setting at the University of Michigan and at Jackson State University over the spring and summer of 2017. The former offers a primarily white sample, while latter offers a primarily black sample. We rely on convenience samples, recruited through participant pools and snowball sampling.

Physiological data are captured using equipment from Thought Technology (Michigan) and BioPac (Jackson State). For Study 1, all data are processed manually, using methods described in some detail in Section D of a methodological appendix connected with ongoing work by Soroka, Fournier and Nir;[3] for Study 2, data are processed using BioPac software. In both cases, a brief survey was completed online following the experiment.

The analysis itself is straightforward. We begin with the raw (entirely unfiltered) data from both samples. These data are down-sampled to five-second units, and the data are stacked into a large time-series panel dataset, where each individual is a panel, and where there are roughly 40 5-second units for each individual (covering the entire period of the experiment). Our dependent variable is galvanic skin levels, measured as the difference between GSL in the stimulus period and GSL is the ISI (pre-stimulus) period, for each photo. To reduce the impact to high outliers, we log the GSL measure; and since there are negative values of almost -2, the

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[3] This is available at http://www.snsoroka.com/files/Method.Appendix.pdf.

dependent variable below is *log(GSL+2)*. We then run a simple time-series panel estimation, in which GSL is regressed on the following:

(a) *Time:* A variable that counts time, in 5-second increments. This variable is intended to capture what we expect is a decrease in GSL from the first to second 5-second increment within each stimulus.

(b) *Order:* A variable that records the order of stimuli, from 1 to 20. This captures trends in GSL over the course of the experiment.

(c) *Stimulus Type:* A series of dummy variables that captures the impact of neutral, threat and police photos, with positive photos as the omitted reference category.

(d) Interactions between (b) and (c), to capture the possibility that the impact of a given type of photo declines or increases over the course of the experiment. Seeing the first police photo might have a different impact than the third police photo; our expectation is that these interactions will be negative, indicating a decreasing impact of stimuli over the course of the experiment.

Note that taking the time-serial component of the experiment into account is relatively unusual in the field, but we regard it as a critical to revealing the impact of (c). Results bear this out, as we shall see.

Recall that our expectation is that results will differ across both gender and race. Our models already include interactions between order and photo type, however, and so including additional third- and fourth-order interactions introduces a great deal of collinearity into a model with limited cases. For this exploratory work, then, we estimate the basic model described above across four different groups: white females, white males, black females, and black males. Results are shown in Table 1.

Table 1. The Impact of Photos, Panel Estimation, Combined Samples

	White Female	White Male	Black Female	Black Male
Time	-0.018 (0.015)	-0.027 (0.026)	-0.014** (0.007)	-0.016* (0.009)
Order	0.006** (0.003)	0.008* (0.005)	0.007*** (0.001)	0.009*** (0.002)
Neutral	**0.049 (0.046)**	**0.152* (0.082)**	**0.081*** (0.023)**	**0.070** (0.030)**
Threat	**-0.009 (0.049)**	**0.154* (0.079)**	**0.057** (0.023)**	**0.109*** (0.031)**
Police	**-0.011 (0.051)**	**0.218** (0.085)**	**0.094*** (0.022)**	**0.004 (0.030)**
Order * Neutral	-0.005 (0.004)	-0.008 (0.007)	-0.005*** (0.002)	-0.004 (0.002)
Order * Threat	0.001 (0.004)	-0.009 (0.006)	-0.004** (0.002)	-0.006*** (0.002)
Order * Police	-0.003 (0.004)	-0.015** (0.007)	-0.006*** (0.002)	-0.001 (0.002)
Constant	0.643*** (0.042)	0.590*** (0.071)	0.592*** (0.020)	0.565*** (0.028)
Observations	520	560	518	760
Subjects	13	14	13	17
R2	0.043	0.017	0.097	0.181

Cells contain coefficients from a random-effects panel estimation, with standard errors in parentheses. $p < .10$; $p < .05$; *** $p < .01$. Observations refer to each subject x the stimulus; for subjects with full data, there were 40 observations.

Note the relatively small sample size for each group. This is a consequence of a limited sample, but also problems with missing data. Even so, groups are relatively balanced, and the use of time-series data allows the estimations to rely on a good deal of over-time variation for each subject. Interpreting the models is relatively straightforward. Coefficients for *Time* suggest that on average GSL decreases from the first to the second 5-second interval during with respondents are viewing photos. The *Order* coefficients suggest that, at the same time, GSL increases gradually over the course of the experiment. The significance of these variables testifies to the importance of taking the temporal component of the experiment into account.

The coefficients for *Neutral*, *Threat* and *Police* indicate the difference between average GSL for these set of photos, versus the residual category, *Positive*. Each of these coefficients captures the average effect of a category of photos as if it was the first stimulus in the experiment; the interactions with *Order* then capture what tends to be the decreasing impact of each set of stimuli over the course of the experiment. This makes good sense, and again suggests

the importance of taking time into account. Even so, our main interest here is the coefficients for each category of photos.

Results are not quite as clear as we might hope – among white women, for instance, there do not appear to be any statistically significant differences in GSL across the four photo categories. Given past work, we expect positive photos to produce especially low GSL; there is no evidence of this among white women. Results for white men are as we would expect, however – all coefficients are positive and significant. The fact that threat photos elicit reactions roughly in line with neutral ones is a little surprising; but it is notable that the strongest reaction for this group is to the traffic stop photos. White men, it appears, react strongly to the possibility of traffic stops.

Black women do as well. We cannot easily account for the relatively high levels of activation from neutral photos for this group, but it is notable that traffic stop photos elicit a reaction that nearly twice as large as threat photos. It is even more notable that this not at all true of black men: for this group, threat photos elicit a strong reaction, and traffic stop photos simply do not. This does not change over the course of the experiment either – regardless of order, traffic stop photos do not produce strong reactions in black men, even as they do for both black women and white men. This seems most in line with expectations drawn from the literature on PTSD. We discuss the results further below, however. For now, we turn to the next experiment.

Study 2

Building on Study 1, Study 2 is based on an all-black convenience sample consisting of a mixture of faculty, staff and students at a predominantly black university located in the Deep-South. The experiment was conducted at a laboratory located on a University campus. Prior to arriving at the lab, subjects were asked to complete a survey and an Implicit Association Test.

The total number of subjects included in the analysis is 43. The sample consists of roughly 10 percent of individuals who possessed an education level between the 9th and 12th grade, approximately 31 percent of participants earned a High School diploma, roughly 40 percent completed some level of college, 10 percent had earned college degrees, almost 8 percent possessed Master's degrees and almost 12 percent had earned PhDs. Roughly 52 percent of the participants were males, compared to 48 percent females. The ages range from 16 to 65, with a mean age of almost 26. We make no claim that the sample employed in our analysis is representative of the country, state, city or campus from which it was drawn. We can claim, however, that the sample does not consist entirely of undergraduates.

The study was approved by the Institutional Review Board at Jackson State University and all subjects gave written informed consent prior to participation in the study. Prior to arriving at the lab, subjects were asked to complete an online survey and were given directions and a time and date to complete the experiment. Once they arrived, a proctor explained to them the process related to the physiological experiment. They were instructed that two small sensors would be attached to the tips of the middle phalanx of the index and middle fingers to measure their sweat levels. Following the instructions, the proctor applied an isotonic, 0.05 molar NaCl, electrode paste to two Ag/AgCl electrodes to the subject. These electrodes were connected to leads that ran from a BioPac M150 for data acquisition and the GSR/EDA100C device which measures skin conductance via changes in perspiration on the surface of the skin due to stress, arousal or emotional excitement. The BioPac M150 data acquisition unit, when attached to the EDA 100c amplifier, allows for the analysis of galvanic skin activity focusing specifically on skin conductance levels, which captures the increased conductivity resulting from moisture secreted by eccrine glands in the lower layers of the skin.

Once the subjects were prepared for the study, they were instructed to relax while the proctor prepared the experiment. The preparation time took about five minutes to allow the subjects to calm down from any potential anxieties that may have existed from being connected to the electrodes or any other factors that may alter the results and to allow the gel to penetrate the skin. Next, the subject was asked to read the consent form and to give an oral response indicating that they agreed to proceed with the study. They were also informed that they could discontinue the study at any time.

Acqknowledge software was used to conduct the analyses. Using raw scores produced by the ISI and stimuli proves to be problematic when using skin conductance analyses due to the wide variance that exists across subjects. For example, some subjects may be prone to sweat more than others. Indeed, black subjects have been found to sweat less when compared to other racial groups (Boucsein et al. 2012). Because of this, the physiological measure used here is not the absolute skin conductance levels computed upon the presentation of the stimuli, but, rather it is the first difference between the ISI and the stimulus. Thus, the data are analyzed by taking the difference between the skin conductance levels (SCL) for the ISI (baseline) and the skin conductance of the stimuli (ISI − Stimulus). Negative numbers served as indicators for a sympathetic response. The data were sampled at 2000 HZ, but, were downsampled to 62 HZ for the analysis.

The *dependent variables* are measured based on the difference between the means of the stimuli and the inter-stimulus interval. The experiment consists of five different stimuli for each of the categories (i.e., Traffic Stops and Threat). Hence, for each subject, five difference-of-means scores were derived. When assessing each subject, the highest score among the five scores was selected to be included as the dependent variable. In determining whether police images

impact blacks, we compare the results from two models; one examining Traffic Stops and the other one explaining blacks responses to Threatening images.

First, to analyze the data, we first log-transformed the raw Traffic Stop and Threatening GSL waveforms for each subject. The unit of analysis is in microsemiens. The first difference is used as the *dependent variable.* The independent variables included intra-racial measurements and attitudes toward police activity.[4]

Intra Racial Resentment is operationalized based on the following Likert-type items (strongly disagree-strongly agree): "Over the past few years blacks have gotten less than they deserve" (reverse coded); "Irish, Italians, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same without any special favors"; "It's really just a matter of some people not trying hard enough. If blacks would only try harder they could be just as well off as whites"; and "Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class" (reverse coded). An additive scale was created, resulting in a reliability score of $\alpha = .63$.

Disillusioned Liberalism is operationalized using two separate variables: Legal Disillusionment and Economic Disillusionment, each coded from disagree-strongly agree. Economic Disillusionment is measured using the following Likert-item: "How strongly do you agree or disagree that the American economic system is unfair to poor people?" Likewise, Legal Disillusionment is measured based on the following Likert-item: "How strongly do you agree or disagree with the statement that the American legal system is unfair to Blacks?"

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[4] Reliability analyses were conducted using statistics computed using SPSS v. 22. The internal properties of the variables were established through analysis of internal reliability via Cronbach alpha.

Multiple measures are employed to measure racial identity. To be sure, we employ the traditional item used in political science, Linked Fate. It is measured based on a single item: "Do you think what happens generally to black people in this country will have something to do with what happens in your life?" Borrowing from Psychology, however, we also incorporate Sellers et al.'s (1998) MMRI model to expand our measures of racial identity. Racial Centrality is measured using two items: "I feel close to other black people" and "I have a strong sense of belonging to other Black people" (Strongly Disagree-Strongly Agree). Each of these items load onto one dimension. An additive scale was created, resulting in a reliability score of $\alpha = .85$.

Public Regard is measured based on the following three items: "Most people think that Blacks are as smart as people of other races,"; "People think that Blacks are as good as people from other races; and "People from other races think that Blacks have made important contributions." These items load onto a single dimension and achieve an α score of .83.

Additionally, the variables used to measure attitudes toward the police are the frequency of Violent Encounters with Law Enforcers and Anger toward Police Violence. Anger toward Police Violence is measured using the open-ended item: "Describe any issues that make you angry about America." The responses were content analyzed and coded as a 1 if the subject noted that either police brutality or a reference to social justice made them angry. Violent Encounter with Law Enforcers was measured based on the subject's response to an item that asked whether they had "ever had a violent encounter with a law enforcement agent (for example: a police officer, a security guard...)?" This variable was coded as a zero for none; one for one; two for two; and three if the subject indicated more than two.

The controls included sex and levels of education. Male is coded as 1 and Female is coded as 0. Education consists of 9 values ranging from 9-12th grade to PhD. OLS is employed to analyze each of the models. The findings are presented below in Table 2.

Table 2. Blacks Responses to Images of Traffic Stops and Threatening Images

	Model A (Traffic Stops)		Model B (Threatening Images)	
	Coef.	Std. Err.	Coef.	Std. Err.
Police Brutality	0.019**	0.008	0.016*	0.009
Violent Encounter	0.008***	0.003	0.001	0.004
Education	0.000	0.001	-0.001	0.001
Centrality	0.000	0.002	0.003	0.002
Linked Fate	0.009**	0.004	0.005	0.004
Angry America	0.0001	0.006	-0.004	0.005
Black Nationalism	0.001	0.002	-0.002	0.003
Public Regard	0.004***	0.001	0.003**	0.001
Economic Disillusionment	0.008*	0.005	0.010**	0.005
Legal Disillusionment	-0.010**	0.004	-0.013**	0.006
Resentment	0.003	0.002	0.001	0.002
Sex	0.003	0.006	-0.003	0.007
Cons	-0.089*	0.048	-0.031	0.055
R^2		.62		.44
N		43		43

P<.01***; p<.05**; *p<.10. Model A

The findings for the Traffic Stop model are found in Table 2, Model A. We first turn our attention to the variables measuring attitudes toward the police. The findings reveal that an increase in violent encounters with law enforcement officers results in a significant increase in GSL. Similarly, there was an increase in GSL among blacks who noted that police brutality was an issue in America that made them angry. Next we focus our attention on physiological responses and intra-racial attitudes. As it relates to racial identity, an increase in blacks' Linked Fate led to an increase in GSL. Public Regard, the variable measuring those blacks who believed that the public thought highly of blacks as a group, was found to significantly increase blacks' GSL. Blacks who have high levels of Public Regard are deemed to possess low levels of racial

identity. In the case of seeing police officers, one might argue that such blacks have been shocked by the violent events that have occurred at the hands of the police, and thus are affected more. On the other hand, however, blacks who do not believe that society thinks highly of blacks may not be bothered by the police because of their low expectations of society's regard for blacks. In the case here, blacks with low Public Regard may anticipate being pulled over by the police, regardless of wrong doing or not. This is also the case for blacks who are disillusioned by the legal system. The findings reveal that exposure to traffic stop stimuli minimizes arousal. Given that such blacks do not have much faith in the legal system, it is plausible that they would not be as aroused when compared to those who may be blindsided because of their hope and belief in the American dream. While there is support for the legal disillusionment argument, this proves not to be the case for the economic disillusionment variable. Economic Disillusionment is found to be marginally significant and in the positive direction, suggesting that those who are economically disillusioned witness an increase in their GSL. Here, the relationship may be in the opposite direction when compared to legal disillusionment because the wording is race neutral. On the other hand, images of traffic stops failed to elicit responses from blacks with high levels of black nationalism and racial centrality i.e., there was no statistically significant relationship between these two variables and GSL. In addition, neither education levels nor sex impacted physiological responses to images of traffic stops.

To assess whether images of Traffic Stops uniquely impact blacks' physiological responses, we compare the findings in Model A with those results in Model B, which focuses on blacks' physiological responses to Threatening images. Based on the findings, GSL scores increased among blacks who held high levels of Public Regard and Disillusionment (both

economic and legal). There was a marginal level of significance between those blacks who were angry at America because of police brutality.

Conclusion

We have provided a preliminary exploration of black-white differences and intra-black differences in response to photos of traffic stops. More work clearly needs to be done, with larger and more generalizable samples. However, our findings point in some interesting directions. First, we show strong gender differences as well as racial ones. Male and female drivers indeed experience very different things in a traffic stop, so we should explore further these findings. Second, racial differences were not always as expected. White males show the strongest response to the police stimuli, as they do to threatening and neutral ones. Black males show low levels of activation by police images, clearly an area where further research is needed. For two of the groups (white males, black females), a photo of a police officer is more stimulating than the average photo from the standard IAPS threat photo array, which includes a street scene with shooting soldiers, a man with gun in his mouth, a masked man with knife, an attacking dog, and an attacking snake. This certainly merits attention. Among blacks, we show powerful effects of attitudinal predispositions on response to threat and police photos. These overlap but are distinct.

As America continues to confront issues of adverse relations between the police and the communities they serve, further research is clearly needed in the psychology of these interactions. We hope that a public-health understanding of the traumas associated with such adverse interactions can help document their cost on the public and help push the nation toward taking these costs seriously, seeking to reduce them.

Appendix Table 1. Traffic Stop Photos
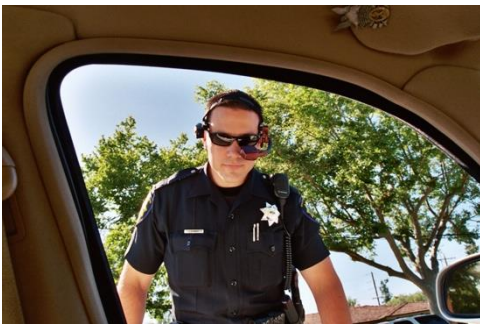
Appendix Table 2. Demographics of the Two Samples

Michigan

	White	Black
Male	14	2
Female	13	1

JSU

	White	Black
Male	1	44
Female	0	46

*Note that not all JSU respondents completed physiological experiments, and so analyses do not always relay on the full JSU sample.

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