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A LABORATORY STUDY OF STRESS REACTIONS TO WITNESSING A POLICE
KILLING OF AN UNARMED BLACK MAN: DISCRIMINATION, DISTRESS
TOLERANCE, ETHNIC IDENTITY, AND RISK-TAKING

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of
Philosophy at Virginia Commonwealth University

by

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Acknowledgements

There are several people who I would like to acknowledge and thank for their contributions. I would like to thank my advisor and chair of my dissertation, Dr. Paul B. Perrin, for his guidance and support over the years. I will be forever grateful for his unwavering confidence in me during my occasions of doubt. I would also like to extend my gratitude to my dissertation committee, Drs. Karen McIntyre, Faye Belgrave, Eric Benotsch, and Shawn Utsey, for their feedback and insight throughout the course of this project. This project would not be possible if not for the help of a number of graduate and undergraduate students involved with this project, as well as the participants who elected to participate in such a topical study. This project is especially dedicated to the many seen and unseen victims of police violence, particularly Black men who are disproportionately and negatively impacted by the broader law enforcement system.

As a first-generation college student and the product of immigrant parents, I am especially grateful for a number of people who have supported and believed in me over the years including my given and chosen family. Words are insufficient to acknowledge my level of gratitude for all of your hard work that allowed me to achieve this milestone. Thank you for your authenticity and never letting me lose sight of who I am and where I come from. Thank you to my friends, both near and far, and especially my partner who continues to be unconditionally supportive of all my pursuits (even when it takes us from one coast to the other and back again). I am appreciative of the innumerable mentors/advisors I have had over the years (and your never-ending guidance) and especially the Ronald E. McNair Scholars Program—the defining educational support system that set me along the path to succeed in attaining this degree.

This study was supported in-part by the National Science Foundation Graduate Research Fellowship Program.

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Abstract

A LABORATORY STUDY OF STRESS REACTIONS TO WITNESSING A POLICE KILLING OF AN UNARMED BLACK MAN: DISCRIMINATION, DISTRESS TOLERANCE, ETHNIC IDENTITY, AND RISK-TAKING

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Virginia Commonwealth University, 2018

Major Director: Paul B. Perrin
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Department of Psychology

Black individuals have been disproportionately targeted by law enforcement, most notably in shooting deaths at the hands of police, and has contributed to a general distrust of law enforcement. A rise in citizen journalism has helped document excessive use of force by police on video; however, little is known how individuals respond to viewing this type of media. A history of race-based stress is likely to contribute to an expectation of racism and may impact how individuals respond to videos of the treatment of unarmed Black men at the hands of police, with some evidence suggesting ethnic identity may moderate this relationship. Additionally, stress has been previously associated with risky health behaviors and risk-taking more generally; however, little is known whether the response to race-related stressors is in line with past work and whether distress tolerance may moderate this relationship. This study sought to contribute to

this literature by examining if racial differences exist in the stress response to a video of police fatally wounding an unarmed black man and if this response (1) was predicted by stigma-related stressors (discrimination, anticipatory racism); (2) was associated with risk-taking; and (3) was moderated by ethnic identity and distress tolerance. Results showed that White respondents evidence greater galvanic skin response than Black respondents; however, there were no other significant racial differences in heart rate variability, systolic blood pressure, or negative affect via facial electromyography in response to the video. The stress response did not predict risk-taking nor was distress tolerance a significant moderator of this relationship. Among Black respondents, stigma-related stressors did not predict the stress response. Levels of ethnic identity commitment marginally interacted with discrimination in predicting heart rate variability, such that individuals with greater levels of commitment evidenced lower heart rate variability as experiences of discrimination increased compared to those with lower levels of commitment. There were no other significant or marginally significant interactions of ethnic identity with stigma-related stressors in predicting the stress response. Stigma-related stressors did not predict risk-taking nor were there indirect effects through the stress response. Health implications and directions for future research are discussed.

Chapter 1: Literature Review

Shooting Deaths of Black Individuals in the US

A series of high-profile fatal shootings by police of Black men (e.g., Michael Brown in Ferguson, MI; Philando Castile in Falcon Heights, MN; Tamir Rice in Cleveland, OH; Walter Scott in North Charleston, SC) have shined a brighter spotlight on police use of deadly force and how these deaths are tracked, if at all (Bialik, 2016). According to former Attorney General Eric Holder (U.S. Department of Justice, 2015):

“The troubling reality is that we lack the ability right now to comprehensively track the number of incidents of either uses of force directed at police officers or uses of force by police...[t]his strikes many – including me – as unacceptable.”

Indeed, the U.S. Department of Justice does not keep a comprehensive database on police shootings and instead opts for self-report of officer-involved shootings from the nation’s more than 17,000 law enforcement agencies as part of the FBI’s annual data on “justifiable homicides” by law enforcement titled “FBI’s Supplemental Homicide Report” (Lowery, 2014). Because of the structurally biased nature of reporting (e.g., Florida police departments have failed to file fatal police shooting reports since 1997; Gabrielson, Grochowski Jones, & Sagara, 2014), many have critiqued the report as an underestimate of true events (Barber, Hemenway, Hochstadt, & Azrael, 2002; Crosby & Lyons, 2016; Lowery, 2014). Though Congress passed a Death in Custody Reporting Act (DCRA) in 2000, which required the collection of individual data on deaths in the process of arrest, local jails, and state prisons, it expired in 2006 and produced limited data as a result (Schwartz, 2014). Legislation by the same name was reintroduced in 2013 and signed into law in 2014 with some notable modifications: it requires the head of every federal law enforcement agency to report to the attorney general certain information about

individuals who die while detained, under arrest, or incarcerated, as well as allows the Justice Department to withhold federal funds from states that fail to comply (Schwartz, 2014; Scott, 2014). In similar fashion as the Supplemental Homicide Report, data regarding arrest-related deaths of the DCRA are currently suspended due to concerns around data coverage and quality (Bureau of Justice Statistics, 2016b).

Another option is to examine the National Violent Death Reporting System (NVDRS), administered by the Centers for Disease Control and Prevention (CDC), which collects data on both legal intervention deaths and homicides of law-enforcement officers. The NVDRS is a state-based surveillance system that collects data from a variety of state and local agencies including: law-enforcement agencies, medical examiners, and death certificates (Centers for Disease Control and Prevention, 2016). This system can elucidate a fine level of detail found in the narratives of the medical examiner and law-enforcement agency submitting the report (CDC, 2016; Crosby & Lyons, 2016). However, the NVDRS has a number of limitations, which preclude true estimates of these causes of death: it is not nationally representative as not all states elect to participate, data missing from a medical examiner or law-enforcement officer's report will reflect in missing data in the system, and the database has at times been difficult to utilize (Crosby & Lyons, 2016).

One source that has specifically examined fatal police shootings in the United States and has been able to address the primary limitation of missing data has come from a newspaper organization, *The Washington Post*. For the years 2015 and 2016, *The Washington Post* has put together a publically available, comprehensive database of every fatal shooting in the United States by a police officer in the line of duty since January 1, 2015 titled the "National Police

Shooting Database” (Tate et al., 2016).¹ This database is replete with details such as whether the deceased was experiencing a mental health crisis at the time of the event, whether the person was armed or unarmed, and whether an officer was named in the reporting of the event, among other information (Tate et al., 2016). To gather these data, *The Washington Post* utilizes a variety of methods including examining local news reports, law enforcement websites, social media, and independent databases, with the newspaper often conducting additional reporting in many of the cases (Tate et al., 2016). Though the database is not perfect, it offers a more comprehensive and detailed overview of the issue. In fact, the database has logged twice as many fatal shootings as the FBI in 2015 (Tate et al., 2016), suggesting it is an appropriate substitute in the absence of a formal government database.

According to the National Police Shooting Database, 991 individuals were fatally shot by police in 2015 (Tate et al., 2016).² Most civilians shot were male (95.8%), White (50%), and between the ages of 25 and 34 (31.4%; $M = 36.7$). The majority of civilians shot and killed were armed with a deadly weapon (82.4%), while 93 civilians (9.4%) were unarmed (Nix, Campbell, Byers, & Alpert, 2017). Of the total civilians shot, 258 (26.1%) were Black individuals. What is important to note is that although White individuals composed the majority of civilians shot, Black individuals make up only 13.3% of the population, whereas White individuals compose 61.6% according to the most recent census (US Census Bureau, 2016). If these shootings were proportionate to the population, 610 (61.6% of 963 shootings) civilians would be White and 131 (13.3% of 963) would be Black—18.8% lower and 96.9% higher than what would be expected

¹The dataset for 2015 can be found here:

<https://www.washingtonpost.com/graphics/national/police-shootings/>. The dataset for 2016 can be found here: <https://www.washingtonpost.com/graphics/national/police-shootings-2016/>.

² The total was 991 as of February 2, 2017.

for White and Black individuals, respectively. This disparity becomes even more evident when examining unarmed civilians, as 38 (40.4%) were Black and 32 (34.0%) were White of the 94 total individuals fatally shot by police, an almost three-fold increase in what would be expected for Black civilians. While data from 2016 seem to indicate that fewer unarmed Black civilians were fatally shot compared to the previous year (35.4% versus 40.4%), this rate remains disproportionate compared to unarmed White civilians (45.6%), as a function of the population (Tate et al., 2016).

Though the National Police Shooting Database suggests shooting deaths higher than those by other government sources, a number of additional crowdsourced databases (e.g., Fatal Encounters, the Gun Violence Archive, and Mapping Police Violence), including one by *The Guardian* newspaper using similar methodology as that of *The Washington Post*, all indicate much higher counts. For example, 1,152 people were killed in 2015 according to Mapping Police Violence (mappingpoliceviolence.org) compared to 991 reported in the National Police Shooting while *The Guardian* found 1,146 victims (The Guardian, 2016).³ While these types of discrepancies are likely to occur, it is also possible that the statistics proposed above are underestimates, as not all shootings are likely to be reported by the media, which affects the accuracy of these crowdsourced databases. Given the unmistakable deficit in the accuracy of these data, the U.S. Department of Justice announced in August of 2016 that it would begin to keep a comprehensive database of fatal officer-involved incidents that uses similar methodology to that of *The Guardian* to verify the incidents seen in local media reports and other sources

³ The total was 1146 as of February 9, 2017. The dataset can be found here: <https://www.theguardian.com/us-news/ng-interactive/2015/jun/01/the-counted-police-killings-us-database>.

(Bureau of Justice Statistics, 2016a). More accurate reporting of these incidents will optimistically give rise to more critical analysis of the issues around police use of force.

Police Use of Force

Police use of force is a controversial topic with a contentious history. One reason for this is exemplified by the lack of a universally agreed-upon definition of use of force (National Institute of Justice, 2016). Though the International Association of Chiefs of Police define it as the “amount of effort required by police to compel compliance by an unwilling subject,” individual agencies provide guidance to their own officers on when and how much force should be used, indicating the lack of an accepted set of rules on this issue (National Institute of Justice, 2016). By extension, most law enforcement agencies have agency level policies that outline police use of force on a continuum from no force to non-physical force to physical force that escalates in intensity and that is driven by contextual cues (National Institute of Justice, 2016). It is the absence of a widely-accepted definition and set of governing rules on use of force that contributes not only to the inability to fully comprehend how frequently force is used but also to an understanding of the motivation by law enforcement officers to use force in different situations. Nevertheless, researchers have sought a better understanding of the frequency and mechanisms that motivate police use of force for decades (Alpert & Dunham, 1997; Bittner, 1970; Fridell & Lim, 2016; Reiss, 1968, 1973; Westley, 1953). While early research tended to be focused on excessive and lethal use of force (e.g., homicide by police), more recent work has taken a less myopic perspective and focused on the nature of force that does not necessarily reach the level of inappropriateness (Terrill, Leinfelt, & Kwak, 2008). This broadened perspective has been driven by the belief that understanding all forms of force, not exclusively excessive or lethal, are paramount to the assertion that “the police are nothing else than a

mechanism for the distribution of situationally justified force in society” (Bittner, 1973, p. 39). Police use of force is examined within this context that defines the central role of police in modern society as one that has the capacity and authority to use force and therefore necessitates inquiry into how, when, why, and upon whom force is used.

Police use of force as a line of research has generally been examined through one of four perspectives: individual, situational, organizational, or ecological (Friedrich, 1980; Nix et al., 2017). The individual approach posits that the use of force is predicated on individual characteristics of police officers (e.g., their background and outlook; Friedrich, 1980). For example, law enforcement officers with higher levels of education are less likely to use force (Paoline & Terrill, 2004, 2007; Terrill & Mastrofski, 2002). It is thought that law enforcement officers with greater educational attainment possess better decision making skills and make better officers (Worden, 1990). In fact, it was the recommendation of the President’s Commission on Law Enforcement and Administration of Justice that all police officers should be required to have a college degree, as it was thought that this would improve the quality of policing (1967). Studies on police experience have yielded mixed results with some identifying a negative relationship with police use of force (Paoline & Terrill, 2007; Terrill & Mastrofski, 2002), while others have failed to identify significant results (Mccluskey & Terrill, 2005; Sun & Payne, 2004; Terrill et al., 2008). Interestingly, race/ethnicity and gender of police officers have generally not been related to use of force (Mccluskey & Terrill, 2005; Paoline & Terrill, 2004, 2007; Sun & Payne, 2004; Terrill & Mastrofski, 2002), implying that other individual characteristics may play a greater role in the motivation to use police force. These results suggest that despite greater educational attainment predicting less force, other individual characteristics yield mixed findings at best.

Understanding use of force via the situational perspective examines characteristics of the situation by which police encounter citizens including: the type of alleged offense, the physical setting, and the behavior and characteristics of the citizens they encounter (e.g., race, age, class; Friedrich, 1980). An examination of the type of alleged offense indicates that unsurprisingly the use of force increases as the seriousness of the offense increases (Friedrich, 1980; Worden, 2015). An inspection of data from police departments in three metropolitan cities indicates that while violent (i.e., the use of force or injury to another person) and non-violent crime are more likely to result in reasonable use of force, only violent crime is likely to yield improper or unreasonable use of force (Worden, 2015). This likelihood of force steadily increases as the number of bystanders increases beyond four, when there are between two and five officers, and is greatest when there are more than five officers present (Worden, 2015). However, the majority of the work within this perspective has focused on characteristics of the citizen or “suspect” involved.

Characteristics of the organization or agency help define the organizational approach. Within this context, police use of force is a product of the policies and culture at a given agency (Brown, 1988; Wilson, 1968), whereby patterns of police behavior may be predicted by the organizational rules, regulations, standard operating procedures, incentives and disincentives, and administrative direction set forth by a particular agency. It can be presumed then that organizations which condone and encourage heavy reliance on force will ultimately lead to greater use of force among members within that agency (Friedrich, 1980). Examination of longitudinal data has found that restrictive deadly force policies yield fewer instances of deadly force (Sherman, 1983). Similarly, agencies that require greater supervisory oversight in reporting use-of-force demonstrate lower rates of force compared to agencies that allow officers to follow

through with reporting these instances on their own (Alpert & MacDonald, 2001). In a separate study, more “formal” agencies (i.e., agencies with a greater number of written policies), did not have a lower number of police killings; however, more extensive field training was positively associated with a higher number of police killings (Smith, 2004). It was proposed that more extensive field training increases contact with more experienced officers and may encourage traditional occupational norms—norms that may stress respect for police authority and personal protection over defense of life (Smith, 2004).

Lastly, the ecological perspective emphasizes that the use of force is based upon the broader context of any given incident (e.g., perception of a setting as dangerous; Nix et al., 2017). According to Smith (1986), law enforcement officers’ behavior is susceptible to change depending on the neighborhood context, which has been supported by Terrill and Reisig’s (2003) findings that officers are more likely to use greater levels of force in disadvantaged (e.g., individuals in poverty, high percentage unemployed) and high crime neighborhoods even after accounting for those situational (e.g., suspect resistance) and individual (e.g., officer age, education, and training) factors. Additionally, neighborhood context mediated the association between suspect race and level of force. An examination of police shootings between 2003 and 2012 in St. Louis, Missouri found that neither neighborhood disadvantage nor racial composition was associated with police shootings; however, levels of firearm violence were associated with police shootings in a curvilinear fashion. Specifically, neighborhoods with a moderate amount of firearm violence had a greater number of police shootings than those with low or high amounts of violence.

Taken together, this body of work supports the generalization that police use of force is complex and is likely influenced by a number of factors. A systematic review of the literature

(Harris, 2009) concluded that psychological variables (e.g., officers' attitudes toward their job and to African Americans), situational variables (e.g., the nature of the offense and the individuals' behavior), and organizational variables (e.g., characteristics of the police department) all affect the improper use of force. Additionally, improper use of force was more likely to be committed against individuals who were hostile toward police, intoxicated, poor, and African American, and was more likely to be committed by young male officers with less police experience. The four perspectives discussed above all support this claim to varying degrees; however, a number of individual and often unconscious factors may also motivate this behavior.

Racial bias as a motivator? A significant number of publicized events in recent years depicting law enforcement officers using deadly force on Black civilians has reignited a discussion of the impact of stereotypes on the decision to use force by law enforcement officers. One mechanism that appears to have substantive impact on this relationship can be understood through implicit social cognition theory. According to this theory, cognitions can be the result of two different processes: (1) a controlled process that is intentional, effortful, slower, and dependent on cognitive capacity and motivation by the individual; or (2) a relatively automatic process that does not require intention, attention, or resource capacity and is quick compared to controlled processes (Devine, 1989; Devine & Sharp, 2009). Controlled processes are considered to be more flexible than automatic processes and thus more useful for decision making (Devine & Sharp, 2009). These processes are thought to underlie our understanding of "implicit" and "explicit" biases toward out-group members (i.e., Black men), that is that implicit attitudes tap into cognitions that are less readily available than explicit ones.⁴ Although it is possible that

⁴ Though the literature has debated the unconscious nature of "implicit" cognitions until recently (Hahn & Gawronski, 2014; Payne & Gawronski, 2010), the terms *implicit* and *explicit* will be

some law enforcement officers hold explicit racial biases toward minorities when deciding on the use of force, there is substantive work demonstrating the significant role that implicit biases may have on police behavior (Kahn & McMahon, 2015). This is especially important considering that implicit racial bias has become more prevalent and pervasive in society while explicit racial bias has become less frequently endorsed in the past 50 years (Dovidio, Glick, & Rudman, 2005).

There is a wealth of research indicating that compared to Whites, Black individuals are subject to automatic negative stereotypes and prejudice (Devine, 1989) that directly impact racial bias against them. Researchers have highlighted the frequency and durability of these negative stereotypes across a range of outcomes beginning in youth. In a series of studies, Goff, Jackson, Di Leone, Culotta, and DiTomaso (2014) examined whether Black boys were equally perceived as childlike compared to White and Latino boys. Participants, college students and law enforcement officers, were asked to evaluate young Black, White, or Latino suspects and estimate their age and culpability for their actions. Researchers found that Black boys were perceived to be older and less innocent than White boys and were more likely to be candidates for greater use of police force. These results were largely motivated by the implicit dehumanization of Black individuals as vicious and violent. In both student and police officer samples, Black boys were both perceived to be older and more adult-like, suggesting that the force used on adults might be perceived as appropriate for a teenager.

Though prior work has largely examined the dehumanization of Black individuals (Haslam & Loughnan, 2014) and has been found to justify police violence against Black, but not White suspects (Goff, Eberhardt, Williams, & Jackson, 2008), more recent work has begun to

used to describe the features of cognition that arise from relatively automatic and controlled processes, respectively.

examine superhumanization in this population. Indeed, Black individuals are also perceived to maintain superhuman qualities, or “possessing mental and physical qualities that are supernatural... extrasensory...and magical” (Waytz, Hoffman, & Trawalter, 2015, p. 1). In one study, Whites were more likely to perceive superhuman qualities in Black individuals at both an implicit and explicit level, and this perception predicted higher attributions of pain tolerance in Black targets (Waytz et al., 2015). This misperception of greater pain tolerance in Black individuals has been identified among students, nurses, and primary care physicians (Staton et al., 2007; Trawalter, Hoffman, & Waytz, 2012), despite evidence to the contrary (Tait & Chibnall, 2014), suggesting that Black individuals may be perceived as less susceptible to harm and more invincible to physical attacks than a non-Black person.

Stereotypes depicting Black people as violent, criminal, and aggressive persist in society and have been well-documented in the psychological literature (Allport & Postman, 1947; Devine, 1989; Duncan, 1976; Payne, 2001). For instance, Black men compared to White men are more likely to be misremembered as carrying a weapon (Allport & Postman, 1947) and to activate concepts related to crime (Eberhardt, Goff, Purdie, & Davies, 2004). Black men are also more likely to be perceived as aggressive or hostile in ambiguous situations (Devine, 1989; Duncan, 1976). One study found that Black men were perceived to be bigger (taller, heavier, more muscular) and more physically threatening (stronger, more capable of harm) than White men; this judgement justified greater use of force against unarmed Black men (Wilson, Hugenberg, & Rule, in press). In fact, Black men have reported being mindful of the ways in which their physical stature and tone of voice could be perceived as menacing and oftentimes behave in ways so as to not reinforce these negative stereotypes (Brooms & Perry, 2016).

Implicit bias. Given the abundance of negative stereotypes about Black men and the wealth of research pointing to a racial bias against this population, researchers have sought to examine if implicit bias may have an effect on the use of deadly force against them. In one of the first experimental studies to examine this potential association, respondents were primed with either an image of a Black or White face, which they were told to ignore, followed by the image of a gun or a tool flashed on screen. They were then instructed to identify the object as a gun or a tool as quickly as possible. Participants were faster to identify a gun when they were primed with a Black versus White face and were more likely to mistakenly identify tools as guns if it had been preceded by a Black face (Payne, 2001). In a separate study, participants engaged in a first-person shooter task whereby they were randomly presented with either a White or Black man with either a gun or some other object. Participants were asked to determine whether the man was holding a gun and to decide whether to “shoot” or “don’t shoot” as quickly as possible. Results indicated that participants shot at armed Black men more quickly than at armed White men, and decided not to shoot at unarmed White men faster than unarmed Black men (Correll, Park, Judd, & Wittenbrink, 2002). The results of the previous studies suggest that race is likely a factor in the decision to shoot; however, the samples primarily consisted of undergraduate students and community members and likely do not generalize to law enforcement officials who receive significant training on the decision to use their weapons.

With that in mind, a series of studies have been conducted to directly examine if the previous results were maintained with police officers and have produced mixed and complex results. In one study, police officers were compared to a community sample in terms of the speed and accuracy with which they made simulated decisions to shoot (or not shoot) Black and White targets. Both showed pronounced racial bias in response times and decisions. While police

officers were more likely to make correct decisions (shooting an armed target, not shooting an unarmed target) and were faster in making those decisions, they were faster to shoot armed targets when they were Black (rather than White), and they were faster to choose a don't-shoot response if an unarmed target was White rather than Black (Correll et al., 2007). This bias certainly suggests that police attend to race and to racial stereotypes. In another study using a computer simulation, Plant and Peruche (2005) examined police officers' decisions to shoot Black and White criminal suspects. The study revealed that officers were more likely to mistakenly shoot unarmed Black versus White unarmed suspects upon initial exposure to the program but after numerous trials, the bias was no longer present. In a follow-up study (Peruche & Plant, 2006), researchers examined the correlates of police officers' explicit attitudes toward Black individuals including their beliefs of criminality of Black suspects to the officers' computer simulation results described above. Results identified that officers with negative compared to more positive beliefs about the criminality of Black individuals were more likely to shoot unarmed Black suspects while those with positive contact with Black individuals in their personal lives were particularly able to eliminate these biases after numerous trials.

More recent work utilizing more sophisticated technology meant to more accurately reflect real world scenarios has built upon prior work and has similarly found mixed results. In one study (Cox, Devine, Plant, & Schwartz, 2014) using both still pictures and dynamic video stimuli (meant to increase the realism of the shooter task), police officers were instructed to hold a realistic plastic toy gun and asked to shoot any suspect who was armed in both conditions (i.e., picture stills, video format). Replicating prior work (James, Vila, & Daratha, 2013), officers were faster to shoot armed Black suspects in picture trials but slower to shoot them in video trials. The only form of race bias that arose occurred in the video blocks, and the bias observed

reflected officers correctly *not* shooting unarmed Black suspects, counter to what was expected. These results have been replicated across other studies utilizing similar methodology, finding that participants take longer to shoot armed Black than White suspects, and are *less* likely to shoot unarmed Black than unarmed White suspects (James, James, & Vila, 2016; James, Klinger, & Vila, 2014), supporting the presence of a supposed “reverse racism” effect. One study explicitly tested and failed to find an association between participants’ implicit racial bias and their shooting behavior (James et al., 2016) indicating that, at least in the sample they employed, the decision to shoot unarmed Black suspects did not appear to be motivated by racial bias. It was posited that this counter bias may be driven by the belief that the officers’ behavior is more likely to be caught on video (either by police dashcam or civilian cellphone) and that there might be greater repercussions to shooting an unarmed man that is Black rather than White.

A number of points are worth noting on the studies described above. One, the studies all completed data collection prior to the summer of 2014, indicating that police behavior was unlikely motivated by the increased national focus on the use of deadly force following the events that transpired in Ferguson, Missouri, and the shooting of Mike Brown. Two, the participants in all studies by James and colleagues were recruited from Spokane, Washington—a city with less than 3% of the population identifying as Black or African American (US Census Bureau, 2013), limiting the generalizability of their results to less diverse communities. Despite a significant number of methodological and theoretical concerns of James and colleagues’ (2016) work (e.g., failing to acknowledge that police perceptions of behavior and demeanor are shaped by race, that “reverse racism” does not exist, that police officers are rarely charged with a crime even if police behavior is caught on camera; Roussell, Henne, Glover, & Willits, in press), it is

worth highlighting the complexity and interconnected factors that impact excessive use of force and the mechanisms taken to understand this phenomenon.

While the prior experimental studies have produced mixed and at times controversial findings, the focus has largely centered on single cities, and relatively little is known at the national level about the presence of racial bias in the decision to use deadly force. Two studies sought to address this limitation using cross-sectional methodology. In one of the first studies to use data believed to be more comprehensive and less biased than in previous work, Ross (2015) examined county-level data provided by the US National Police Shooting Database (Wagner, 2014) to investigate the extent of racial bias in the shooting of US civilians by police officers. In contrast to previous work that relied on the FBI's Supplemental Homicide Reports that were constructed from self-reported cases of police-involved homicide, this dataset is less likely to be biased, as it utilized crowd sourcing efforts to identify each shooting. The results identified a significant bias in the killing of unarmed Black versus White civilians such that being unarmed and shot by police was 3.49 times more probable among Black than White individuals. Additional results indicate similar shooting bias is more prevalent in larger metropolitan counties with low median incomes and a sizable portion of Black residents, especially when there is high financial inequality in that county. The results also failed to support the notion that racial bias in police shootings is driven by race-specific crime rates (i.e., in urban areas with more Black residents and higher levels of inequality, individuals are more likely to commit violent crime, and thus the racial bias in police shooting may be explainable by greater presence of police in areas of high violence and crime).

These results were replicated and extended by Nix and colleagues (2017) using National Police Shooting Database provided by *The Washington Post*. The authors identified significant

racial bias across a number of outcomes. Fifteen percent of Black civilians shot and killed by police were unarmed compared to 6% of White civilians, despite twice as many White civilians dying by police gunfire. Indeed, Black individuals were more than twice as likely as Whites to have been unarmed when fatally shot by police even after accounting for other factors (e.g., age, mental illness, neighborhood crime). These results are suggestive evidence of implicit racial bias and speak to a potential failure of threat perception by law enforcement officials.

The literature on excessive and deadly use of police force is overwhelmingly suggestive that law enforcement officials disproportionately use excessive force against Black civilians. The rationale and mechanisms through which this might operate are numerous and complex but are nevertheless indicative of systemic racism operating at multiple levels. The lack of a national police database that catalogues police shootings or excessive use of force, police agencies' reluctance and unwillingness to make their use-of-force data public, and negative stereotypes about Black individuals that have become so invariably ingrained in society in numerous aspects (e.g., individual prejudices contributing to excessive force) all contribute to and encourage injustice against Black people. A greater focus on addressing police practices and combating negative stereotypes would unequivocally aid in combating the racial bias present in law enforcement culture.

Experiences with Law Enforcement

Attitudes toward law enforcement have become significantly more polarized following a number of national shootings that drew attention to (in)appropriate police behavior. The shooting of Michael Brown in Ferguson, Missouri and death of Eric Garner in New York and their following protests/riots prompted then-President Barack Obama to sign an executive order initiating a taskforce aimed at identifying best practices in running law enforcement departments

and to make recommendations. In the report, 52% of Black citizens indicated having a great deal or a fair amount of confidence of the police officers in their community doing a good job of enforcing the law; however, the majority lacked the confidence that the police would not use excessive force (59%) and that police treat Black and White citizens equally (62%) compared to 24% and 27% of White respondents, respectively (US Department of Justice, 2015). This pervasive mistrust of the police and general negative attitude towards law enforcement may be warranted given the racial disparities across a variety of outcomes that adversely impact Black citizens. For instance, Black individuals are approximately four times more likely than Whites to be targeted for police use of force (Walker, Spohn, & DeLone, 2007) and are stopped (Gelman, Fagan, & Kiss, 2007; Miller et al., 2017) and arrested at disproportionately higher rates than their representation in the population, especially among juveniles (Federal Bureau of Investigations, 2016). According to a national survey, Black individuals are more likely than Whites to endorse the belief that Black people are more likely to be treated less fairly than Whites when dealing with the police (84% versus 50%, respectively; Pew Research Center, 2016). These experiences broadly underscore experiences of racial profiling, defined as “[the use of] race as a factor in conducting stops, searches and other investigative procedures” (Bush, 2001 as cited in Goff & Kahn, 2012), with near consensus among the public that it is damaging to those who are subjected to such behavior.

Individuals only reporting negative personal contact with law enforcement is problematic as it colors future police interactions as representations of racism. Studies show that prior direct experiences with law enforcement have a significant influence on opinions of the police (Mazerolle, Antrobus, Bennett, & Tyler, 2013), which may contribute to how they are likely to perceive future police contact. In a study by Weitzer and Tuch (2002), the authors identified that

“net of other factors, race and personal experience with racial profiling are among the strongest and most consistent predictors of attitudes towards the police” (p. 445) and that direct experience with racial discrimination can have a lasting and adverse effect on perceptions of the police. In a follow-up study, Weitzer and Tuch (2005) identified that Black individuals with negative personal experiences with the police were more likely to perceive that: (1) the police have a bias against Black individuals when compared to Whites; (2) that the police service White neighborhoods better than Black neighborhoods; (3) that racial prejudice exists among police officers; and (4) that police officers engage in racial profiling. In fact, negative contact with the police predicted future negative attitudes toward the police in a diverse community sample as well as the reverse: negative attitudes toward the police predicted future negative police contact—a particularly robust relationship for Black compared to White and Hispanic respondents (Rosenbaum, Schuck, Costello, Hawkins, & Ring, 2005). Having a history of negative contact with law enforcement, especially when these experiences are often a reflection of racial discrimination, is likely to motivate anticipation of racism in the future.

While direct experiences have a profound effect on attitudes toward law enforcement, vicarious experiences (i.e., indirect experiences) with law enforcement are often just as important in shaping attitudes, particularly for the Black community. For instance, Feagin and Sikes (1994) note that: “black victim[s] frequently share [their experiences] with family and friends, often to lighten the burden, and this sharing creates a domino effect of anguish and anger rippling across an extended group” (p. 16 as cited in Brunson, 2007). This is important as vicarious experiences with law enforcement are found to predict attitudes toward police as expected—negative experiences predict more negative attitudes while positive ones predict less negative attitudes—and that the effects of negative various experiences are strongest for African Americans

compared to White and Hispanic individuals (Rosenbaum et al., 2005). In fact, in a study of Black men's experiences with the police, the respondents indicated that they were more likely to hear about instances of police violence and misconduct from friends and family than witnessing or being the recipient of such behavior (Brunson, 2007). Despite not hearing about police misconduct every day, individuals shared their experiences often enough to warrant high levels of mistrust and resentment toward the police, which impacts how they perceive law enforcement behavior and likely contributes to Black individuals' anticipation of racism in the future. In fact, Black citizens who indicate having had negative vicarious experiences with the police are also more likely to believe racial prejudice exists among police officers and that police officers engage in racial profiling, but these effects are not stronger than negative personal experiences (Weitzer & Tuch, 2005). The collectively negative group experience of many Black individuals in their interactions with law enforcement is likely to contribute to their belief that racial stressors are ever-present and should be guarded against in future interactions.

An especially potent form of vicarious experience comes from police-citizen encounters captured on video. Given that the majority of individuals do not come into regular contact with police, individuals will draw on information obtained from other sources when they encounter a police officer in the future (Warren, 2011). An increase in citizen journalism—when average citizens engage in journalistic practices (Goode, 2009)—has allowed for an explosion of additional perspectives beyond those offered by the police, which may impact the anticipation of future racist experiences at the hands of law enforcement. Exposure to news reports on incidents of police misconduct has long been found to impact confidence in the police (Weitzer, 2002), support for the use of force as an appropriate tactic (Sigelman, Welch, Bledsoe, & Combs, 1997), and public perceptions of racial profiling (Graziano, Schuck, & Martin, 2010). Especially

troubling is that increased news consumption about police misconduct (such as police of use excessive force, verbal abuse, and corruption) via television, newspaper, or radio is predictive of several forms of perceived police bias including against minority individuals (i.e., Black, Hispanic), unequal treatment of neighborhoods, and prejudice and profiling against Black and Hispanic people (Weitzer & Tuch, 2005).

It is especially important to note that the increase in news accounts of police misconduct does not indicate that misconduct is increasing but rather that there is greater coverage of these incidents (McLaughlin, 2015), thanks in part to advances in mobile technology (Brown, 2016). In fact, one of the top stories of 2014 was the death of Eric Garner at the hands of New York City police officers, which was caught on cell-phone video by a citizen (Snyder et al., 2017) and undoubtedly contributed to an increased awareness of potential police misconduct and prompted greater police coverage by local citizens shared on mobile platforms.

Collectively, these studies highlight that negative police contact impacts negative attitudes toward law enforcement, and that these negative experiences are disproportionately reported by Black individuals. Importantly, individuals do not have to be the direct recipient of these negative experiences to color their perceptions of police, suggesting that hostile law enforcement interactions can impact large portions of a community through separate and individual interactions. This is made even more significant through an increase in citizen journalism documenting these interactions for all to see. This context is particularly important for the current study and suggests that a history of negative police contact may contribute to an anticipation of racism in the future.

Health Effects of Traumatic Media

At present, there is no research that has overtly examined the effects of watching videos depicting police brutality, due in part to the recent advancement of technology that has allowed for such types of experiences to be viewed by a large audience. Nevertheless, substantive work has examined the effects of news media coverage of violence and traumatic events and is pertinent to the study at hand. Broadly, individuals are likely to experience feelings of fear following media exposure depicting violence and brutality, even among those whom have not been directly exposed to this type of violence and for whom it poses no immediate threat (Bandura, 1986). It can therefore be posited that individuals who are exposed to the violence depicted in the media may have a more substantive and/or exaggerated response.

Research examining the effects of watching violent news media generally indicates a wide range of negative health outcomes. In a study by Schuster and colleagues (Schuster et al., 2001), researchers conducted a national survey assessing the mental health effects of the terrorist attacks on September 11, 2001 three to five days following the attack. The study authors uncovered that 44% of adults reported one or more substantial symptoms of stress, with those who watched the most coverage having more substantial stress reactions. In a separate study examining the effects of media exposure following the Boston Marathon bombings, researchers recruited participants living in the Boston area at the time of the attacks who had previously participated in a study assessing sympathetic reactivity to stress. Results revealed that media exposure and prior violence exposure were associated with post-traumatic stress disorder (PTSD) symptoms and that those with heightened stress reactivity were more susceptible to develop PTSD symptoms (Busso, McLaughlin, & Sheridan, 2014).

Similar results have been found in experimental studies manipulating news coverage. For instance, a study by Slone (2000) sought to identify if Israeli participants experienced differential

anxiety responses to television coverage of national threat situations and terrorism compared to a control group. Participants were randomized into one of two groups: (1) exposure to television news clips of terrorism and threats to national security or (2) a control condition of news clips unrelated to national danger. Slone found that individuals in the experimental condition reported greater anxiety than individuals in the control condition. Broadly, research on news media coverage following disasters like those above suggests that greater news media consumption is associated with a number of psychological outcomes including: development of PTSD and posttraumatic stress, depression, stress response, substance use, and negative emotions (Pfefferbaum et al., 2014).

When this phenomenon has been studied among journalists, results are strikingly similar. Feinstein, Audet, and Waknine (2014) conducted a cross-sectional study that aimed to examine the psychological impact that viewing graphic images may have among journalists. Researchers found that frequent exposure to violent images was uniquely associated with greater symptoms of PTSD, depression, anxiety, as well as greater somatic complaints and alcohol consumption. Duration of exposure to violent images was only predictive of intrusive thoughts. These results suggest that journalists may habituate to the content but only if they are constantly exposed. By contrast, relatively quick exposure to very violent images may be more psychologically damaging than constant exposure. This is particularly important in the context of the current study, as access to violent media is literally in the palm of a person's hand allowing for constant exposure to potentially unsettling content at any moment.

The stress of repeated media exposure can best be exemplified by a study conducted by Holman, Garfin, and Silver (2014), who assessed the role of news media versus direct exposure on acute stress response following the Boston Marathon bombing. The authors identified that,

like other studies (Busso et al., 2014), greater daily hours of bombing-related news media exposure in the week following the bombings was associated with higher acute stress. However, when this was compared to direct exposure to the bombing, news media exposure remained uniquely predictive of acute stress while direct exposure was not significant. Repeated exposure was up to nine times more likely to lead to reporting symptoms of PTSD, even after accounting for pre-bombing mental health, demographics, and prior collective stress exposure. These findings underscore the psychological impact of repeated news media exposure to a traumatic event and highlight the need for limiting exposure to graphic violence as a means of preventing stress and protecting mental health.

Collectively, these studies indicate that repeated exposure to violent news media in the aftermath of a traumatic event leads to increased psychological consequences. Though this work has been extrapolated from different violent and traumatizing contexts, the countless videos of police violence against Black individuals likely equates to relentless community stress, which can be accessed at any moment via a computer or smart phone. Although the literature on repeated stressful media exposure suggests psychological consequences, little is known about how individuals may physiologically respond to videos of police-violence against Black individuals—a gap in the literature this study hopes to fill. As has been illustrated in prior research (Holman et al., 2014), violent news media are likely to elicit a stress response, which will be described in greater detail in the next section.

Models of Stress and the Stress Response

General stress. Research examining stress has dominated the social science literature for decades with work aimed to understand its antecedents, process, and management (Antonovsky, 1987; Lazarus, 1966; Selye, 1952, 1956). Though stress has been defined in numerous ways, the

current work conceptualizes it as the constellation of cognitive, emotional, physiological, and behavioral reactions the organism experiences as it transacts with perceived threats and challenges (Harrington, 2012). However, the experience of stress is subjective; that is that not all events will elicit a stress response and that the event must first be characterized, or appraised, as stressful.

Utilizing Lazarus and Folkman's transactional theory of stress and coping (1984), an individual engages in a two-stage process of cognitive appraisal. In the first stage, an individual engages in primary appraisal whereby an event is characterized as either negative, positive, or neutral. If the event is appraised as negative, it is further characterized either as (1) harm/loss (assessment of current damage), (2) threat (potential for future harm/loss) and/or (3) challenge (opportunity for growth). Secondary appraisal follows this whereby an individual evaluates the availability of resources or coping abilities to prevent or reduce future harm. If the event is appraised as harmful or threatening and an individual has limited coping resources, an individual will experience stress.

As noted above, the stress experience is composed of an amalgam of reactions. If an event is appraised as a threat, an individual may have negative cognitive (e.g., inability to make decisions), emotional (e.g., anger, irritation, anxiety), behavioral (e.g., poor performance), and/or physiological reactions. Walter Cannon (1932) first described the physiological response to stress through his discussion of *homeostasis*, the biological self-regulation process allowing an organism to adapt to life's demands. In doing so, Cannon outlined that an organism will have one of two automatic responses when faced with a threat: (1) fight, confrontation of the stressor (the stimulus propelling the stress response), or (2) flight, withdrawal from the stressor.

When faced with a stressor, the sympathetic branch of the autonomic nervous system is activated, which prepares the body for physical action. During arousal, the hypothalamus activates the sympathetic-adrenal-medulla (SAM) and the hypothalamic-pituitary-adrenal (HPA) axis, two primary systems of the fight-or-flight response. As part of SAM, the sympathetic nervous system stimulates the adrenal medulla to secrete two catecholamines, epinephrine and norepinephrine, which cause the pupils to dilate, accelerates heartbeat, promotes sweating, inhibits digestion, and suppresses the immune system, among other responses. As part of the HPA axis, the hypothalamus influences the anterior pituitary gland to secrete adrenocorticotropic hormone (ACTH) into the bloodstream which stimulates the adrenal cortex to release glucocorticoids. The primary glucocorticoid secreted by the adrenal gland is cortisol which raises glucose levels in the blood (energy mobilization) and reduces inflammation. To return back to homeostasis, the parasympathetic branch serves to dampen the arousal response of the fight-or-flight response by relaxing the body including constricting the pupils, slowing the heartrate, and regaining clearer thoughts (Harrington, 2012). The stress response can therefore best be described as the body's attempt to regain homeostasis or ideal level of physiological functioning following exposure to a stressor.

Rooted in evolutionary psychology, the fight-or-flight response is believed to have evolved as a survival strategy to effectively adapt to the environment. For acute, or short term, stressors, successful adaptation is more easily determined; however, chronic stressors, or long-term stressors, often require greater resources as they place substantial demand on the body. The stressors of today have changed considerably since the development of this response such that individuals experience fewer physical forms of stress (e.g., tigers, bears) and more psychological stress (e.g., job stress), with stress becoming more chronic in nature (Harrington, 2012).

According to Hans Selye (1956), the course of stress could be described by three stages which he called the *general adaptation syndrome*. First, an array of physiological changes occurs in an immediate effort to counter the stressor, noted as the alarm stage. If the stress continues, bodily resources are utilized to heal any damage that has occurred until its natural resources begin to deplete, known as the resistance stage. If the stress persists or is severe enough, the body's systems begin to break down in a stage of exhaustion.

While acute stressors are successfully countered in the resistance stage, chronic stressors can exert true physiological and psychological damage on the body. Chronic activation of the fight-or-flight response can lead to dysregulation of the SAM and HPA axis and depletion of resources, known as allostatic load (McEwen, 1998; Sterling & Eyer, 1988). Allostatic load can lead to a weakened immune system and increase the risk for illness and disease (Cacioppo & Berntson, 2011; Dickerson & Kemeny, 2004), including impairment of cognitive functioning (e.g., learning, memory, decision making), neural atrophy, cardiovascular disease, depression, and PTSD (Juster, McEwen, & Lupien, 2010; McEwen, 1998, 2007).

Negative affect. In addition to physiological arousal, the stress response is characterized by dispositional negative affect (NA; Folkman, 2013). Negative affect (NA) is a general dimension of subjective distress and subsumes a broad range of aversive mood states including: anger, fear, guilt, and disgust (Watson & Pennebaker, 1989). Substantive work on stress and affect has found that negative affect is associated with subjective stress (Clark & Watson, 1986; Watson, 1988) as well as the physiological response to stress (Buchanan, Absi, & Lovallo, 1999; Quirin, Kazen, Rohmann, & Kuhl, 2009). Additional work on the frequency of stressful events indicates a similar relationship. In study of married couples, individuals who experienced a daily hassle also reported worse mood the day the hassle took place (DeLongis, Folkman, & Lazarus,

1988). Interestingly, collective stress does not appear to be associated with NA, but rather experiencing more or less stress than usual appears to predict NA in a longitudinal sample of young adults (Rehm, 1978). This suggests that individuals are likely successfully adapting to daily stress until they perceive they no longer have the resources to effectively combat the additional stress. In a study by Bolger and colleagues (1989), greater daily stress predicted NA; however, when stressors occurred on a series of days, emotional habituation occurred by the second day for all stress events except for interpersonal conflict; that is that interpersonal conflict maintained its association to NA across several days while other stressors (e.g., financial problems, work/family demands) were less likely to remain significant. Collectively, stress in its various forms appears to predict NA but interpersonal stress may be an especially formidable stressor that is robustly associated with NA.

Health effects of general stress. Research spanning more than 60 years has well-established myriad physical and mental health consequences due to stress (Thoits, 2010). An accumulation of stress has been found to produce elevated levels of psychological stress and has predicted the onset or recurrence of a number of psychiatric disorders including: major depression, generalized anxiety disorder, PTSD, and alcohol and substance use disorders (Brown & Harris, 1978; Dohrenwend & Dohrenwend, 1974; Mirowsky & Ross, 2003; Thoits, 1983, 1995, 2010). Stress has also been linked to a number of physical health issues including cardiovascular disease, tension headaches, atopic disorders (e.g., asthma, allergic rhinitis), upper respiratory diseases, and a greater disease progression in some chronic illnesses including HIV and cancer (Harrington, 2012; Schneiderman, Ironson, & Siegel, 2005). Experiencing a stressful life event (e.g., divorce, death in the family) has also been found to predict subsequent physical morbidity, mortality, symptoms of psychological distress, and psychiatric disorder (Coyne &

Downey, 1991; Kessler, Price, & Wortman, 1985; Thoits, 1983, 1995) and been found to predict longer durations of illnesses (Taylor, 2010). In fact, stress has been found to place individuals at greater risk for infection (Cohen, Tyrrell, & Smith, 1991) and compromise immune functioning as illustrated by slower wound healing (Kiecolt-Glaser, Marucha, Malarkey, Mercado, & Glaser, 1995) and poorer antibody response to a flu vaccine (Kiecolt-Glaser, Glaser, Gravenstein, Malarkey, & Sheridan, 1996).

Stress has been found to have a significant impact on blood pressure. Acute stress can cause spikes in blood pressure, and if the stress response is repeatedly or continuously activated, it can prevent elevated blood pressure from returning to its homeostatic levels, forcing the heart to work harder and leading to damaged arteries and plaque formation (Harrington, 2012; Schneiderman et al., 2005). In a study of students, researchers found that blood pressure was higher the day before and during a student examination (Sausen, Lovallo, Pincomb, & Wilson, 1992), suggesting that the stress associated with the anticipation and taking of an exam elevated blood pressure. Additionally, Fredrikson and Matthews (1990) determined that individuals with high blood pressure demonstrate a heightened blood pressure response to all stressors, indicative of an exaggerated physiological response to stress. These studies are important for the current study insofar as to illustrate that regular exposure to videos of police violence may have a detrimental impact on health and suggest limiting exposure to these videos to protect against the adverse effects of stress.

Race-related stress. Given that encounters with police are often perceived as negative, in particular for Black individuals, it is likely that exposure to videos depicting police brutality will elicit a strong stress response from the viewer. Being the victim of police brutality has been found to be stressful and has even been classified as a stressful life event (Hobson et al., 1998)—

stressful situations that place individuals at risk for illness—in part because they are perceived as acts of racism (Brunson, 2007), given the history of police-perpetuated discrimination against Black men (Aymer, 2016; Brunson, 2007). In fact, frequent negative police contact often results in trauma for Black individuals and especially for Black men (Aymer, 2016). Considerable work has identified that any form of discrimination is profoundly stressful, with racial discrimination as being especially potent and pernicious (Clark, Anderson, Clark, & Williams, 1999; Lewis, Cogburn, & Williams, 2015; Schmitt, Branscombe, Postmes, & Garcia, 2014; Williams & Mohammed, 2009). According to Dovidio and Gaetner (1986), one reason for this may be that racism is embedded in the “social norms, institutional policies, and cognitive and affective systems of White Americans” (p. xi as cited in Utsey & Ponterotto, 1996). In fact, stress specifically caused by or related to exposure to racial discrimination has been conceptualized as a unique construct distinct from general stress aptly known as “race-related stress” (Harrell, 2000; Pieterse & Carter, 2007; Utsey & Ponterotto, 1996). As such, race-related stress is defined as “the race-related transactions between individuals or groups and their environment that emerge from the dynamics of racism, and that are perceived to tax or exceed existing individual and collective resources or threaten well-being” (p. 44). According Harrell’s (2000) racism-related stress model, there are six types of racism-related stressors: (1) racism-related life events, (2) vicarious racism experiences, (3) daily racism microstressors, (4) chronic-contextual stress, (5) collective experience of racism, and (6) transgenerational transmission of group traumas. Especially pertinent to the current study are racism-related life events, vicarious racism experiences, and daily racism microstressors, as they are likely to impact an individual’s perception of a future race-related event and their subsequent reaction to it.

The prevalence of racism in society has, and continues to have, a considerable effect on Black individuals such that many plan their lives around avoiding it or defending against experiences of discrimination (Essed, 1990). The chronicity of these experiences are inevitably stressful and are cumulative in nature such that “new encounters are interpreted on the basis of past experiences with racism, knowledge of others’ experience with racism, and knowledge about the systemic nature of racism” (Utsey & Ponterotto, 1996, p. 490). This is especially important in the context of police videos as many Black individuals will likely interpret the content of the videos through this racialized frame, as noted by Utsey and colleagues (2013):

“[e]ven if an individual never personally experiences a race-related event, learning about the experiences of others (vicarious, chronic-contextual, collective, and/or transactional) creates an awareness or expectation that he or she may encounter racism at any time” (p. 537).

Witnessing harm to others of the same racial group can also lead to racial trauma—the feeling of danger from real or perceived experiences of racial discrimination, threats of harm, and humiliating events—and can occur when Black individuals are constantly reminded of the danger of being Black (W. H. Smith, 2010). To capture the unique experiences associated with race-related stress, Utsey and colleagues (2013) developed the Prolonged Activation and Anticipatory Race-Related Stress Scale (PARS). Conceptually, the measure aims to assess the cognitions that are maintained following a race-related event, secondary appraisal (i.e., an evaluation of available resources needed to effectively combat the stressor), the anticipation of future race-related events, as well as the physiological response to forthcoming stressors. The ability of the measure to assess the bodily response to future race-related stressors is especially

important for the current study, as it is likely to predict the physiological response to videos depicting police violence against Black men.

Collectively, research has underscored the importance of race-related stress as unique from general stress, especially in its chronicity for Black people and in the distinct ways it manifests (e.g., vicarious racism experiences). Similar to general stress, race-related stress can have negative consequences for effective adaption and is likely to have significant health impacts.

Race-related stress and negative affect (NA). As with general stress, prior work supports a relationship between experiences of race-related stress (i.e., perceived racism) and NA (Karlsen & Nazroo, 2002; Noh & Kaspar, 2003; Ren, Amick, & Williams, 1999). In a daily diary study of African American college students, researchers have found that experiences of prejudice were common and that many reported feelings of anger and being upset following the incidents (Swim, Hyers, Cohen, Fitzgerald, & Bylsma, 2003). Studies utilizing ecological momentary assessments (EMA) to examine perceived racial/ethnic discrimination and daily affect in racial/ethnic minority adults have found similar results, such that baseline measures of racial/ethnic discrimination predict greater NA (e.g., anger, nervousness, sadness) throughout the day (Broudy et al., 2007), even after accounting for demographics, trait hostility, and socioeconomic status (Brondolo, Brady, et al., 2008).

Similar results have also been found in studies that experimentally induce racism. In a study conducted by Bennett, Merritt, Edwards, and Sollers (2004), researchers exposed African American men to one of two negative social interactions: one with blatantly racist content (BRC) and one with no contain racist content (NRC). Researchers found that NA scores were higher for those in the BRC scenario group than those in the NRC group. Interestingly, individuals in the

NRC group who perceived racism in the scenario reported greater NA than those who did not perceive racism in the scenario. Self-reported past experiences with racial discrimination moderated the association between perceived racism and NA among those in the NRC group. These results suggest that even in the absence of racist content, perceptions of racism may have a substantive impact on NA especially when evaluating ambiguous situations. When coupled with evidence that a history of negative police contact impacts the perception of future police interactions, it is likely that individuals with a history of race-related stress will perceive police videos as stressful and elicit NA.

Health effects of race-related stress. The literature has overwhelmingly identified the negative health impacts of racism and perceived discrimination across innumerable health outcomes (Brondolo, Hausmann, et al., 2011; Paradies et al., 2015; Pascoe & Richman, 2009; Pieterse, Todd, Neville, & Carter, 2012; D. R. Williams & Mohammed, 2009). Though not an exhaustive list, results from meta-analyses indicate racism and perceived discrimination to be associated with poor mental health (e.g., depression, distress, negative affect, life satisfaction, self-esteem; Utsey, Giesbrecht, Hook, & Stanard, 2008), poor physical health (e.g., cardiovascular disease, diabetes, respiratory problems), lower engagement in health behaviors (e.g., sleep, exercise), and/or greater unhealthy behaviors (e.g., alcohol use, substance use, smoking) and lower general health (Paradies et al., 2015; Pascoe & Richman, 2009; Pieterse et al., 2012). Substantial evidence points to Black individuals exhibiting higher rates of stress-related diseases such as hypertension, cardiovascular disease, and stroke compared to other racial/ethnic groups (Brondolo, Gallo, & Myers, 2009; Brondolo, Love, Pencille, Schoenthaler, & Ogedegbe, 2011; D. R. Williams & Mohammed, 2009). Additional work appears to suggest that these disparities may result from Black individuals' chronic exposure to race-related stress

(Harrell, 2000; Pieterse & Carter, 2010; Utsey et al., 2012; Utsey & Ponterotto, 1996; Williams, 1999). This is important in the context of videos depicting police brutality, as greater exposure to these types of media may contribute to chronic race-related stress and ultimately exacerbate health disparities.

Though the pathways linking racism to health are complex, considerable research on the topic has examined the effects of racism physiologically on the body. For instance, studies have documented an association between racism and/or racial discrimination and psychophysiological reactivity (Harrell, Hall, & Taliaferro, 2003), including cortisol, blood pressure, heart rate responses (Brondolo, Libby, et al., 2008; Harrell et al., 2003; Morris-Prather et al., 1996; Richman, Bennett, Pek, Siegler, & Williams, 2007), allostatic load (Brody et al., 2014), increased oxidative stress (Szanton et al., 2012), and dysregulations in cortisol (Zeiders, Hoyt, & Adam, 2014). These patterns of reactivity have been linked to the development of stress-related disorders such as hypertension (Matthews et al., 2004) and cardiovascular disease (Treiber et al., 2003), both of which have similarly been associated with experiences of racial discrimination (Dolezsar, McGrath, Herzig, & Miller, 2014; T. T. Lewis, Williams, Tamene, & Clark, 2014).

Despite the abundance of work linking the impact of discrimination on health, research examining the effects of vicarious discrimination or vicarious racism is lacking. In a study with Black college students, individuals were asked to watch excerpts of films that showed racist situations involving Black individuals, anger-provoking non-racist situations, and neutral situations. Results indicated that blood pressure increased following exposure to racist situations but not to anger-provoking or neutral stimuli (Armstead, Lawler, Gorden, Cross, & Gibbons, 1989). Additionally, in an extension of Bennet and colleagues (2004), researchers identified that Black individuals who perceived greater racism in the NRC condition evidenced greater anger

and cardiovascular reactivity in the form of diastolic blood pressure than those in the BRC (Merritt, Bennett, Williams, Edwards, & Sollers, 2006).

However, the most applicable study on the current topic is a thesis examining the physiological and affective reactivity to vicarious discrimination (Kort, 2016). In the study, Black and White participants were randomly assigned to read and give a speech about either police brutality or car accidents that harmed Black individuals. Participants completed several positive and negative affect assessments throughout the study, and data were collected on heart rate, blood pressure, and respiratory sinus arrhythmia. Individuals in the police brutality condition experienced increased reactivity in heart rate, systolic blood pressure, and respiratory sinus arrhythmia compared to individuals in the control condition. Additionally, there was a greater increase in systolic blood pressure for Black compared to White individuals. Participants in the police brutality condition also reported greater positive and negative affect compared to individuals in the control condition with the effects being stronger among Black compared to White individuals. These results give support for the current study and illustrate how vicarious discrimination impacts stress pathways of both White and Black individuals.

Engagement in risky health behaviors have been posited as an additional pathway by which racism and racial discrimination may impact health. The literature has demonstrated a relatively robust and consistent association between racism and race-related stress and risky health behaviors (Paradies, 2006) including: smoking, alcohol use, and substance use (Borrell et al., 2007, 2010; Brodish et al., 2011; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Landrine & Klonoff, 2000; Martin, Tuch, & Roman, 2003; Todorova, Falcón, Lincoln, & Price, 2010); less use of preventative services such as cholesterol testing, mammography, or cancer screenings (Gonzales, Harding, Lambert, Fu, & Henderson, 2013; Hausmann, Jeong, Bost, &

Ibrahim, 2008; Mouton et al., 2010; Trivedi & Ayanian, 2006); and non-adherence to medical regimens (Cuffee et al., 2013; Thrasher, Earp, Golin, & Zimmer, 2008). These associations may interact in dynamic ways that impact health (e.g., negative mood may influence autonomic functioning and smoking) and contribute to health disparities.

In addition to research on the effects of exposure to discrimination on health, there have been several studies that have examined how anticipation of discrimination and race-related stress might impact health. According to Brosschot and colleagues (2006), the experience of stress may begin before a stressor is actually encountered and endure beyond the end of the stressor. Repeated or chronic activation of the cognitive imagery of the stressor (i.e., experience of discrimination) can serve to prolong the stress and exacerbate the negative effects of stress on health (Brosschot, Pieper, & Thayer, 2005). It has been suggested that the process of perseverative cognition is most common when an individual is faced with stressors that seem out of their personal control (Brosschot et al., 2006), which is likely to include experiences of racial discrimination for Black individuals.

This anticipatory stress, reflected in chronic or sustained vigilance, can lead to dysregulation of both emotional and physiological functioning that can increase risks for multiple diseases with growing evidence heightened vigilance related to the threat of discrimination has pathogenic effects on health (T. T. Lewis et al., 2015). For instance, perseverative cognition and body alarm response of the PARS were associated with depression and anxiety in a sample of African American college students (Tilghman, 2015). In a study of Latina college students, researchers found that students who anticipated being discriminated against had greater concern and more threat emotions before an encounter with the potential perpetrator and more stress and greater cardiovascular response after the encounter (Sawyer,

Major, Casad, Townsend, & Mendes, 2012). Similarly, anticipatory ethnic discrimination was associated with lower levels of psychological health in a national sample of adults in Sweden (Lindström, 2008). More recent studies with adults in Chicago have found that racism-related vigilance predicted elevated risk of self-reported sleep difficulties (Hicken, Lee, Ailshire, Burgard, & Williams, 2013) and greater odds of hypertension for African Americans and Hispanics, even after accounting for hypertension risk factors (Hicken, Lee, Morenoff, House, & Williams, 2014). Collectively, these findings suggest that the threat of discrimination and anticipatory stress outside of actual experiences of racism or overall discrimination may be important for health outcomes.

Ethnic Identity as a Moderator

Central to the numerous videos depicting law enforcement's lethal use of force is its overwhelming target of Black men. The salience of this is in how Black individuals perceive these events, which may impact their response to racial discrimination. An important factor to consider in this relationship is the salience of ethnic identity. According to Chávez and Guido-DiBrito (1999), ethnic identity is the identification with a portion of society whose members, or others, are thought to have a common origin and share portions of a common culture and participate in shared activities. More generally this is framed as a shared set of similar traditions, behaviors, values, and beliefs. Race is also believed to be a salient feature of an individual's ethnicity (E. J. Smith, 1991). Phinney (1990) developed a model describing an ethnic identity process that indicates nondominant group members must resolve the stereotyping and prejudicial treatment by the dominant White population. However, it is believed that accomplishment of this process depends on the strength of the individual's ethnic identity (Chávez & Guido-DiBrito, 1999), which may impact an individual's perception of prejudicial treatment. This suggests that

ethnic identity may interact with experiences of racial discrimination and racial stressors in ways that may impact health.

Social Identity Theory (Tajfel, 1979; Tajfel & Turner, 1986) provides one possible explanation for how ethnic identity may interact with experiences of discrimination and race-related stress. According to this theory, individuals are motivated to belong to and enhance their social identity group in part because of the salience of group identity to an individual's personal identity. Especially important is that the more an individual identifies with a particular social group, the more invested the person is in focusing on the positive attributes of that group. In the context of ethnic identity, individuals who identify more strongly with their ethnic group may be more likely to commit to the positive characteristics of their group even when exposed to discrimination (Yip, Gee, & Takeuchi, 2008). If distress results from an attack on self-concept following experiences of discrimination, then a strong ethnic identity might reduce the effect of discrimination on distress. Previous work has found that ethnic identity is a protective factor in buffering the negative impact of discrimination on psychological distress (Branscombe, Schmitt, & Harvey, 1999; Mossakowski, 2003; Neblett, Shelton, & Sellers, 2004; Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003; Sellers, Copeland-Linder, Martin, & L'Heureux Lewis, 2006).

However, if ethnicity is a central component of an individual's identity, it is also possible that having a strong ethnic identity may actually exacerbate the effects of discrimination, resulting in poor health outcomes in part because a threat to this social identity may also be interpreted as a threat to one's self. According to self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), people should be more attuned to environmental cues that are important or relevant to their ethnic identity, which may include experiences of

discrimination and race-related stressors. For instance, individuals who consider race to be a salient component of their identity perceive or report more racially discriminatory events compared to those for whom race is less central to their identity (Neblett et al., 2004; Sellers et al., 2003; Sellers, Morgan, & Brown, 2001). In prior research with a sample of African American, Asian, and Latino college students, individuals who more strongly identified with their racial/ethnic group similarly reported more incidents of racial discrimination (Major et al., 2002). Interestingly, racial/ethnic minority individuals reported equal amounts of perceived discrimination toward members of their racial/ethnic group, but individuals with a stronger ethnic identity reported greater perceived personal discrimination compared to individuals with weaker ethnic identities (McCoy & Major, 2003).

Not only are individuals with a stronger ethnic identity more likely to report racial and ethnic discrimination, but they should be more likely to negatively react to such events. Several studies support this exacerbating hypothesis that ethnic identity exacerbates the negative impact of discrimination or race-related stress. For example, Operario and Fiske (2001) found that individuals with strong ethnic identity were more vulnerable to experiences of racial and ethnic discrimination in a sample of African American, Asian, and Latino students. Similar results have been reported by McCoy and Major (2003) who found that college students who more strongly identified with their ethnic identity reported greater negative affect after reading about unfair treatment toward individuals of their ethnic group compared to individuals who indicated weaker ethnic identification. Sellers and Shelton (2003) found that African American college students high in public regard (i.e., those who felt that other groups viewed African Americans less negatively) showed greater negative emotional reactivity to racial discrimination. Additional work has found that African Americans who were more likely to anticipate race-based rejection

reacted more intensely to discrimination when it occurred. Indeed, Burrow and Ong (2010) conducted a longitudinal study that examined racial identity as a moderator of daily exposure and reactivity to racial discrimination among African Americans students. The study found that racial centrality exacerbated the effects of daily racial discrimination on daily negative affect and symptoms of depression.

Taken together, ethnic identity seems to both buffer and exacerbate the negative effects of discrimination; however, research examining the acute impact of discrimination on negative affect and stress seems to suggest that greater ethnic identity may exacerbate rather than buffer this association. It is possible that ethnic identity may buffer experiences of discrimination that impact longer term mental health rather than momentary distress following discrimination and race related stressors; however, future research in this area is necessary to substantiate these claims.

Risk-Taking and Stress

The influence of stress on cognition is well-documented with more recent work focusing on the role of stress in decision making (Starcke & Brand, 2012). Many decisions are often made under stress such as making the best decision in an emergency or deciding what type of behavior to engage in when under distress, which may be especially relevant to public health. The detrimental effects of general and race-related stress on health have been well-established including the association between experiences of stress and risky health behaviors such as smoking, drinking, or substance use (Juster et al., 2010; McEwen, 2008; Paradies, 2006). Therefore, stress may have indirect effects on health, and these effects may be mediated by the individual's suboptimal decisions in the form of risk-taking.

Most studies report greater risk-taking under acute stress. For instance, one study aimed to understand if acute stress promoted risk-taking behavior in a sample of college students (van den Bos, Harteveld, & Stoop, 2009). Half of participants experienced acute stress via induction of the Trier Social Stress Test (TSST), a validated procedure at eliciting stress, and then asked to complete the Iowa Gambling Task, a measure of risk-taking. The study uncovered that the more salivary cortisol levels are elevated following the TSST, the poorer the performance on the Iowa Gambling task; that is individuals engaged in greater risk-taking. Other studies have replicated these results utilizing a variety of stressors including psychosocial stress induction procedures like the TSST (Buckert, Schwieren, Kudielka, & Fiebach, 2014; Pabst, Brand, & Wolf, 2013; Pabst, Schoofs, Pawlikowski, Brand, & Wolf, 2013; Preston, Buchanan, Stansfield, & Bechara, 2007) and physiological stressors like the cold pressor task (Lighthall, Mather, & Gorlick, 2009), where individuals are asked to submerge their non-dominant hand in a bucket of cold water for a predetermined amount of time. These results suggest that greater risk-taking is likely to occur following experiences that are perceived as stressful.

However, as has been noted by Brosschot and colleagues (2006), the experience of stress may begin before a stressor is actually encountered which should impact risk-taking in much the same way as the actual encounter with the stressor. Starcke, Wolf, Markowitsch, and Brand (2008) tested this association in a sample of college students. In their study, students were told that they had to deliver a public speech on the topic of “how I evaluate my cognitive abilities” in front of two psychologists, who would be asking them questions regarding their actual performance on neuropsychological tasks taken before their speech. Students were given three minutes to prepare for the speech, and afterward the neuropsychological tests (including the decision making tasks) were administered. Researchers assessed stress with the Positive and

Negative Affect Schedule as well as biomarkers (salivary cortisol and alpha-amylase), both of which revealed that speech anticipation led to increased stress. In line with perseverative cognition theory (Brosschot et al., 2006) and prior results, greater anticipatory stress predicted poorer performance on the risk-taking task such that individuals with the greatest increase in cortisol engaged in greater risk-taking. Similar results have been found in another study identifying that greater anticipatory stress leads to greater disadvantageous decision making, with individuals experiencing anticipatory stress showing difficulty with comprehension compared with a control group (Preston et al., 2007).

As the experience of stress extends beyond response to acute stressors, more recent work has sought to identify whether the stress and risk-taking association includes chronic stress. Ceccato, Kudielka, and Schwieren (2016) sought to add to this literature by examining chronic stress via self-reported scales and hair samples (used to quantify accumulation of cortisol) and their association with risk-taking. The researchers discovered a significant association between risk-taking and self-reported chronic stress but not for hair cortisol. Though this study has yet to be replicated, the results are certainly suggestive that self-report chronic stress may lead to greater risk-taking behaviors, which is especially relevant for Black individuals given the chronicity of racism and race-related stress experienced by many in this community.

Despite the general trend linking stress to risk-taking, little is known about a potential relationship between race-related stress and risk-taking. Given its conceptualization as a unique and distinct form of stress, additional work in this area may help illuminate a potential pathway by which race-related stress influences health outcomes and contributes to health disparities. One study that may indirectly point to a potential association between race-related stress and risk-taking is that by Jamieson, Koslov, Nock, and Mendes (2013). In their study, researchers

examined whether the experience of discrimination in sample of Black and White individuals increased risk-taking as measured by the Columbia Card Task, a measure of risky decision making. As part of the study, participants each received rejecting feedback from partners via a computer-based interaction who were either of their own race or of a difference race, which as authors note is to be interpreted as discrimination. Cross-race rejection, compared to same-race rejection, was associated with greater anger and more risk-taking. While the results of this study do not completely support an association between race-related stress and risk-taking, it is generally in line with past work outlining that experiences of discrimination are stressful and may motivate engagement in risk-taking behaviors.

It is worth noting that relatively little work has examined racial differences in behavioral measures of risk-taking similar to those above among adults. In a study among adolescents, young adults, and adults (Gardner & Steinberg, 2005), researchers sought to examine the impact of peer influence on a risk-taking measure whereby individuals are asked to make decisions about whether to stop a car that is moving across the screen once a traffic light turns from green to yellow. The appearance of the yellow light signals the impending appearance of a red traffic light, as well as a potential crash if the car is still moving when the red light appears. The study authors identified that across all age groups, non-White participants engaged in greater risk-taking than did White individuals; however, these differences were negligible among adults and were more apparent among the adolescent sub-sample. Relatedly, some work has identified greater risk-taking among non-White compared to White children (Collado et al., 2017), but few have explicitly sought to examine potential racial differences among adults. Researchers acknowledge the potential role of race in risk-taking (Aklin, Lejuez, Zvolensky, Kahler, & Gwadz, 2005) and when coupled with the work of Gardner & Steinberg (2005), it suggests that

any potential differences that exist in childhood may not extend to adulthood and/or that other factors, such as stress, may be more robust predictors of any differences that may exist among adults.

One rationale that has been proposed to explain the increase in risk-taking is the self-regulation model (SRM) of decision making (Boyer, 2006). The SRM hypothesizes that an individuals' inability to internally regulate encourages engagement in risky behaviors in part because they bypass crucial decision making processes (e.g., attending to incoming information) and irrationally engage in risk-taking behaviors—behaviors that involve the potential for loss (e.g., injury, disease, arrest), such as substance use and risky driving. That is, individuals who experience emotionally loaded and/or stressful experiences may be unable to properly regulate their physiological and emotional responses which allows for poor decision making and subsequent engagement in risk-taking behaviors.

In the context of the current study, risk-taking (i.e., poor decision making) may drive risky-health behaviors in part because of poor regulation strategies. In fact, prior researcher has identified a clear association between poor decision making and risky-health behaviors. In a study examining the role of deliberate decision making (i.e., thinking through various aspects of a decision) and risk-taking behaviors, the study authors identified that less deliberate decision making was associated with drug use (e.g., marijuana) and greater frequency of getting drunk concurrently and 1 year later (Wolff & Crockett, 2011). Additionally, emotional decision making has been found to be associated to greater alcohol use (Patrick, Blair, & Maggs, 2008) and greater non-deliberate processing was correlated with real-life gambling behavior (Denes-Raj & Epstein, 1994), which is associated with alcohol and substance use (Barnes, Welte, Hoffman, & Dintcheff, 2005).

Distress tolerance as a potential moderator. One potential mechanism by which stress impacts risk-taking may be through the ability to tolerate the negative emotional state associated with the stress response. Literature on risk-taking behavior underscores the importance of negative reinforcement, such that the motivation to engage in risky behavior is to avoid or escape negative affective states, including feelings of depression, anxiety, and stress (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004). Such reinforcement may be measured by distress tolerance, a construct defined as the ability to tolerate aversive emotional states (Simons & Gaher, 2005). Evidence of its relevance to risk-taking has been through findings that individuals with low distress tolerance exhibit greater risk-taking propensity (Macpherson et al., 2010) and are more likely to engage in risk-taking behavior, including risky driving (Beck, Ali, & Daughters, 2014), substance use coping (Howell, Leyro, Hogan, Buckner, & Zvolensky, 2010; Simons & Gaher, 2005; Zvolensky et al., 2009), a higher frequency of alcohol and drug use (Buckner, Keough, & Schmidt, 2007; Gorka, Ali, & Daughters, 2012), nicotine dependence (Leyro, Bernstein, Vujanovic, McLeish, & Zvolensky, 2011; Trujillo et al., 2017), and negative reinforcement (Trujillo et al., 2017).

The literature has also firmly documented that individuals with low distress tolerance (the inability to tolerate aversive emotional states) are more likely to maladaptively respond to certain situations that elicit stress (Leyro, Zvolensky, & Bernstein, 2010). For instance, one study found that among smokers who were able to abstain from smoking on a predetermined quit day, those who evidenced lower distress tolerance reported higher levels of negative affect compared to those with greater distress tolerance. Additionally, negative affect as a risk factor for early relapse was strongest for those who demonstrated lower distress tolerance (Abrantes et al., 2008). These findings suggest that individuals who evidence lower distress tolerance are more

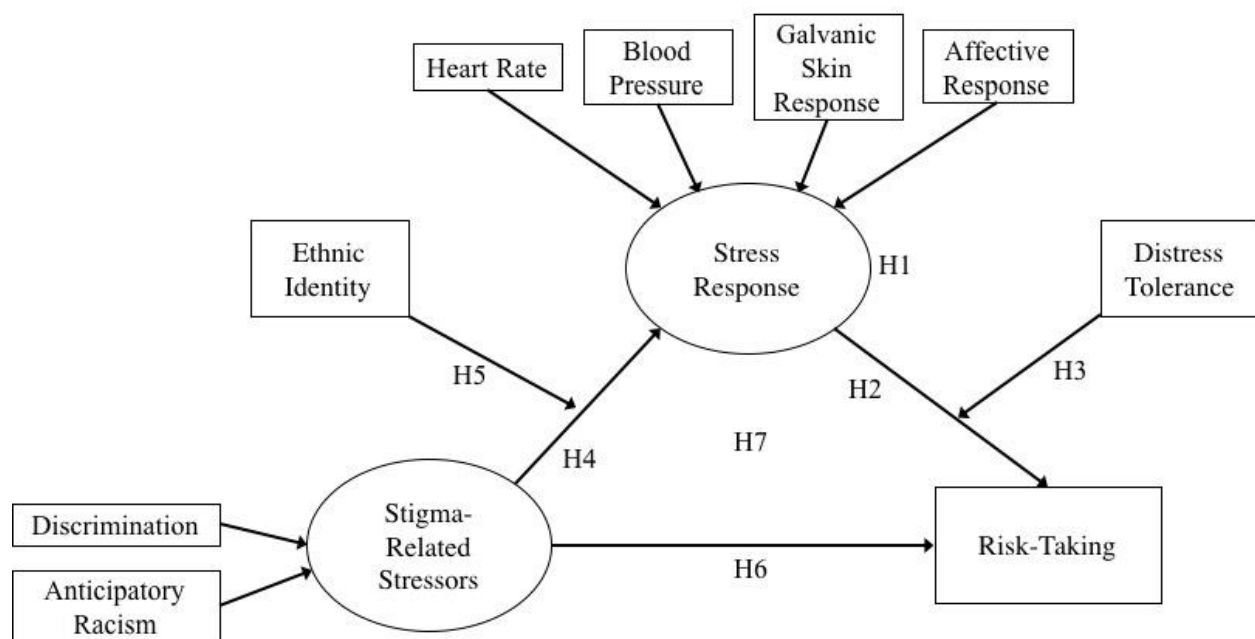
likely to engage in behaviors that aim to mitigate aversive states, which may be rooted in the inability to make advantageous decisions following acute stress. Despite this, limited research has overtly examined distress tolerance as a potential moderator of the relationship between experiences of distress and motivation to engage in risky behaviors (Vujanovic, Marshall-Berenz, & Zvolensky, 2011). Examination of distress tolerance as a potential moderating variable in the stress and risk-taking relationship may be important to consider given its association with greater risk-taking behaviors and the success around interventions aimed at reducing engagement in risky health behaviors among those with low distress tolerance (Bornovalova, Gratz, Daughters, Hunt, & Lejuez, 2012; R. A. Brown et al., 2008). This is particularly important in the context of the current study, as individuals are likely to experience distress from exposure to videos of police brutality, and distress tolerance may be one mechanism by which to reduce engagement in risk-taking behaviors.

The Current Study

Literature on discrimination has long established that it is stressful and that these experiences along with race-related stress cause poor mental and physical health, especially engagement in risky health behaviors. With the recent advancement of mobile technology, more individuals are being exposed to videos depicting police violence, particularly against Black men which are theorized to be distressing although no studies to date have examined this phenomenon. Given the institutionalized nature of racism and subsequent discrimination, especially at the hands of law enforcement, Black individuals may be likely to interpret videos of police violence against Black men as an example of vicarious racism which is likely to have adverse health effects. Despite the clear associations among discrimination, stress, and health, relatively little research has examined the effects of discrimination on risk-taking more broadly

and less so with distress tolerance as a potential moderator of this relationship. Additionally, relatively little has examined the role of ethnic identity interacting with experiences of discrimination and race-related stress in predicting the acute physiological response to a distressing news media. Therefore, the purpose of this study was to examine the connections among experiences of discrimination and race-related stress, physiological response to a video of police violence against an unarmed Black man, and risk-taking in a sample of Black and White college students, as well as examine distress tolerance and ethnic identity as components in this model.

Figure 1. Conceptual Framework



Hypotheses

H1: Given the legacy of discrimination against Black individuals at the hands of police (Aymer, 2016; Miller et al., 2017; Tate et al., 2016; Walker et al., 2007), it was hypothesized that Black participants would elicit a more potent physiological (evidenced by lower heart rate variability, increase in systolic blood pressure and galvanic skin response) and affective response

(greater negative affect via self-report and facial EMG) to a video of police violence compared to White individuals (denoted by H1 in Figure 1).

H2: As increased stress has previously been shown to predict greater risk-taking (Brosschot et al., 2006; Ceccato et al., 2016), it was hypothesized that individuals with greater physiological and affective response to the video would engage in greater risk-taking (denoted by H2 in Figure 1).

H3: Distress tolerance has previously been found to predict engagement in risk-taking behaviors (Beck et al., 2014), potentially as a mechanism to mitigate negative affect (Abrantes et al., 2008; Trujillo et al., 2017). Therefore, it was hypothesized that distress tolerance would moderate the relationship between the physiological/affective response and risk-taking (denoted by H3 in Figure 1).

H4: Experiences of discrimination and racism are profoundly distressing (T. T. Lewis et al., 2015; D. R. Williams & Mohammed, 2009) and can elicit a psychophysiological response (Brondolo, Libby, et al., 2008; J. P. Harrell et al., 2003). As such, it was hypothesized that greater past experiences with discrimination and anticipatory racism would predict a more robust physiological response (lower heart rate variability, higher systolic blood pressure, and greater galvanic skin response) and affective response (greater negative affect) in Black participants (denoted by H4 in Figure 1).

H5: Ethnic identity has been found to moderate the relationship between experiences of discrimination and psychological distress (Branscombe et al., 1999; Sellers et al., 2006). Given prior work suggesting ethnic identity may predict acute psychological stress in response to discrimination (Burrow & Ong, 2010; McCoy & Major, 2003), it was hypothesized that ethnic

identity would exacerbate the association between discrimination and anticipatory racism with the physiological and affective response in Black participants (denoted by H5 in Figure 1).

H6: As stress has been shown to predict risk-taking and given that experiences of discrimination are profoundly distressing, it was hypothesized that prior experiences of discrimination and race-related stressors would be associated with greater risk-taking in Black participants, which is generally in line with prior work (Jamieson et al., 2013; denoted by H6 in Figure 1).

H7: Given that discrimination and race-related stressors are associated with stress, and that stress is independently associated with risk-taking, it was hypothesized that the stress response would mediate the association of discrimination and race-related stress to risk-taking in Black participants (denoted by H7 in Figure 1).

Chapter 2: Method

Participants

Individuals ($N = 116$) who participated in the study were undergraduate college students enrolled in a psychology course. All participants were recruited through the psychology subject pool at a large Southern research university. Participants were eligible to participate in the study if they were at least 18 years old and identify as either White or Black. Individuals were ineligible to participate if they self-report any heart condition (history of heart attacks, stroke, angina or coronary heart disease), chronic obstructive pulmonary disease, any other medical condition that may affect their heart, take medications that may affect their heart rate, tattoos on their non-dominant forearm or face, identify as both White and Black/African-American.

Participants had a mean age of 19.36 ($SD = 4.09$; range: 18-48). The sample was comprised of 60 individuals (51.7%) identifying as White/European-American (non-Latino/non-Hispanic), 51 individuals (44.0%) identifying as Black/African American (non-Latino/non-Hispanic), and 5 (4.3%) as multiracial. Of the individuals identifying as multiracial, 4 individuals identified as Black in some regard and 1 individual identified as White. The majority of the participants were women with 90 individuals identifying as women (77.6%), 23 identifying as men (19.8%), and 3 individuals identifying as another gender (2.6%). On a subjective social class measure from 1 (lowest standing) to 10 (highest standing) indicating where respondents believe they stand in their communities, the majority of individuals indicated they fell somewhere in the center ($M = 5.71$, $SD = 1.71$).

Self-Report Measures

Participants completed a series of questionnaires assessing: history of discrimination and anticipatory race-related stress, positive and negative affect, distress tolerance, ethnic identity,

and social media use. Demographic information was collected through a researcher-created questionnaire. Participants also completed a computerized risk-taking task.

Daily Life Events Scale (DLE). The Daily Life Events Scale (DLE), a subscale of the Racism and Life Experiences Scale (RaLES; S. P. Harrell, 1994), was used to assess the frequency of discriminatory experiences. The DLE is a 20-item self-report measure that assesses the frequency of daily hassles because of race in the past year. Respondents were asked how often different experiences occurred in the past year (e.g., “Been accused of something or treated suspiciously”) on a 6-point Likert-type scale from 0 (*never*) to 5 (*once a week or more*). The RaLES assesses racism experienced collectively, individually, and vicariously with three types: life event/episodic stress, daily hassles, and chronic/contextual stress (S. P. Harrell, 1994). The items are averaged to create a total score with greater scores reflecting greater prior experiences of racism. Previous psychometric analyses indicate that internal consistency is adequate, with construct validity reflected by the finding that daily life experiences correlated negatively with social desirability and cultural mistrust (S. P. Harrell, 1997). Daily life experiences were related to perceived stress, psychological symptoms, and trauma-related symptoms, demonstrating evidence of criterion-related validity. Evidence of concurrent validity has been demonstrated by correlations as expected with self-esteem, cultural mistrust, racism reaction, and urban life stress (S. P. Harrell, 1997). The scale evidenced good internal consistency in the current sample ($\alpha = .93$)

Prolonged Activation and Anticipatory Race-Related Stress Scale (PARS). The PARS is a 17-item self-report measure used to measure race-related stress (Utsey et al., 2012). The PARS captures prolonged activation and anticipatory race-related stress responses in Black individuals and is comprised of four subscales: perseverative cognition, anticipatory race-related stress,

anticipatory bodily alarm response, and secondary appraisal. Because the experience of racism is likely to impact the response to videos of police violence, only one subscale was used in the current study: Anticipatory Race-Related Stress Scale (ARS). The Anticipatory Race-Related Stress Scale (ARS) consists of four items and measures the degree to which an individual cognitively anticipates future encounters with race-related stressors (e.g., “I believe there is a good chance I will experience racism in the future”). Respondents use a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*) to indicate their response to the race-related stressor, with higher scores indicating a greater expectation that an individual will experience race-related stress to impending encounters with racism in the future. Internal consistency for the Anticipatory Race-Related Stress Scale has been shown to be adequate ($\alpha = .83$) in prior studies and excellent in the current sample ($\alpha = .81$).

Positive and Negative Affect Schedule (PANAS). Positive and negative affect were assessed with the PANAS (Watson, Clark, & Tellegen, 1988). Participants were asked to rate the extent to which they felt a number of emotions at the present moment (i.e., “Indicate to what extent you **currently** feel the following feelings and emotions”). Ratings were made on a 5-point Likert-type scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The PANAS consists of 10 items that compose a positive affect (PA) subscale (active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong) and 10 items that compose a negative affect (NA) subscale (afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared, upset). Participants were assessed for positive and negative affect immediately before and after the police video. A total score is derived by the sum of the responses for each subscale with higher scores indicative of greater levels of either positive or negative affect. Internal consistency for PA and NA have been shown to be good ($\alpha s \geq .84$ for both subscales)

across different samples (Crawford & Henry, 2004; Watson et al., 1988). The reliability for the NA subscale at time 1 and time 2 ($\alpha \geq .75$) were shown to be good.

Distress Tolerance Scale (DTS). The DTS is 15-item self-report measure that aims to assess the tolerance of negative emotional states. (Simons & Gaher, 2005). Items are rated on a 5-point Likert scale from 1 (*strongly agree*) to 5 (*strongly disagree*) with lower scores corresponding to lower distress tolerance. The DTS has four subscales: Tolerance, (e.g., “I can’t handle feeling distressed or upset”); Appraisal, (e.g., “I am ashamed of myself when I feel distressed or upset”); Regulation, (e.g., “I’ll do anything to avoid feeling distressed or upset”); and Absorption, (e.g., “When I feel distressed or upset, all I can think about is how bad I feel”). An overall score is calculated by averaging the four subscale scores. Only the overall score was used for the current study. The DTS has evidenced good internal consistency in past studies ($\alpha \geq .89$; Dennhardt & Murphy, 2011; Simons & Gaher, 2005) as well as in the current sample ($\alpha = .91$).

Multiethnic Group Identity Measure (MEIM-R). The MEIM-R is a 6-item scale that purports to assess strength of ethnic identity (Phinney & Ong, 2007). The measure uses a 5-point Likert scale, from 1 (*strongly disagree*) to 5 (*strongly agree*), to assess two aspects of ethnic identity: Commitment (e.g., “I have a strong sense of belonging to my own ethnic group”) and Exploration (e.g., “I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs”). These subscales can be derived by calculating the mean scores with an overall measure of ethnic identity calculated by the mean of all items. As these subscales assess different but related facets of ethnic identity (Phinney, 1992), both subscales were used in current analyses to provide greater nuance to understanding the impact of ethnic identity. The MEIM has been used widely across a variety of ethnic groups. Internal consistency for the

Exploration and Commitment subscales have been shown to be good ($\alpha = .83$ and $.89$, respectively; Phinney & Ong, 2007) as well as in the current sample ($\alpha = .89$ and $.82$, respectively).

Physiological and Affective Response Measures

All recordings were obtained with Biopac MP150 and integrated with Acknowledge version 4.3 software (Biopac Systems, Santa Barbara, CA). Recording of all data was synchronized with video exposure.

Facial electromyography (facial EMG). Facial EMG is used to measure muscle activity in particular regions of the face by detecting and amplifying the tiny electrical impulses that are generated by muscle fibers when they contract. Facial EMG is a precise and sensitive method to measure emotional valence (broad dimension of positive and negative affect) that does not require cognitive effort and is able to measure activities to even weak emotional stimuli (Dimberg, Thunberg, & Grunedal, 2002). Data from three particular facial regions were collected: (1) the corrugator supercillii, a muscle group associated with negative affect and located at the medial end of the eyebrow; (2) the orbicularis oculi, a muscle group associated with positive affect and located immediately below the eye distal to the nose and on the ridge of the cheekbone; and (3) the zygomaticus major, a muscle group associated with positive affect and located on the cheek between the corner of the mouth and the tragus. Facial EMG data uses a Biopac EMG100C amplifier with a gain of 2000. Data were collected continuously throughout the session. Facial EMG is used as a reliable tool for measuring emotional reactivity (Dimberg et al., 2002).

Cardiovascular activity. To capture cardiovascular activity, measurement of blood pressure, heart rate, and pulse were taken. A standard blood pressure monitor was used to capture

pulse, systolic and diastolic blood pressure, and was taken on the subject's left arm. Both are routinely used as a measure of cardiovascular activity with an increase typifying a response to stressful and/or arousing stimuli (Mendes, 2009). Systolic blood pressure was utilized in current analyses as increases in systolic blood pressure compared to diastolic blood pressure have been identified as part of an adaptive defense patterning and health consequences have been identified as resulting from increases in systolic and not diastolic blood pressure (Mendes, 2009). Heart rate was captured continuously throughout the session with three sensors placed on the radial non-dominant wrist and below the bend of the elbow on both forearms. Heart rate collection used a Biopac ECG100B amplifier, gain of 2000, with upper frequency response of 35Hz and lower frequency response 0.5Hz. Heart rate variability (HRV) was used in the current analyses as it has been found to be an indicator of physiological stress/arousal with lower HRV representing greater parasympathetic nervous system activity and an indication of the stress response (Mendes, 2009).

Galvanic skin response (GSR). GSR captures the secretion of sweat produced by sweat glands in the palm and is an indication of psychological or physiological arousal (Montagu & Coles, 1966). As sweating is controlled by the sympathetic nervous system, an increase in GSR is an indication of arousal of the sympathetic nervous system and of the stress response (Montagu & Coles, 1966). A total of two GSR sensors were placed on the left hand with one on the thenar eminence and the second placed next to the first and toward the center of the palm. A Biopac GSR100C electrodermal activity amplifier was used and set at a channel sampling rate of 10 Hz and a gain of 5 μ Siemens (μ S) per volt. Data were captured continuously throughout the session.

Columbia Card Task (CCT). Risk-taking was assessed using a computerized card game, the CCT, hot version (Figner, Mackinlay, Wilkening, & Weber, 2009). On each trial in this task, participants were presented with 32 cards and with three pieces of information, which vary across trials. Participants were instructed that the goal of the game is to turn over as many gain cards as possible without turning over a loss card; points are earned by turning over a gain card and lost by turning over a loss card. The pieces of information that vary across trials are the probability of loss (i.e., the number of loss cards in the trial—1 or 3), the amount of loss (i.e., the number of points lost by turning over a loss card—250 or 750), and the amount of gain (i.e., the number of points gained by turning over a gain card—10 or 30); these variables were independently randomized over 25 trials. If a participant chooses a loss card, the loss amount is subtracted from the score, and the trial ends. Because the loss cards represent an artificial ceiling on behavior, the number of cards turned over on non-loss trials was analyzed. Risk is operationalized as the number of cards turned over during these trials.

Procedure

Participants interested in the study, known as “The Social Media and Health Study,” signed up on the undergraduate psychology participant pool and were asked to complete an online screener to assess their eligibility. Participants were informed that the purpose of the study was to understand how people respond to different forms of social media and how it might be related to their health. Following the completion of the screener, participants were informed that someone that from the study team would contact them to set up their next appointment, if they were eligible. Eligible participants were contacted within the week that they completed the online screener and were provided additional information about the study. During this conversation, they were informed that participation in the study involved coming into the lab

space for a 1.5-hour session that would involve having sensors placed on their hands, arms, and face; asked to watch different forms of media; and complete a series of surveys and a computer task. Interested participants were scheduled to come in for their session at a time that was most convenient for them. All participants were sent an email and received a reminder call with confirmation of their session as well as instructions to follow prior to attending which include: refraining from caffeine and nicotine for 30 minutes prior to their session, both of which have been shown to impact blood pressure and heart rate (Green & Suls, 1996; Minami, Ishimitsu, & Matsuoka, 1999), and to refrain from wearing cosmetics to their session as it obscures receptivity of data by the facial sensors.

All participants were consented upon arrival to their session and were asked to wash their hands in the restroom prior to placement of sensors. The skin was then prepped, and the participant was outfitted with six 4-mm Ag/AgCl facial EMG electrodes, HR, and GSR sensors. After all equipment was connected, the experimenter verified the quality of the facial EMG signals by checking impedance levels with UFI Checktrode model 1089 mk III. If adjustments were necessary (i.e., levels greater than 100 mV), they were made at this time and were noted in the session notes. Once signal quality is ensured, participants were then asked to complete a baseline measure of the PANAS on a laptop computer to assess for baseline affect. This was followed by a baseline measurement of systolic and diastolic blood pressure as well as pulse.

Following this, the experimenter began recording facial EMG, GSR, and heart rate data. The experimenter returned and informed the participant that they would be asked to view a series of two videos, the first of which lasts 30 seconds followed by a second video that lasts approximately 2.5 minutes. Participants were asked to sit as still as possible with their arms relaxed at their sides with their palms up while they viewed the videos. The first video that

participants were shown was a neutral stimulus video of a gentle flowing stream accompanied by soothing music. The second video was of a police dashcam video of a handcuffed Black man seen moving away from officers at which point he is initially tased by police and falls to the ground. The victim is then seen lying on the ground with police officers on top of him where he is subsequently tased more than 20 times. The police officers are shown holding him under his arms where he is dragged to the police vehicle. The video cuts to spotlight the victim in the back of a police vehicle, eyes open and unresponsive. An officer is seen checking his pulse followed by a statement calling out an emergency medic. The physiological and affective data collection were stopped at this point. Throughout these videos, all participants were seated on a couch with a flat-screen television approximately eight feet in front of them.

The experimenter returned following the end of the video, turned off the television, and recorded a second blood pressure measurement. The participant then completed a second assessment of the PANAS on a laptop. Following the second affect assessment, the participant completed the Columbia Card Task on the laptop. The participant was given instructions that the task involved two parts: a practice session where they learn how to play the game as noted by the computer instructions, followed by the actual trials. At the end of the practice round, any participant questions were answered, and the participant was asked to begin the actual trials. All participants completed a battery of self-report measures using a computer-presented survey at the end of the session.

Data Analysis

Preliminary analyses. Because of computer problems, 7 participants' risk-taking data were lost. A total of 8 participants were missing HRV and 1 was missing facial EMG data due to poor data quality. One participant did not have systolic blood pressure as the blood pressure cuff

was unable to get an accurate reading. As such, expectation maximization was used to impute missing data prior to data analysis. To determine whether the data were missing completely at random prior to imputation, a Little's MCAR test was conducted using all variables with the exception of race/ethnicity. The test was significant ($p = .002$) indicating that the data were not missing completely at random and that imputation would be appropriate. Twenty-five iterations were conducted during imputation using expectation maximization.

Physiological and affective responses. Following guidelines, measures of HRV in the time domain were derived from heart rate following recommended guidelines (Task Force of the European Society of Cardiology, 1996). Root mean square of differences of successive inter-beat intervals were used (RMSSD), as it is a reliable measure of HRV and parasympathetic activity (Task Force of the European Society of Cardiology, 1996). For GSR data, the average signal amplitude was calculated. For facial EMG, its amplitude was quantified by calculating the mean rectified EMG amplitude for the duration of the video (Van Boxtel, 2010).

Primary analyses. To address H1, a series of 3 independent samples *t*-tests were conducted to determine differences in HRV, GSR, and NA via facial EMG by race (White, Black). Two one-way repeated measures ANOVAs were conducted to examine changes in self-reported negative affect as well as systolic blood pressure by race.

To address H2, one multiple regression was initially proposed with risk-taking as the outcome variable and HRV, change in systolic blood pressure, GSR, and negative affect as predictor variables in the first regression. Any physiological variables not correlated with each other were examined separately as simple linear regressions predicting risk-taking

To address H3, a series of multiple regressions were conducted. Multiple regressions with correlated physiological variables were entered in the first block with distress tolerance, and the

interaction of distress tolerance with each of the physiological variables in the second block. Any simple linear regressions conducted to address H2 were conducted as multiple regressions here with the physiological variable and distress tolerance entered in the first block, and their interaction in the second block.

To address H4, two multivariate regressions were proposed with discrimination and anticipatory racism as separate predictors regressed onto HRV, difference in blood pressure, GSR, and NA via facial EMG. However, if the outcome variables are not significantly correlated, multivariate regressions are not conceptually appropriate and other statistically analyses such as multiple regression are more appropriate. As this was the case in the current study, separate multiple regressions were conducted with stigma-related stress (experiences of discrimination, anticipatory race related stress) as predictors. To address H5, a series of multiple regression were conducted with the stigma-related stressors and each MEIM subscale (Exploration, Commitment) independently entered in step one, with the interaction of each stigma-related stressor and its subsequent MEIM subscale interaction term in step two.

To address H6, a multiple regression was conducted with discrimination and anticipatory racism predicting risk-taking. To determine if the stress response mediated the association between stigma-related stressors and risk-taking and to address H7, the indirect effects from a path analysis were examined with stigma-related stressors (discrimination and anticipatory racism) leading to the stress response (consisting of heart rate, blood pressure, GSR, and negative affect) impacting risk-taking. Analyses that addressed H1 – H6 were conducted in SPSS 24.0 (IBM, 2016) and analyses addressing H7 were conducted in AMOS 24.0 (IBM, 2016).

Chapter 3: Results

Preliminary Analyses

Normality assumptions, outliers, multicollinearity. Normality assumptions were assessed prior to running the primary analyses. All measures of physiological (HRV, GSR, NA via facial EMG), as well as the DTS, MEIM subscales and total scale, DLE, and Anticipatory Race-Related Stress scale of the PARS, all met criteria for skewness and kurtosis with absolute values less than or equal to 2.0. The NA subscale of the PANAS both before (skew: 2.86, kurtosis: 13.07) and following the video (skew: 1.77, kurtosis: 4.40), as well as the difference score of systolic blood pressure from pre- to post-video (skew: -0.17, kurtosis: 4.40) did not meet the assumption of normality. An assessment of the scatterplot for each measurement showed evidence of outliers. In an attempt to retain as much data as possible, two data points were winsorized for the pre-video and one point for the post-video NA subscales. One point was winsorized for the difference score of systolic blood pressure. The subscale for the pre-video (skew: 1.34, kurtosis: 1.48) and post-video (skew: 1.41, kurtosis: 2.00) NA subscale, as well as the difference score of systolic blood pressure (skew: 0.14, kurtosis: 2.00) measure were within normality. Tolerance and VIF were used to assess multicollinearity and Mahalanobis D^2 . Tolerance values ranged from .95 to .99 and VIF values ranged from 1.00 to 1.05 indicating the absence of multicollinearity.

Bivariate correlations. In terms of bivariate correlations (Table 1), HRV was negatively associated with NA via facial EMG. Among Black respondents, the Exploration subscale of the MEIM was significantly associated with the Commitment subscale of the MEIM and marginally correlated with GSR and risk-taking in a positive direction. The Commitment subscale of the MEIM was marginally significant with risk-taking in the positive direction. The DLE scale was

Table 1.

Bivariate Correlations, Means, and Standard Deviation Scores among Stigma-Related Stressors, Select Physiological/Affective Measures, Risk-taking, and Moderator Variables.

	1	2	3	4	5	6 ^a	7 ^a	8 ^a	9 ^a	10
1. HRV	-									
2. BP Systolic Difference	.00	-								
3. GSR	-.06	.02	-							
4. NA via facial EMG	-.20*	-.01	.10	-						
5. DTS	.01	-.05	.02	.01	-					
6. MEIM – Exploration ^a	.03	.05	.24†	.21	-.07	-				
7. MEIM – Commitment ^a	.20	-.07	.22	.16	.03	.73***	-			
8. DLE ^a	.05	.10	-.09	-.01	.10	-.03	-.12	-		
9. PARS – ARS ^a	-.16	.05	.08	.18	-.30*	.03	-.01	.46***	-	
10. Risk-taking	-.13	.03	-.03	.10	-.04	.23†	.22†	-.27†	.00	-
<i>M</i>	0.51	-1.42	6.03	3.24	3.33	3.72	4.05	1.95	22.04	13.80
<i>SD</i>	0.24	9.91	4.58	2.02	0.87	0.99	0.83	1.04	4.58	5.96

Note. NA = negative affect; HRV = heart rate variability; BP = blood pressure; GSR = galvanic skin response; EMG = electromyography; DTS = Distress Tolerance Scale; MEIM = Multiethnic Identity Measure; DLE = Daily Life Events Scale; PARS – ARS = Prolonged Activation and Anticipatory Race-Related Stress Scale – Anticipatory Race-Related Stress subscale; M = mean; SD = standard deviation.

^aCorrelations only among Black respondents.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

significantly and positively associated with the ARS subscale and was marginally negatively associated with risk-taking. The ARS subscale was negatively associated with the DTS scale. All other bivariate correlations were not statistically significant.

Descriptive statistics. Respondents had a mean score of 13.02 ($SD = 2.89$) for self-reported NA prior to the video and a mean of 16.89 ($SD = 5.70$) post-video. On average, participants' systolic blood pressure was 116.49 ($SD = 12.53$) prior to the video and 115.07 ($SD = 12.10$) after the video. Descriptive statistics for the remaining variables can be found in Table 1.

Primary Analyses

Hypothesis 1: Black participants will elicit a more potent physiological and affective response compared to White individuals. A one sample t-test was performed to assess if there were significant differences in HRV, GSR, and NA via facial EMG by race. There were no significant differences by race in HRV [$t(114) = -1.352, p = .179, \eta^2 = .02$] or NA [$t(114) = 0.116, p = .908, \eta^2 = .00$]. There were significant differences in GSR by race, $t(114) = 3.970, p < .001, \eta^2 = .12$, with race accounting for 12% of the variance in GSR. Further examination indicates White individuals ($M = 7.537, SD = 4.42$) evidencing greater GSR than Black individuals ($M = 4.356, SD = 4.18$) in response to the video.

To determine if there were significant differences in changes to systolic blood pressure and NA assessed via self-report, two mixed ANOVAs were conducted with time as the within-subjects factor (pre-video, post-video) and race (White, Black) as the between-subjects factor. There were no significant differences in systolic blood pressure over time [$F(1,114) = 2.29, p = .133, \text{partial } \eta^2 = .02$], by race [$F(1,114) = 0.48, p = .489, \text{partial } \eta^2 = .00$], nor was there a time by race interaction [$F(1,114) = 0.18, p = .694, \text{partial } \eta^2 = .00$]. There was a significant

difference in negative affect over time [$F(1,114) = 56.08, p < .001$, Pillai's Trace = .33, partial $\eta^2 = .33$], such that NA increased from pre-video ($M = 13.02, SD = 2.89$) to post-video ($M = 16.89, SD = 5.71$). However, there was no significant difference by race [$F(1,114) = 0.74, p = .391$, partial $\eta^2 = .01$] nor was there a time by race interaction [$F(1,114) = 0.25, p = .618$, partial $\eta^2 = .00$].

Hypothesis 2: Individuals with greater physiological and affective response to the video will engage in greater risk-taking. A multiple regression was conducted with HRV, and NA via facial EMG as predictor variables and risk-taking as the outcome. The overall model was not significant, $F(2,113) = 1.28, p = .282, R^2 = .01$, and as a result the standardized coefficients were not interpreted. Two simple linear regressions were conducted with risk-taking as the outcome variable and the difference in systolic blood pressure and GSR as separate predictor variables. The overall models for the difference in systolic blood pressure [$F(1,114) = 0.13, p = .718, R^2 = .00$] and GSR [$F(1,114) = 0.08, p = .781, R^2 = .00$] were not significant.

Hypothesis 3: Distress tolerance will moderate the relationship between the physiological/affective response and risk-taking. A multiple regression was conducted with risk-taking as the outcome variable and HRV, NA via facial EMG, and distress tolerance entered in the first block and the interaction term of distress tolerance with each physiological measure entered in the second block. The model from block one was not significant [$F(3,112) = 0.90, p = .444, R^2 = .02$] and neither was the model inclusive of the interaction term [$F(5,110) = 0.61, p = .690, R^2 = .03$]. The standardized coefficients were therefore not interpreted for either model

Two additional multiple regressions were conducted with risk-taking as the outcome. One with the difference in systolic blood pressure and distress tolerance entered in block one, and its interaction entered in block two. The test for model one was not significant [$F(2,113) = 0.15, p =$

.859, $R^2 = .00$] and neither was the test for the model with the interaction term [$F(3,112) = 0.19$, $p = .903$, $R^2 = .01$]. A similar multiple regression was conducted with GSR in block one with distress tolerance and their interaction entered in block two. The model from block one was not significant [$F(2,113) = 0.12$, $p = .890$, $R^2 = .00$] and neither was the model in block two [$F(3,112) = 0.359$, $p = .783$, $R^2 = .01$]. The standardized coefficients were not interpreted for any model.

Hypothesis 4: Greater stigma-related stress will predict greater physiological and affective responses in Black participants. A series of four multiple regressions were conducted with HRV, change in systolic blood pressure, GSR, and NA via facial EMG as dependent variables and the Daily Life Events Scale (DLE) and Anticipatory Race-Related Stress subscale (ARS) as predictors. Models predicting HRV [$F(2,52) = 1.16$, $p = .320$, $R^2 = .02$], change in systolic blood pressure [$F(2,52) = 0.27$, $p = .768$, $R^2 = .01$], GSR [$F(2,52) = 0.68$, $p = .511$, $R^2 = .03$], and NA via facial EMG [$F(2,52) = 1.11$, $p = .337$, $R^2 = .04$] were not significant. Standardized coefficients were therefore not interpreted for any model.

Hypothesis 5: Ethnic identity will moderate the relationship between stigma-related stressors and physiological/affective responses in Black participants. A series of multiple regressions were conducted with HRV, change in systolic blood pressure, GSR, and NA via facial EMG as dependent variables for each regression.

Exploration subscale of MEIM. To identify if the Exploration subscale of the Multiethnic Identity Measure (MEIM) moderated the relationship between stigma-related stressors and aspects of the stress response, a series of multiple regressions were conducted. In the first four multiple regressions, the Exploration subscale, the DLE, and ARS scale were entered in block one, and Exploration \times DLE and Exploration \times ARS interactions were entered in block two. In

the first multiple regression predicting HRV, the model from block one was not significant [$F(3,50) = 0.79, p = .505, R^2 = .05$] and neither was the model with the interaction terms [$F(5,48) = 1.16, p = .343, R^2 = .11$]. In the second model predicting the difference in systolic blood pressure, the test for the model in block one was not significant [$F(3,50) = 0.23, p = .878, R^2 = .01$] and neither the was model with the interaction terms [$F(5,48) = 0.64, p = .673, R^2 = .06$]. The test for block one in the third model predicting GSR was not significant [$F(3,50) = 1.48, p = .233, R^2 = .08$] and neither was the model from block two [$F(5,48) = 0.88, p = .504, R^2 = .08$]. In the fourth regression predicting NA via facial EMG, the model from block one not significant [$F(3,50) = 1.49, p = .229, R^2 = .08$] as was the model from block two [$F(5,48) = 1.20, p = .325, R^2 = .11$].

Commitment subscale of MEIM. Similar to the prior analyses, the Commitment subscale was entered along with the DLE and ARS in step, and Commitment \times DLE and Commitment \times ARS interactions. In the first model predicting HRV, the test for the model in block one [$F(3,50) = 1.66, p = .189, R^2 = .09$] was not significant. The model inclusive of the interaction in block two was trending in significance [$F(5,48) = 2.27, p = .053, R^2 = .19$]. Purely for exploratory and training purposes, the set of predictors were observed and showed that the Commitment \times DLE interaction was significant ($\beta = -1.33, p = .020$). A standardized coefficient exceeding the value of 1.00 is likely due to multicollinearity with other predictors in the model and can occur in stepwise regressions when interaction terms are included in a model (Deegan, 1978). An examination of the interaction on the scatterplot (Figure 2) indicates that among individuals with low levels of Commitment, HRV increases as experiences of discrimination increases. Conversely, HRV decreases as experiences of discrimination increase among individuals with high levels of Commitment. All other predictors in the model were not significant ($ps > .214$).

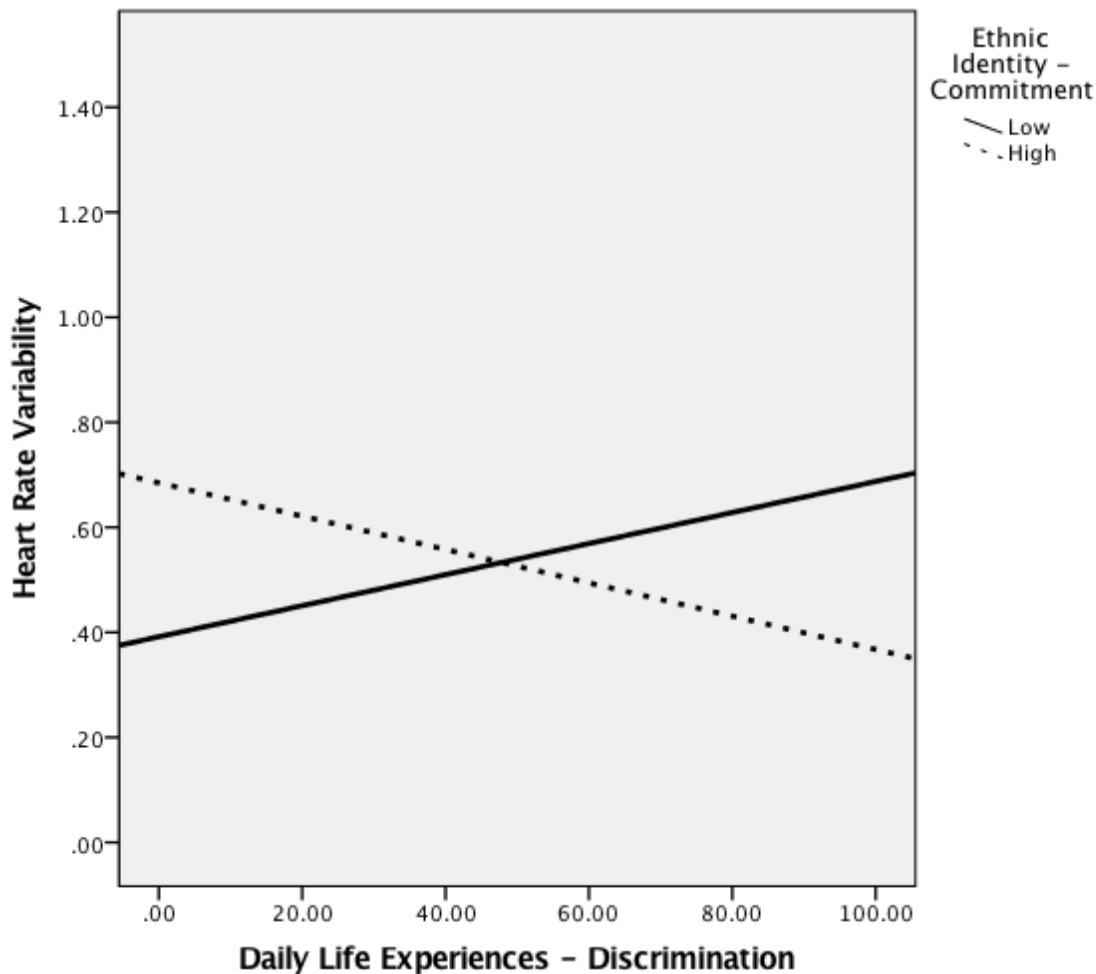


Figure 2. The Interaction of Experiences of Discrimination and Ethnic Identity Commitment Predicting HRV.

Note. Levels of commitment were categorized via median split.

In the second model predicting the difference in systolic blood pressure, tests of models from block one [$F(3,50) = 0.24, p = .871, R^2 = .01$] and two [$F(5,48) = 0.55, p = .738, R^2 = .05$] were not significant. In the third model predicting GSR, similar to the first two, the model with the DLE, ARS, and the Commitment subscale was not significant [$F(3,50) = 1.22, p = .314, R^2 = .07$] as was the model with the interaction term [$F(5,48) = 0.76, p = .583, R^2 = .07$]. In the final model predicting NA via facial EMG and in line with all the prior models, both models from

block one [$F(3,50) = 1.16, p = .335, R^2 = .07$] and two [$F(5,48) = 0.85, p = .521, R^2 = .08$] were not significant.

Hypothesis 6: Stigma-related stressors will be associated with greater risk-taking among Black participants. One multiple regression was conducted with the DLE and ARS as criterion variables predicting risk-taking. The model was not significant, $F(2,51) = 2.49, p = .093$.

Hypothesis 7: The stress response will mediate the association of stigma-related stressors and risk-taking in Black participants. In the first set of analyses, the indirect effects linking the DLE to risk-taking through the stress response were calculated. Given the small sample size, indices of model fit and interpretation of individual pathways were not examined. The indirect effects of DLE to risk-taking through HRV ($\beta = -.01, p = .465$), the difference in systolic blood pressure ($\beta = -.00, p = .611$), GSR ($\beta = .00, p = .837$), and NA via facial EMG ($\beta = .00, p = .887$) were not significant. In the second set of analyses, indirect effects were calculated for the mediation of the stress response between the ARS and risk-taking. The indirect effects of ARS to risk-taking through HRV ($\beta = .04, p = .153$), the difference in systolic blood pressure ($\beta = .00, p = .536$), GSR ($\beta = .00, p = .629$), and NA via facial EMG ($\beta = .00, p = .712$) were not significant.

Exploratory Analyses

A number of additional analyses were conducted in an effort to explore the data further and provide some additional context to the null findings in the primary results. These analyses primarily focused on two additional variables: self-reported NA and the frequency with which individuals obtain news online and on social media.

Self-reported negative affect. Though NA affect was collected physiologically and via self-report, the primary results focused almost exclusively on the data collected physiologically. Similar to the variable capturing a change in systolic blood pressure before and following the video, a new variable was created to denote the change in self-reported NA. A bivariate correlation matrix was run on the entire sample between the new difference in self-reported NA score and all physiological variables (HRV, difference in systolic blood pressure, GSR, and NA via facial EMG), as well as the DTS and risk-taking variables. All bivariate correlations were not significant (r s range: .04 to -.11; p s \geq .236). An independent samples t-test was conducted next to identify if there was a significant difference by race in the difference of self-reported NA. The results of the t-test was not significant, $t(114) = 0.50$, $p = .618$, indicated no difference by race in the difference of self-report NA.

An additional bivariate correlation matrix was conducted on the subsample of Black participants between the difference in self-reported NA and risk taking, the DLE and ARS, and the Exploration and Commitment subscales of the MEIM. The correlation with the Commitment subscale was statistically significant and in the positive direction ($r = .34$, $p = .013$). The correlation with the Exploration subscale was marginally significant ($r = .27$, $p = .052$), while correlations with risk-taking ($r = .17$, $p = .213$), the DLE ($r = .04$, $p = .756$) and ARS ($r = .04$, $p = .773$) were not significant.

Exploration and commitment subscales. Though not all of the correlations within the subsample were statistically significant, a series of multiple regression analyses were conducted predicting the difference in self-reported NA. Using the same conceptualization that served as the framework for Hypothesis 5, the Exploration and Commitment subscales were explored as potential moderators of the relationship between the stigma-related stressors and the difference in

self-report NA. However, to offset potential issues around the lack of power, the stigma-related stressors were examined independently. In the first multiple regression, the Exploration subscale and DLE were entered in block one, and their interaction was entered in block two. The model without the interaction terms was not statistically significant [$F(2,51) = 2.02, p = .143, R^2 = .01$] and neither was the model inclusive of the interaction term [$F(3,50) = 1.35, p = .269, R^2 = .08$]. In the second multiple regression, the Exploration subscale and the ARS were entered in block one, and their interaction was entered in block two. The model from the first block was not statistically significant [$F(2,51) = 1.97, p = .155, R^2 = .08$] and neither was the model with the interaction term [$F(3,50) = 1.61, p = .200, R^2 = .09$].

In the third multiple regression, the Commitment subscale and the DLE were entered in block one, and their interaction was included in block two. The model from the first block was statistically significant, $F(2,51) = 3.48, p = .038, R^2 = .12$. Examination of the predictor variables indicates that the Commitment subscale was an independent predictor ($\beta = .35, p = .012$) such that as levels of Commitment increased, there was a greater positive difference in self-reported NA. The DLE was not identified as a unique predictor ($\beta = .09, p = .522$). The model with the interaction term was also statistically significant [$F(3,50) = 3.05, p = .037, R^2 = .15$]; however, there was no statistically significant increase in the variance accounted for by the interaction [$\Delta F(1,50) = 2.03, p = .16, \Delta R^2 = .03$]. An examination of the interaction term indicates it is not a unique predictor ($\beta = .20, p = .160$). The Commitment subscale fell below significance ($\beta = .03, p = .907$) and the DLE remained as not statistically significant ($\beta = .03, p = .229$).

In the fourth regression, the Commitment subscale and the ARS were entered in block one, and their interaction was entered in block two. The model from block one was statistically significant, $F(2,51) = 3.31, p = .044, R^2 = .12$. The Commitment subscale was a unique predictor

($\beta = .34, p = .014$) such that as levels of Commitment increased there was a greater positive difference in self-reported NA. The ARS was not an independent predictor ($\beta = .05, p = .736$). The model from the second block was marginally significant, [$F(3,50) = 2.58, p = .061, R^2 = .13$]; however, there was no statistically significant increase in the variance accounted for by the interaction [$\Delta F(1,50) = 1.10, p = .298, \Delta R^2 = .02$]. For training and exploratory purposes, the standardized coefficients of the predictors were examined. An inspection of the interaction term indicates it is not a unique predictor ($\beta = .15, p = .298$). The Commitment subscale fell below significance ($\beta = -.13, p = .609$) and the ARS remained not statistically significant ($\beta = -.09, p = .337$).

News consumption online and from social media. A frequency table was constructed to identify how often individuals obtain their news from online and social media platforms (Table 1). The majority of respondents (60.8%) obtain their news from online platforms on a daily or weekly basis. The remainder of respondents were equally dispersed across other options (less than once a month, monthly, multiple times a day). The majority of respondents report getting their news via social media on a daily basis, followed by multiple times a day, or weekly. Relatively few indicate getting their news from social media monthly or less than once a month. A bivariate correlation matrix was conducted to identify how the frequency of news consumption via these different platforms might be associated with physiological/affective measures of stress (HRV, difference in systolic blood pressure, GSR, NA via facial EMG), DTS, and risk-taking. The results of the bivariate correlation indicate that the frequency with which individuals consume their news online is positively associated with news consumption via social media ($r = .28, p = .002$) and is positively associated with a difference in self-reported NA ($r = .24, p = .009$). The frequency with which individuals obtain their news via social media was positively

associated with risk-taking ($r = .26, p = .006$). All other bivariate correlations were not statistically significant (r s range: $.02 - .12; p$ s $> .190$).

Table 1. Frequency of News Consumption Online and from Social Media.

How often do you view news...	Online, N (%)	On social media, N (%)
Less than once a month	14 (12.2)	3 (2.6)
Monthly	16 (13.9)	6 (2.6)
Weekly	38 (33.0)	25 (21.7)
Daily	32 (27.8)	43 (37.4)
Multiple times a day	15 (13.0)	38 (33.0)

Given the significant correlation between the frequency of online news consumption and the difference in self-reported NA, a one-way between-subjects ANOVA was conducted to identify if there were any significant differences in the difference in self-reported NA by frequency of online news consumption. The test was significant, $F(4,110) = 2.56, p = .043$, partial $\eta^2 = .085$, indicating that there was a significant difference in the change of self-reported NA by how frequently respondents consumed the news online. More specifically, the results of Tukey post-hoc tests indicate that individuals who consume news multiple times a day had a larger difference in self-reported NA ($M = 7.33, SD = 8.83$) than individuals who consume their news online less than once a month ($M = 1.14, SD = 3.10$). All other between group differences were not statistically significant (p s $> .109$).

Black participant subsample. An additional bivariate correlation was conducted for the subsample of Black participants between the two news consumption variables, the physiological and affective measures, the ethnic identity subscales, and the stigma-related stressor variables. The correlation matrix identified that frequency of news consumption from online platforms was significantly and positively associated with frequency of news consumption via social media platforms ($r = .34, p = .011$), difference in self-reported NA ($r = .30, p = .026$), the Exploration ($r = .37, p = .007$) and Commitment ($r = .34, p = .012$) subscales, DLE ($r = .28, p = .039$), and was

marginally associated with the ARS ($r = .25, p = .064$). The frequency of news consumption via social media was significantly associated with the Commitment subscale ($r = .27, p = .046$) and was marginally associated in the negative direction with HRV ($r = -.24, p = .085$). All other bivariate correlations were not significant (r s range: $.01 - .20; p$ s $> .155$).

Given the significant associations between the difference in self-reported NA separately with the Exploration and Commitment subscales as well as the frequency of news consumption via online, the frequency of news consumption was explored as a potential moderator of the ethnic identity subscales and the difference in self-reported NA. While the news consumption variable is ordinal in nature, rather than dummy code each category for regression analyses which will increase the number of degrees of freedom and reduce power (Tabachnick & Fidell, 2007), the variable was treated as a quantitative variable as it conceptually captured an increase in frequency of news consumption across the response categories. In the first multiple regression predicting the difference in self-reported NA, the Exploration subscale and the news consumption variable were entered in block one, and their interaction was entered in block two. The model from block one was statistically significant, $F(2,51) = 3.45, p = .039, R^2 = .12$. Further examination indicates that neither the Exploration subscale ($\beta = .18, p = .210$) or the news consumption variable ($\beta = .24, p = .100$) were unique independent predictors. The model from the second block was not statistically significant, $F(3,50) = 2.70, p = .082, R^2 = .12$. In the second multiple regression, the Commitment subscale and the news consumption variable were entered in block one, with their interaction entered in block two. The model from the first block was statistically significant, $F(2,51) = 4.61, p = .014, R^2 = .15$. An examination of the predictors indicates that the news consumption ($\beta = .21, p = .126$) variable was not uniquely predictive while the Commitment subscale ($\beta = .26, p = .059$) was trending as a unique predictor of the

difference in self-reported NA. The model from the second block inclusive of the interaction term was also statistically significant [$F(3,50) = 3.14, p = .034, R^2 = .16$]; however, there was no statistically significant increase in the variance accounted for by the interaction [$\Delta F(1,50) = 0.32, p = .577, \Delta R^2 = .01$]. An examination of the predictors indicates that the interaction was not statistically significant ($\beta = .15, p = .577$) and that the Commitment subscale was no longer trending as a unique predictor ($\beta = .07, p = .846$).

Finally, given the significant association between news consumption via social media and the Commitment subscale as well as being marginally associated with HRV, an additional multiple regression was conducted to determine if news consumption via social media might interact with the Commitment subscale to predict HRV. Both the Commitment subscale and the news consumption via social media variables were entered in block one and their interaction was entered in block two. The model from block one was statistically significant, $F(2,51) = 3.86, p = .027, R^2 = .13$. An examination of the predictors indicates that news consumption via social media was a unique and statistically significant predictor ($\beta = -.315, p = .024$) such that greater frequency of consuming news via social media is associated with lower HRV. Furthermore, the Commitment subscale was also uniquely associated with HRV ($\beta = .286, p = .040$) such that as levels of Commitment increase, individuals HRV also increase. The model from the second block inclusive of the interaction was not statistically significant, $F(3,50) = 2.57, p = .064, R^2 = .13$.

Chapter 4: Discussion

Black individuals have been disproportionately targeted by law enforcement across a number of areas, most notably in shooting deaths at the hands of police. Excessive use of force by police against Black individuals has contributed to a general distrust of law enforcement and expectation of negative encounters with police. A rise in citizen journalism has helped document excessive use of force by police on video; however, little is known how individuals respond to viewing this type of traumatic media. Furthermore, a history of race-based stress is likely to contribute to an expectation of racism and may impact how individuals respond to videos of the treatment of unarmed Black men at the hands of police, with some evidence suggesting ethnic identity may moderate this relationship. Additionally, stress has been previously associated with risky health behaviors and engagement in risk-taking more generally; however, little is known about whether the response to race-related stressors is in line with past work and whether this association may be moderated by the ability to tolerate distress. This study sought to contribute to this literature by examining if racial differences exist in the stress response to a video of police fatally wounding an unarmed black man and if this response (1) was predicted by stigma-related stressors (discrimination, anticipatory racism); (2) was associated with risk-taking; and (3) was moderated by ethnic identity and distress tolerance.

Findings from Preliminary Analyses

The results of the descriptive statistics indicate that respondents reported little negative affect prior to the video with, on average, an almost four-point increase following the video indicating a relatively nominal increase in NA. However, an examination of the standard deviation from pre- to post-video indicates that there was greater variability in NA following the video indicating that some respondents were having a more substantive affective response to the

video. Examination of systolic blood pressure prior to and following the video indicates that it remained relatively unchanged (a one-point difference in mean). While nominal, the variability around blood pressure decreased after watching the video points to a potential issue around the video. This seems to suggest that the video may not be as physiologically stimulating as expected and, without a comparison group, it is difficult to determine the unique impact of this type of video when compared to other videos of violence. Additionally, the means and variability of risk-taking are somewhat higher than those found in other studies utilizing the similar task (Jamieson et al., 2013). One reason for this is likely due to a difference in age between the two samples. The sample in the comparative study was older ($M = 24.11$) than those in the current study ($M = 19.8$) with the majority of the current sample (95%) being aged 23 years and younger. This difference is important as risk-taking peaks in young adulthood and decreases as individuals age (Arnett, 2000), which is represented in the difference between the two samples. Levels of distress tolerance in the current study were similar to other samples (Beck, Daughters, & Ali, 2013).

Among Black participants, individuals reported experiencing racial discrimination on average “a few times a year,” which is somewhat higher than levels reported in other college samples of African Americans (Banks & Kohn-Wood, 2007; Bernard, Hoggard, & Neblett, 2018; Sellers & Shelton, 2003). Levels of anticipatory race-related stress are greater than other samples close in age (Maxwell, 2016) as well as other college student samples (Tilghman, 2015). Additionally, participants in the study reported relatively high levels of commitment and exploration as the maximum value of the subscales are reached within 1.5 standard deviations from the mean. These scores are substantially higher than those found in other samples of Black college students (McClain et al., 2016); however, levels of ethnic identity among this population

tend to be higher in Southern regions of the United States when compared to other regions (M. T. Williams, Duque, Wetterneck, Chapman, & DeLapp, 2017).

The results of the bivariate correlations are intriguing. First, among the physiological variables, only HRV and NA via facial EMG were significantly and negatively correlated with each other, while all other associated pairings among the physiological stress measures (i.e., difference in systolic blood pressure, GSR) were not. While HRV, GSR, and blood pressure are all broad measures that assess facets of the autonomic nervous system (ANS), they are considered independent measurements of different branches—the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS). Though the two branches are related, their relationship is considered complex (Berntson, Cacioppo, & Quigley, 1991) and should not be interpreted simply as being reciprocally related (as sympathetic activation increases parasympathetic activity decreases; Mendes, 2009). Therefore, the lack of significant correlations among the physiological measures does not specifically indicate the lack of or an inaccurate measurement of the stress response but may instead represent the complex relationship between the branches of the ANS and their impact on the stress response. That HRV and NA via facial EMG evidence a negative association is generally in line with past work identifying an inverse relationship between NA and HRV (Sloan et al., 2017). Interestingly, there was no significant association of any physiological measure of stress with risk-taking. Though there is literature evidencing an association between stress and risk-taking (Lighthall et al., 2009; Pabst, Schoofs, et al., 2013; Starcke et al., 2008; van den Bos et al., 2009), there is also some counterevidence (Delaney, Fink, & Harmon, 2014; Gathmann et al., 2014; Lempert, Porcelli, Delgado, & Tricomi, 2012) suggesting a more complex and nuanced relationship between these two constructs. This will be expounded upon in the discussion of hypothesis two.

Among Black respondents, experiences of discrimination was positively associated with anticipatory race-related stress. This is in line with prior work (Maxwell, 2016; Utsey et al., 2012) and intuitively makes sense that that individuals with more chronic experiences of discrimination based on their race are also going to anticipate more racism in the future. Interestingly, distress tolerance was negatively associated with anticipatory race-related stress; that is that individuals who are less likely to tolerate stress are also more likely to report greater anticipatory race-related stress. It is likely that individuals who are unable to tolerate distress may also be more likely to anticipate potential stress as a way to mitigate its impact and prepare the individual to be available to respond to the stress if and when it occurs. Conceptually, this follows the underlying belief that individuals with low distress tolerance are unable to endure negative emotional states (Simons & Gaher, 2005) and therefore may be more proactive in identifying future stress as a means to avoid it.

Furthermore, the association between risk-taking and the ethnic identity subscales was trending in significance and in the positive direction. Specifically, this indicates that Black respondents who exhibit more commitment to and engage in greater exploration of their ethnic identity, engage in more risk-taking. It is possible that individuals with a stronger sense of ethnic identity may engage in behaviors that place them in positions which may be considered “risky” or force them to make decisions that place them at risk for harm. For instance, they may be more likely to get involved with a Black Lives Matter protest (Templeton & Eccles, 2011), which may be considered risky given the racially charged political climate—analogous to the protest for civil rights in the 1950s which knowingly made Black individuals targets of police violence.

Additionally, the relationship between risk-taking and experiences of discrimination was trending in significance such that greater experiences of discrimination was negatively associated

with risk-taking. Though trending in significance, this is counter to prior work (Jamieson et al., 2013) evidencing a positive association. It is possible that in this instance, individuals who have experienced greater discrimination may take less risks specifically around police as a result of their history of discrimination. In fact, Black parents say “The Talk,” a nearly fundamental conversation parents have raising their children about interacting with the police, encourages Black individuals to be polite and respectful around police, and not to antagonize them (Bouchard, 2016). “The Talk” is rooted in the Black community and born from past experiences and fear for safety (Bouchard, 2016), suggesting that Black individuals with greater experiences of discrimination are more fearful of potential police violence making adherence to these behaviors a life-and-death matter. Given the size of the beta-weights and the relatively smaller sample size of the subsample, it is possible that there was insufficient power to significantly detect the described associations among the Black subsample. Nevertheless, these sets of associations should be examined and interpreted with caution given the marginal significance of the correlations.

Findings from Primary Analyses

Hypothesis 1. The first hypothesis posited that Black individuals would elicit a more potent physiological (HRV, systolic blood pressure, GSR) and affective response (NA via facial EMG and self-report) to the video compared to White individuals. Findings did not support this hypothesis. In fact, the opposite finding occurred for GSR: there were significant differences in GSR by race with White individuals evidencing greater GSR than Black individuals. However, there were no significant racial differences in HRV or NA via facial EMG. There was a significant pre-post increase across the full sample in self-reported NA, but no pre-post

difference in systolic blood pressure. However, there was no difference by race for either self-reported NA or systolic blood pressure.

Findings revealed differences in GSR by race with White individuals evidencing a greater response than Black individuals. These relationships were counter to what was expected but support prior research on desensitization. Black individuals experience a profound disparity in negative police encounters (e.g., greater number of stops, more likely to be arrested, more likely to be targeted for police use of force; Gelman, Fagan, & Kiss, 2007; Miller et al., 2017; Walker, Spohn, & DeLone, 2007). As previously indicated, police misconduct is not increasing but rather that these incidents are receiving greater news coverage (McLaughlin, 2015), suggesting that these videos are likely to be perceived as “new” or “novel” to White individuals who are likely less aware of and/or have not been exposed to these types of experiences at the same level or with the same frequency as Black individuals. This increased frequency to this type of behavior likely encourages a habituation to the effects brought on by the video. In one study (Krahé et al., 2011), researchers asked a group of undergraduate students to complete measures of habitual media violence and then exposed them to a violent film clip two weeks later. Researchers found that habitual media violence exposure was negatively associated with GSR during violent clips, that is that individuals who were more frequently exposed to media violence were habituated to violence and evidenced less arousal at the violent clip. Similar results of habituation have extended to videos of real-life violence (Carnagey, Anderson, & Bushman, 2007) and among African-American adolescents (Cooley-Quille & Lorion, 1999). Collectively this lends support to the idea that Black individuals are likely habituating to these types of videos in part to their increased exposure to police violence, when compared to White individuals.

Additional findings failed to identify any racial differences in HRV, systolic blood pressure, or NA via facial EMG and self-report. These results are best understood in the context of a similar study that examined physiological and affective reactivity to a police brutality or control condition among Black and White college students (Kort, 2016). In this study, researchers identified a significant difference by race in systolic blood pressure and a marginally significant difference by race in heart rate reactivity. Additionally, self-reported NA increased following a police brutality condition but these differences did not vary by race, which is in line with the results of the current study. The increase in self-reported NA serves as an important manipulation check and acknowledges that this type of media can be emotionally distressing for anyone who views it.

Despite the considerable conceptual overlap between the two studies, it is worth noting some important methodological differences that bear upon the current study findings. In the previous study, participants were asked to read and give a speech about the set of slides they had just viewed on cases of police brutality (e.g., Michael Brown, Walter Scott) or a car accident harming an African American individual analogous to the TSST. However, data were analyzed via reactivity scores including data from the first minute of the speech task when participants are most reactive. This makes a comparison between both studies challenging and in the case of the prior study, an exaggeration of what may have occurred if the data were localized only to the slides around violence. According to Mendes (2009), examination of ANS responses, like those in the current study, should consider the extent to which an individual engaged in an active versus a passive task. Active tasks are those that require some form of response from participants, as opposed to passive tasks, in which participants simply experience some sort of event without having to respond in some instrumental way. In the previous study, participants

were asked to actively engage with the material around police brutality while in the current study, participants were more passively engaged. This significant difference may therefore account for the difference in results.

Furthermore, the distinction between active and passive tasks is especially important as many ANS patterns are thought to index psychological states that stem from active situations and not passive ones (Mendes, 2009). For instance, challenge and threat are thought to occur only in active situations and not passive ones (Mendes, 2009). This is likely to explain the lack of support for the current hypothesis and also lends support for the lack of significant bivariate correlations among the psychophysiological variables. Specifically, as the video was a passive task, it was not likely to elicit a physiological reaction that resembled a stress profile (HRV, GSR, blood pressure). Collectively this suggests that the video in isolation may not be enough to elicit a collective stress response and that more active engagement with the video content may be more likely to elicit the hypothesized physiological response.

Hypothesis 2 and 3. The second hypothesis posited that the stress response would predict risk-taking such that a greater stress response would predict greater risk-taking. In the third hypothesis, it was postulated that distress tolerance would moderate the relationship between the stress response and risk-taking. The findings did not support either hypothesis. None of the measures of the stress response, either in combination (HRV and NA via facial EMG) or in isolation (difference in systolic blood pressure, GSR) predicted risk-taking. Furthermore, distress tolerance did not significantly interact with any measure of stress in the prediction of risk-taking.

The current study findings fail to support much of the literature around the association between stress and risk-taking (Starcke & Brand, 2012). However, to investigate the effects of

stress on risk-taking, it is especially important to ensure that the stress induction was successful (Starcke & Brand, 2012). With this in mind, much of the research on the topic has utilized laboratory stressors that contain either a physical challenge (e.g., cold pressor task), a cognitive demand (e.g., mental arithmetic) and/or a social evaluative threat (e.g., anticipation of and/or actual performance of a public speech; Starcke & Brand, 2012). As an extension of the discussion of hypothesis one, all of these tasks are active and therefore most likely to elicit the profile of a “true” stress response when compared to passive tasks like the one used in the current study. As such, the failure to identify a significant association for any of the physiological measures of stress to risk-taking is likely due to the lack of a true stress response.

Additionally, the literature has also identified important differences in risk-taking by gender. Prior work has indicated that men engage in greater risk-taking when compared to women under stressed (Lighthall et al., 2009) and non-stressed conditions (Byrnes, Miller, & Schafer, 1999). It is important to take into the account the profound imbalance in gender in the current study (78% women, 20% men) suggesting that the lack of significant findings may also be the result of the limited number of men—those who show the most robust association between stress and risk-taking. While inclusion of gender as potential moderator would be ideal, the small sample of men in the study would not produce reliable results worthy of interpretation. Additionally, the relationship between stress and risk-taking may operate differently among men and women. In one study (van den Bos et al., 2009), researchers found a linear relationship between stress (as measured by cortisol) and risk-taking among men, while an inverted U-shaped relationship was found among women. This can further obscure a comprehensive understanding of the relationship between the stress reaction to the video and its association to risk-taking.

With respect to distress tolerance, the lack of any significant bivariate association between it and any measure of the stress response makes the lack of moderation by distress tolerance unsurprising. Despite past research that has demonstrated that individuals with low distress tolerance are more likely to maladaptively respond to certain situations that elicit stress (Leyro et al., 2010) and that they exhibit greater risk-taking propensity (Macpherson et al., 2010), this study did not find distress tolerance to be an influential factor on the relationship between the stress response and risk-taking. One explanation for the lack of findings may be due to a conceptual discrepancy within the distress tolerance literature. Specifically, “distress tolerance” has been referred to as (a) the *perceived* capacity to withstand negative emotional/or other aversive states (e.g., physical discomfort), primarily captured via self-report, and (b) the *behavioral act* of withstanding distressing internal states brought forth by some type of stressor, primarily captured via behavioral measurement (Leyro et al., 2010). Although self-report measures of distress tolerance are typically associated with one another and behavioral measures of distress tolerance are typically associated with one another, self-report and behavioral measures generally do not demonstrate significant relationships with one another (McHugh et al., 2011), making comparisons of findings across studies challenging. Therefore, it is possible that the lack of significant findings in the current study may be due to this conceptual discrepancy, particularly as stress was measured physiologically and distress tolerance was captured via self-report. Furthermore, much of the prior work linking distress tolerance and risk-taking has primarily been captured via self-report (Beck et al., 2014, 2013; Howell et al., 2010) and less so on risk-taking as defined by a behavioral task, as in the current study.

Hypothesis 4. The fourth hypothesis posited that experiences of discrimination and greater anticipatory race-related stress would be associated with a more robust physiological and

affective response in Black participants. However, the findings do not support this hypothesis. Results showed that discrimination and anticipatory race-related stress did not collectively predict any physiological or affective measure in response to the video of police violence. Though limited, prior research on vicarious discrimination and vicarious racism has found changes in blood pressure in response to films depicting racist situations (Armstead et al., 1989) and greater NA among individuals in a blatantly racist (BRC) versus non-racist condition (NRC; Bennett, Merritt, Edwards, & Sollers III, 2004). One possible explanation for the null results may be that not all individuals are perceiving the video as racist in nature which could impact the response to the video. Recall that an individual will experience stress if the event is appraised as harmful or threatening, which may result in an individual having negative cognitive, emotional, behavioral, and/or physiological reactions. In fact, self-reported past experiences with racial discrimination moderated the association between perceived racism and NA among those in a NRC (Bennett et al., 2004). Additionally, Black individuals who perceived greater racism in a NRC evidenced greater anger and diastolic blood pressure than those in the BRC (Merritt et al., 2006). This suggests that not all individuals are appraising the video as racist, thereby not eliciting a physiological reaction in line with the stress response. Unfortunately, there was no manipulation check that asked participants whether they perceived racism in the video, which could lend support to this as a viable explanation.

By extension, the extent to which Black respondents have had negative interactions with law enforcement was not assessed. It is possible that Black individuals may have a history of discrimination and may anticipate racism but not in the context of law enforcement. For instance, the majority of Black citizens indicate having a great deal or a fair amount of confidence of the police officers in their community doing a good job of enforcing the law (US Department of

Justice, 2015). Additionally, studies show that prior direct experiences with law enforcement have a significant influence on opinions of the police (Mazerolle et al., 2013), which may contribute to how Black individuals are likely to perceive future police contact or law enforcement behavior.

Gender is also likely to play an important factor within this context. For instance, both Black men and women describe police harassment as being particularly aimed at Black men (Dottolo & Stewart, 2008), and frequent negative police exposure results in trauma for many Black individuals, especially for Black men (Aymer, 2016). In one study of police encounters and mental health among primarily racial/ethnic minority young men aged 18 to 26 years (Geller, Fagan, Tyler, & Link, 2014), researchers identified that individuals reported higher levels of anxiety and post-traumatic stress disorder symptoms if they reported more police contact, particularly if that contact was more intrusive (e.g., used harsh or racially tinged language, or threatened or used physical force). In a separate study, experiences of discrimination was associated with an increased stress response among men and not women (Busse, Yim, & Campos, 2017). Given that the video in the current study represents the majority of videos depicting the shooting of unarmed Black men at the hands of law enforcement, it is possible that gender might interact with the stigma-related stressors in the prediction of this response, especially if men are likely to report negative racial experiences by law enforcement. With the small sample size, the small number of Black men, as well as the small effect sizes demonstrated in the study, an examination of these analyses by gender would be inappropriate. Future work should aim to disentangle the impact of gender and a history and tenor of police contact on the impact of stigma-related stressors and physiological response.

Hypothesis 5. The fifth hypothesis posited that ethnic identity would exacerbate the association between stigma-related stressors and the physiological and affective response to the video in Black participants. The findings do not demonstrate support for this hypothesis. The results showed that exploration (seeking information and experiences relevant to one's ethnicity) did not moderate the association between the stigma-related stressors and any of the physiological or affective responses. One reason for the null findings may be due to the context in which this study is situated. The increased frequency of these videos in the news and on social media has likely sparked conversations about these events, what they mean, and how they relate to an individual's Black identity. That is, irrespective of an individual's personal history of discrimination and anticipation of race-related stress, many Black individuals are likely to engage in exploration around their Black identity, particularly given the rise of the Black Lives Matter movement and the current political context (e.g., the Unite the Right Rally and counter-protest in Charlottesville, Virginia). This likely also explains the relatively high levels of exploration in the current sample.

Furthermore, exploration is an ongoing process that continues over time (Phinney, 2006), tends to increase during important developmental markers, such as school transitions (Syed & Azmitia, 2009), and is based on personal experiences (Phinney & Ong, 2007). When this is considered in light of increased discussion around the importance of Black lives in our society, as well as the historical significance of VCU being situated in Richmond, VA (e.g., capitol of the confederacy) and the university's diverse student body, it may be that these particular individuals may still be in the process of developing their sense of self and the meaning behind their new experiences. In fact, exploration tends to occur as individuals encounter ethnically-charged situations and attempt to make sense of the meaning of their ethnicity within the larger setting

(Phinney, 2006). While it is unlikely that exploration will take place without some sense of belonging to their ethnic group, it is developmentally normal for individuals to vacillate in their sense of commitment to their group and engage in greater exploration (Syed, Azmitia, & Phinney, 2007).

When commitment (a sense of belonging and a personal investment in a group) was examined, the results collectively did not demonstrate that it moderated the association described above. However, the results from a model that examined commitment as a moderator of stigma-related stressors predicting HRV indicated it was trending in significance. For exploratory purposes, the predictors were examined and indicated that commitment interacted with discrimination to predict HRV. The interaction demonstrated that individuals experienced less of a stress response (as indexed by HRV) as experiences of discrimination increased among individuals with low levels of commitment; however, individuals demonstrated a robust stress response at greater reported experiences of discrimination among individuals with high levels of commitment.

These particular results, though marginal in nature, appear to suggest that individuals with a strong ethnic identity are more vulnerable to experiences of racial and ethnic discrimination (Burrow & Ong, 2010; McCoy & Major, 2003; Operario & Fiske, 2001). While there is prior work indicating that individuals with a strong group identity perceive more discriminatory events (Branscombe et al., 1999) and that there is a positive association between discrimination and heart rate reactivity (i.e., greater stress response; Richman, Bennett, Pek, Siegler, & Williams, 2007), it could be presumed that Black individuals are perceiving the video content as racist, which in turn impacts their physiological response to the video. However, the results of the exploratory analyses suggest that frequency of news consumption via social media

might also play an important role. For instance, greater news consumption via social media was positively associated with levels of commitment and negatively associated with HRV.

Additionally, when frequency of news consumption via social media was included in a model with commitment predicting HRV, greater news consumption via social media predicted lower HRV (greater stress response) while commitment predicted greater HRV (lower stress response). While the interaction of news consumption via social media and levels of commitment was not significant, this does suggest that levels of commitment may be more likely to protect against the effects of the video when accounting for news consumption via social media.

That individuals with lower levels of commitment evidenced a lower stress response at higher levels of discrimination is interesting. As individuals with less commitment also consume the news less via social media, individuals who experience less discrimination may be more impacted by these types of videos in part because acts of discrimination are more novel to them. As a result of this novelty, these videos may produce a more pronounced stress response than individuals with more discrimination who may be more habituated to experiences of discrimination (Gaylord-Harden, Dickson, & Pierre, 2016). It is possible that a three-way interaction (discrimination, news via social media, levels of commitment) may be occurring and future research efforts should aim to disentangle these relationships.

It is important to note that levels of commitment did not moderate the association between the stigma-related stressors and most measures of the stress response. The potential impact of additional factors, such as news consumption via social media, as well as the potential for individuals to both habituate to these videos as well as to experiences of discrimination and violence suggests a more complex system linking stigma-related stressors to the physiological response to these videos. Given the frequency of these events (e.g., the shooting of Stephen

Clark, an unarmed black man shot by police in his backyard on March, 18, 2017), future work is essential to understand the potential long-term impact of these videos.

Hypothesis 6 and 7. No support was rendered for the sixth and seventh hypotheses that posited that risk-taking would be directly predicted by stigma-related stressors and indirectly through the stress response. Although experiences of discrimination were marginally negatively associated with risk-taking (and at a medium effect) in bivariate correlations, anticipatory race-related stress was not at all associated and together did not predict risk-taking. Additionally, none of the physiological measures served as mediators the relationship between risk-taking and either discrimination or anticipatory race-related stress. Despite prior work evidencing an association between risk-taking and discrimination (Jamieson et al., 2013) as well as general anticipatory stress (Starcke et al., 2008), the current study did not directly or indirectly predict risk-taking from past experiences of discrimination and anticipatory race-related stress.

There are a number of reasons that have already been expounded upon above that likely contribute to the lack of significant findings in the current study (e.g., whether the video was perceived as racist, gender differences in the stress response and risk-taking). To the author's knowledge, only one study (Jamieson et al., 2013) has overtly examined the association between racial discrimination and risk-taking thereby making comparisons challenging, particularly given the methodological differences that likely bear upon the differences in results (e.g., experimentally manipulated versus self-reported experiences of discrimination). It is also important to consider that the current study focused on vicarious rather than personal experiences of discrimination. While both personal and vicarious experiences of discrimination have been found to be stressful (T. T. Lewis et al., 2015; Utsey et al., 2012), previous stress research has primarily examined the physiological effects for personal rather than vicarious forms of

discrimination. It is possible that the physiological response between these two forms of discrimination may not be directly comparable to the extent that they impact risk-taking; however, future work should be conducted to more directly test this.

Exploratory Analyses

Difference in self-reported negative affect. A number of exploratory analyses were conducted to help contextualize the null findings in the current study. The increased variability in self-reported NA following the video as well as the significant difference in self-reported NA from pre- to post-video, suggests that some individuals' emotional response may be greater than others. Additionally, a self-reported measure of NA likely encourages individuals to interpret their emotional response to the video in a way that may be different than their immediate physiological response. This introspection may be especially important given that an individual's perception of the video can have different social and health implications. The difference in self-reported NA was not associated with any physiological variable, distress tolerance, or risk-taking among the entire sample. There was also no difference by race in the difference in self-reported NA. These results are in line with the results of the primary hypotheses and will therefore not be expounded upon here.

The results of the correlation matrix among the Black participant subsample identified a significant positive association between the difference in self-reported NA and commitment while the positive association with exploration was marginally significant. These results are in the same direction but stronger than the correlations between the subscales of ethnic identity and NA via facial EMG. In general, these associations indicate that as levels of exploration and commitment increase, the more negative affect in response to the video individuals are reporting and point to a strong ethnic identity as a potential risk factor for distress when exposed to race-

related media. When these subscales were examined as potential moderators of stigma-related stressors in predicting the difference in self-reported NA among the Black participant subsample, commitment emerged as a unique positive predictor of the difference in self-reported NA. These results are in line with prior work (McCoy & Major, 2003) indicating that individuals who more strongly identify with their ethnic identity report greater negative affect than those with weaker ethnic identities.

That neither experiences of discrimination nor the anticipation of race-related stress were associated with the difference in negative affect in bivariate correlations or in any of the models is interesting, particularly given the wealth of research in this area (Brondolo, Brady, et al., 2008; Broudy et al., 2007; Swim et al., 2003). One explanation for this may be that participants may not have felt that they had enough information from the brief video to provide a global evaluation that the police were acting with bad intentions. There is much debate in the current discourse whether the law enforcement officials seen in these videos should be viewed as individuals or whether they represent the broader police “system” (see the comments section for most news stories about police shooting of unarmed black men [e.g., St. John, Ulloa, & Change, 2018]). Therefore, participants’ self-reported NA may be interpreted as a response to harm towards someone from their in-group and not specifically attributed to experiences of discrimination. Similar results around the isolated impact of perceived discrimination have been reported in other studies (Operario & Fiske, 2001). That exploration was not significantly associated with NA is generally in line the null results from the primary results and will not be expounded upon here.

News consumption online and social media. Prior work has demonstrated the potential adverse impact that consuming the news may have on the health of individuals such as

physiological hyperarousal and poor mental health (Bodas, Siman-Tov, Peleg, & Solomon, 2015), especially if they are exposed to graphic content (Busso et al., 2014; Feinstein et al., 2014; Holman et al., 2014). These associations motivated the exploratory analyses to help illuminate how news consumption through these different mediums might impact our understanding of the primary analyses.

The exploratory analyses identified that the majority of respondents get their news online either daily or weekly but get their news from social media more frequently (daily or multiple times per day). In fact, social media has become a primary form of media communication among young adults today (Fuch, 2017). It is therefore unsurprising that respondents report consuming their news via social media more frequently than through other online formats. That frequency of news consumption online was positively associated with news consumption via social media is in line with prior reports that individuals are likely to consume get their news from more than one platform (Project, 2010). Additionally, greater news consumption online was associated with a stronger NA reaction to the video. User generated content, similar to that in the current study, is regularly sought after for news programs and often depicts graphic content and extreme violence (Feinstein et al., 2014). Therefore, individuals who are more frequently exposed to this content would exhibit a stronger emotional response to similar violent content, which has been demonstrated in prior work (Feinstein et al., 2014). This rationale also supports the finding that individuals who consume the news multiple times a day exhibit a significant more robust NA reaction to the video compared to the group of individuals who consume the news less than once a month.

Among the Black participant subsample, frequency of news consumption online was associated with more frequent news consumption via social media, a larger difference in self-

reported NA, stronger commitment and exploration, and more experiences of discrimination. Additionally, more frequent news consumption via social media was associated with stronger commitment and was marginally negatively associated with HRV (more stress). Collectively, these results indicate that individuals with stronger ethnic identities consume the news through online and social media platforms more frequently. While relatively little work has specifically examined news consumption and ethnic identity, there is some work showcasing social media sites as a primary source for news, that there is considerable overlap between those who consume the news on social media and through other online sites (Pew Research Center, 2017), and that ethnic minorities regularly use social media sites as a way to connect with similar others (Spies Shapiro & Margolin, 2014). In fact, Black social media users say that most or some of the posts they see on social media are about race and that they regularly have conversations about race based on what they see on their social media sites (Pew Research Center, 2016b). A bidirectional relationship may exist between news consumption and ethnic identity such that individuals may initially seek out to explore and connect with others who share their experiences and through this process are exposed to various news stories about themselves and other events. In turn, individuals who consume the news more frequently may see themselves reflected in the events and wish to explore and connect with others as a way to validate and affirm their experiences, which may explain why individuals report more discrimination as news consumption increases.

A set of multiple regressions was run to try to disentangle the effects of ethnic identity and online news consumption on the difference in self-reported NA. Results indicated that collectively exploration and news consumption online predict the difference in self-reported NA; however, none were identified as independent predictors and there was no significant interaction. This result supports the idea that individuals who engage in greater exploration of the ethnic

identity are likely to do so online and through consumption of current events (Huang, 2009). That these two constructs are intimately associated is important for our understanding of the positive and negative effects of online news consumption and distress. Similarly, commitment and news consumption jointly predict the difference in self-reported NA, with levels of commitment trending as a unique predictor while news consumption was not. Though trending in significance, individuals with greater levels of commitment may be more emotionally responsive to these videos despite greater exposure to news. Though these individuals are likely exposed to more graphic content through the news, their emotional response to these types of videos does not diminish over time and may persist for lengthy periods of time (Mendoza, 2016). This is important to consider when using these videos as a way of sharing vital information to a large audience.

Collectively, the exploratory analyses provide greater nuance in our understanding of the primary analyses: a stronger ethnic identity and increased frequency of news consumption through various means play a significant role in an individuals' response to videos of police brutality.

Implications

While the findings from this study are preliminary in nature, they do provide insight into the physiological and affective stress response to these videos among Black and White individuals and highlight the importance of ethnic identity and news consumption for how Black individuals affectively respond to videos of police violence. Prior work examining police violence against Black individuals has shown it to be particularly stressful when compared to other forms of harm (Kort, 2016) and this study has contributed to the literature by demonstrating that Black respondents are desensitized to the effects of the videos when

compared to White respondents. That Black individuals have habituated to these types of violent media has important health implications. For instance, individuals who have habituated to violent media have reported decreased prosocial behavior (Mrug, Madan, & Windle, 2016) and greater aggressive thoughts and behavior (Bushman & Huesmann, 2006). Repeated exposure to violent media has also been linked to symptoms of PTSD (Holman et al., 2014), depression, and anxiety, as well as greater somatic complaints and alcohol consumption (Feinstein et al., 2014).

One way to mitigate the impact is a reduction in the consumption of this type of violent media. In fact, the impact of violent media has been found to short lived among adults (Bushman & Huesmann, 2006) suggesting that individuals who are able to refrain from consuming this type of media may be able to improve their mental and emotional health over time. Among children and adolescents, interventions aimed to reduce violent media found a reduction in aggression and aggressive behavior (Möller, Krahe, Busching, & Krause, 2012) and were less likely to relate to violent content (Rosenkoetter, Rosenkoetter, & Acock, 2009). There has been some anecdotal evidence in the public sphere that taking a break from this type of media can improve mental health (Downs, 2016; Pajak, 2016) though scientific evidence is scarce. Future work in this area could more directly indicate the impact that reducing violent media may have on mental health among adults.

That greater news consumption online and social media also significantly impacts negative affect and the stress response also has health implications. There is growing evidence demonstrating that exposure to the news may be adversely impacting mental health (Gregoire, 2015; Hovitz, 2018) and that it is a significant source of stress for the majority of Americans (American Psychological Association, 2017). There is also evidence that negative television news significantly alters mood, specifically sadness and anxiety (Johnston & Davey, 1997), and

this can be exaggerated given that current news is increasingly more visual and shocking, in part due to the inclusion of smartphone videos. With the many negative consequences of stress such as increased risk for cardiovascular disease, atopic disorders, and a greater disease progression in some chronic illnesses including HIV and cancer (Harrington, 2012; Schneiderman et al., 2005), reducing news consumption may be especially helpful for mitigating its impact on health. This can be especially helpful for those who primarily get their news from social media. Among teens who took a voluntary break from social media, many reported overall feeling positive during their time away (The Associated Press-NORC Center for Public Affairs Research, 2016). This data also reinforces prior efforts to prevent these videos and graphic content from automatically playing or showing the violence when they come across an individual's computer or social media device. Facebook has already changed their sharing policies to include more content warnings on graphic content (C. Lewis, 2016) and other media platforms like Twitter have similar "sensitive content" warnings which asks its users to "opt in" to viewing the content, rather than "opting out." This can have substantive health impacts on individuals most vulnerable to its impact.

Though reducing news consumption via social media may important, it may be especially helpful for Black individuals. For instance, they are more likely to get their news from various social media platforms like YouTube and Instagram and are more likely to engage with news stories by commenting or starting a discussion on the topic (American Press Institute, 2015). As it has been previously indicated, many Black individuals say that most of the posts they see are race-related and that many use social media to connect with others. Additionally, more active engagement with these types of media may be more likely to uniformly elicit a stress response (Mendes, 2009). As disconnecting from social media entirely may have negative consequences like feelings of isolation and fears of missing out on important information (The Associated

Press-NORC Center for Public Affairs Research, 2016), one way to mitigate these impacts is to refrain from sharing graphic videos and violent news. Some in the community have described that videos of police violence “are shared thousands of times, to the point that they’re hard to avoid” (Reign, 2016); therefore refraining from promoting the video may allay the negative consequences associated with the video but retain the potential benefits of social media.

Lastly, that a stronger ethnic identity can be both beneficial and place Black individuals at risk for increased stress is also important for their health. The negative effects of discrimination and race-related stress on health are innumerable and can have long-lasting impacts on health (Brondolo, Hausmann, et al., 2011; Paradies et al., 2015; Pascoe & Richman, 2009). The results of the current study suggest that Black individuals with a strong sense of belonging to their racial group exhibit a strong cardiovascular response to these videos when they have experienced more discrimination and, based on prior work, may be at greater risk for developing stress-related diseases such as hypertension, cardiovascular disease, and stroke (Brondolo et al., 2009; Brondolo, Love, et al., 2011; D. R. Williams & Mohammed, 2009). Additionally, a stronger ethnic identity predicts a greater emotional response to these videos, potentially due to a greater sense of empathy towards the individual in the video (Xu, Zuo, Wang, & Han, 2009). Paradoxically, stronger ethnic identity may also protect them against the negative impact of these videos, when accounting for news consumption on social media. Together this depicts a complex system that both protects and places individuals with a strong racial identity at risk for poor health. It would therefore behoove clinicians who work with Black clients with strong racial identities to identify the ways in which they connect with their racial identity, particularly if this includes strong social media use, and the ways in which they engage with race-related content. Helping them limit their interaction in stressful racial content may help

offset the negative health impact and allow them to benefit from the sense of community that having a strong ethnic identity yields.

Limitations and Future Research

The present study has some limitations that should be considered in the interpretation of the findings. Though initial power analyses indicated an ability to detect medium sized effects, some of the effects in the study were smaller than expected and would have necessitated a larger sample size to detect any significant effects. Thus, the smaller sample size may have contributed to reduced power and may have contributed to potential type 2 error. Additionally, the lack of a comparison group makes it difficult to accurately indicate the impact of these videos when compared to other forms of violence. For instance, we were unable to indicate how the response to this video compares to a print news story of racism, or other videos depicting distress and violence. While prior research suggests there may be a difference (Kort, 2016), we are unable to determine what is particularly unique about this video and the extent to which individuals were responding to the racial content of the video. Future research could benefit from a larger sample size and inclusion of comparison groups (e.g., neutral video, video depicting a different but non-racialized type of violence) to more appropriately identify the extent to which individuals are responding to the racial content or general police violence. Additionally, the current political discourse has at times called into question the validity of news stories. As such, it is possible that the video may have been perceived as inauthentic by the study participants. Future work should make certain to indicate the authenticity of their news stories to their participants.

Additionally, the current study did not assess for specific emotions by race as a function of the video. It is possible that White and Black participants may be experiencing different emotions under the broader negative affect domain, which may yield a more nuanced

interpretation of the impact of the video. For instance, Black participants may be more likely to experience emotions like anger and fear (Brooms & Perry, 2016) while White individuals may experience guilt and shame. This differential response can have a substantive impact on the stress response and its downstream effects on health. An examination of specific emotions to these videos by race could provide a more comprehensive understanding of how individuals respond to police violence and is suggested as a point for future work. By extension, we did not specifically examine whether Black participants were first-generation in this country. Black individuals who were socialized in other parts of the country may perceive the video differently than those socialized in the US. The historical significance of violence by law enforcement may be interpreted differently by individuals who have ties to this country, which can impact their physiological and affective response to the video. Future studies should aim to disentangle this important difference in additional work.

The demographics of the sample may have also had a significant impact. As it has already been expounded upon previously, the current sample was primarily composed of women which likely impacted the stress response to the video as well as the risk-taking task. Women are less likely to be targeted by police and are less likely to engage in risk-taking when compared to men. This may have obfuscated the ability to determine the stress response by those most affected by the videos and its relationship to risk-taking. Furthermore, the sample was relatively young and primarily composed of psychology students. While this population may have less cumulative personal experience with law enforcement than older samples, which may impact their response to these videos, they are also more likely to use social media compared to other age groups (Pew Research Center, 2017) and may be most susceptible to its impact. That the sample was entirely composed of psychology students limits the ability to generalize to the larger

community. This is especially important as less educated Americans are increasingly using social media to consume their news. Future research could benefit from having a more diverse sample (more men, greater variability in age, individuals from the community) who are more representative of the general population and improve the generalizability of the results.

The current study also did not assess for Afrocentric values as a component of ethnic identity or contact with law enforcement. While the ethnic identity measure utilized in the study is a measure that has been validated on multiple different ethnic groups (Phinney & Ong, 2007); the unique nature of the video and the race-specific implications of it, a measure that taps into more Afrocentric values may provide more nuance to the questions at hand. For instance, Phinney (1992) indicates that it is helpful to consider both the universal factors and culture-specific factors in understanding ethnic identity. Utilizing a measure that examines these culture-specific factors such as Afrocentric values would be helpful for more accurately capturing ethnic identity as it relates to Black individuals (Cokley, 2005). Also, history of contact with law enforcement has been shown to impact perceptions of current and future contact with police (Rosenbaum et al., 2005) and would assuredly impact how an individual perceives and responds to video such as the one used in the current study. Future work should aim to incorporate these measures to more accurately parse out the effects of the video.

Additionally, the self-report measures assessing race-related stress and ethnic identity followed the presentation of the video, which may have inadvertently primed participants to respond in a particular way. It is possible that the video may have impacted how much Black individuals were likely to anticipate race-related stress to occur in the future; though it should be noted that the levels of anticipatory race-related stress were comparable with those found in other samples (Maxwell, 2016). Also, the timing of the self-report measures may have also altered

how strongly Black individuals identify with their racial/ethnic group. It is possible that being exposed to the video may have either strengthened or even diminished an individual's ethnic identity as a way to protect against the harmful effects of the video, especially if they perceived the video as being an example of discrimination (Tajfel & Turner, 1986; Turner et al., 1987). Future work could aim to reduce these demand characteristics by offering a survey that assesses for these constructs on a separate day before individuals arrive to their experimental session.

Finally, the task used in the current study (Columbia Card Task) did not utilize monetary gain to incentivize participants, which may have affected their performance. Previous research has provided financial compensation on similar risk-taking tasks (Lejuez et al., 2002), though it is unclear whether decision making would be impacted by this compensation as little work has been done in this area; however, the current literature has identified this as an important area for future research (Buelow & Blaine, 2015).

Conclusion

The current study sought to answer a number of important questions: Are there racial differences in the way that Black and White individuals respond to police violence? Can this be predicted by a history of stigma-related stress among Black respondents? Is risk-taking predicted by stigma-related stressors and separately by an individual's stress response? Do ethnic identity and distress tolerance serve as moderators of these differential relationships? This study found some support for Black individuals having a blunted stress response to the video compared to White respondents and points to a desensitized response to the videos among Black respondents. Ethnic identity also emerged as being particularly important among Black respondents. Black individuals who reported stronger commitment showed a heightened cardiovascular response to the videos at greater experiences of discrimination when compared to individuals with less

commitment. In exploratory analyses, greater news consumption was found to predict a stronger affective and physiological response to the videos, and a stronger ethnic identity predicted a stronger affective but lower physiological response to the videos after accounting for frequency of news consumption. The current findings suggest that limiting exposure to these videos may prevent stress and its health-harming effects, particularly among Black individuals with a strong ethnic identity.

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Appendix A

Daily Life Events Scale

Directions: These questions ask you to think about experiences that some people have as they go about their daily lives. Using the 6-point scale, please determine how often you have each experience.

How often have you...

1. Been ignored, overlooked, or not given service (in a restaurant, store, etc.)?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

2. Been treated rudely or disrespectfully?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

3. Been accused of something or treated suspiciously?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

4. Had others react to you as if they were afraid or intimidated?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

5. Been observed or followed while in public places?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

6. Been treated as if you were “stupid” or been “talked down to?”

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

7. Had your ideas or opinions minimized, ignored, or devalued?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

8. Overheard or been told an offensive joke or comment?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

9. Been insulted, called a name, or harassed?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

10. Had other expect your work to be inferior?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

11. Not been taken seriously?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

12. Been left out of conversations or activities?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

13. Been treated in an “overly” friendly or superficial way?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

14. Been avoided, others moving away from you physically?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

15. Been mistaken for someone who serves others (i.e., janitor, bellboy, maid)?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

16. Been stared at by strangers?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

17. Been laughed at, made fun of, or taunted?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

18. Been mistaken for someone else of your same race (who may not look like you at all).

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

19. Been asked to speak for or represent your entire racial/ethnic group (e.g., “What do _____ people think?”)

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

20. Been considered fascinating or exotic by others?

Never	Less than once a year	A few times a year	About once a month	A few times a month	Once a week
0	1	2	3	4	5

Appendix B

Prolonged Activation and Anticipatory Race-Related Stress Scale

Instructions

Please describe an event/situation involving racism that you or someone close to you (like a family member or close friend experienced in the past. Some examples of racism include being treated unfairly because of your race; being ridiculed, humiliated, or harassed of your race; being denied a job, housing, or access to other services because of your race; or observing a situation in which another person of your race was harassed or mistreated because of their race. These are just a few examples of how you or someone close to you might experience racism. It would be impossible to list all of the ways in which a person can experience racism, so you must decide if an event/situation happened to you because of your race. When describing your experience with racism, please provide as much detail as possible.

1. On a scale from 1 to 7 (1 = not at all stressful and 7 = extremely Stressful), I would describe my experience with racism as...
2. In the days/weeks after my experience with racism, I thought about it
3. Whenever I thought about my experience with racism, I would think about it for
4. In the days/weeks after my experience with racism, I continued to think about it for
5. I would think about my experience with racism even when I didn't mean to
6. Black people have always had to deal with these kinds of events/situations, so my experience with racism was something I could manage
7. At the time the event/situation occurred, I felt prepared to deal with it
8. At the time the event/situation occurred, I was able to think of ways to deal with it.
9. I felt I had what I needed to deal with the event/situation
10. When I am around White people, I expect them to say or do something racist
11. I believe that most Black people will experience some form of racism in the future
12. I know that if I go where there are mostly White people, there is a good chance I will experience racism
13. I believe there is a good chance that I will experience racism in the future
14. I can feel my hands start to shake whenever I think I am about to experience racism
15. I get chest pains whenever I think I am about to experience racism
16. My hands (or other body parts) sweat whenever I think I am about to experience racism
17. I get a lump (or dryness) in my throat whenever I think I am about to experience racism

Note: The response scale for Item 2 is as follows: not at all, once weekly, 2 to 3 times a week, 3 or more times a week, once a day, 2 to 3 times a day, and more than 3 times a day. The response scale for Item 3 is as follows: did not think about it, less than 1 minute, 1 to 5 minutes, 5 to 20 minutes, 20 minutes or more, but less than 1 hour, and could not stop thinking about it. The response scale for Item 4 is as follows: did not think about it at all, less than 7 days, 7 to 30 days, 1 to 2 months, 2 to 5 months, 6 to 9 months, and I still think about it. Item 5 is scaled as follows: never, rarely, sometimes, often, very often, and all the time. Items 6 to 17 are on a 7-point Likert-type scale ranging from strongly disagree to strongly agree.

Appendix C

PANAS				
<p>This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you are currently feeling the indicated feelings and emotions. Use the following scale to record your answers.</p>				
Very slightly or not at all	a little	moderately	quite a bit	extremely
1	2	3	4	5
Interested _____		Irritable _____		
Distressed _____		Alert _____		
Excited _____		Ashamed _____		
Upset _____		Inspired _____		
Strong _____		Nervous _____		
Guilty _____		Determined _____		
Scared _____		Attentive _____		
Hostile _____		Jittery _____		
Enthusiastic _____		Active _____		
Proud _____		Afraid _____		

Appendix D

Distress Tolerance Scale

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1. Strongly agree
2. Mildly agree
3. Agree and disagree equally
4. Mildly disagree
5. Strongly disagree

1. Feeling distressed or upset is unbearable to me.
2. When I feel distressed or upset, all I can think about is how bad I feel.
3. I can't handle feeling distressed or upset.
4. My feelings of distress are so intense that they completely take over.
5. There's nothing worse than feeling distressed or upset.
6. I can tolerate being distressed or upset as well as most people.
7. My feelings of distress or being upset are not acceptable.
8. I'll do anything to avoid feeling distressed or upset.
9. Other people seem to be able to tolerate feeling distressed or upset better than I can.
10. Being distressed or upset is always a major ordeal for me.
11. I am ashamed of myself when I feel distressed or upset.
12. My feelings of distress or being upset scare me.
13. I'll do anything to stop feeling distressed or upset.
14. When I feel distressed or upset, I must do something about it immediately.
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.

Appendix E

The Multigroup Ethnic Identity Measure

In this country, people come from many different countries and cultures, and there are many different words to describe the different back-grounds or ethnic groups that people come from. Some examples of the names of ethnic groups are Hispanic or Latino, Black or African American, Asian American, Chinese, Filipino, American Indian, Mexican American, Caucasian or White, Italian American, and many others. These questions are about your ethnicity or your ethnic group and how you feel about it or react to it.

Please fill in: In terms of ethnic group, I consider myself to be _____

Use the numbers below to indicate how much you agree or disagree with each statement.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

1. I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

2. I have a strong sense of belonging to my own ethnic group.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

3. I understand pretty well what my ethnic group membership means to me.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

4. I have often done things that will help me understand my ethnic background better.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

5. I have often talked to other people in order to learn more about my ethnic group.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

1	2	3	4	5
---	---	---	---	---

6. I feel a strong attachment towards my own ethnic group.

Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
1	2	3	4	5

7.- My ethnicity is

- (1) Asian or Asian American, including Chinese, Japanese, and others
- (2) Black or African American
- (3) Hispanic or Latino, including Mexican American, Central American, and others
- (4) White, Caucasian, Anglo, European American; not Hispanic
- (5) American Indian/Native American
- (6) Mixed; Parents are from two different groups
- (7) Other (write in): _____

Appendix F

Columbia Card Task

The CCT was designed to assess risk preferences, information use, and proximity to the optimal solution (as determined using a normative model) through choices made in a card game. The CCT is presented on a computer in an experimental room. Participants play multiple trials in a card game. On each trial in this task, participants are presented with 32 cards and with three pieces of information, which vary across trials. The participants decide how many cards to turn over in hopes of earning as many points as possible; points are earned by turning over a gain card and lost by turning over a loss card. The pieces of information that vary across trials are the probability of loss (i.e., the number of loss cards in the array—1 or 3), the amount of loss (i.e., the number of points lost by turning over a loss card—250 or 750), and the amount of gain (i.e., the number of points gained by turning over a gain card—10 or 30); these variables are independently randomized over 24 trials. If a participant chose a loss card, the loss amount was subtracted from his or her score, and the trial ended. Because the loss cards represented an artificial ceiling on behavior, we analyzed the number of cards turned over on nonloss trials. Risk was operationalized as the number of cards turned over during these trials.

Example 1

In the example below, you see 32 unknown cards. The display shows you that 1 of these cards is a loss card. It also tells you that turning over each gain card is worth 10 points to you, and that turning over the loss card will cost you 750 points. Let's suppose you decided to turn over 7 cards and then decided to stop. Please click the "See Result" button to see what happened:

The screenshot displays the Columbia Card Task interface. At the top right, a box shows "Current Round Total: 0". Below this, three boxes provide task parameters: "Loss Amount: 750", "Gain Amount: 10", and "Number of Loss Cards: 1". The main area contains a 4x8 grid of 32 red cards, each with a question mark. At the bottom left is a "Back" button and at the bottom right is a "Continue" button.

Above is an example of what the participant would see.

Vita

Michael Anthony Trujillo was born on May 23, 1985 in East Los Angeles, California and is a United States citizen. He graduated from Granite Hills High School and obtained his high school diploma in 2003. He attended California State University, Long Beach where he graduated summa cum laude with a Bachelor of Arts in Psychology in May of 2008. He received his Master of Science in Psychology in December of 2015 from Virginia Commonwealth University. He is a member of Phi Beta Kappa, Phi Kappa Phi, and is a proud Ronald E. McNair Scholar. He is the proud recipient of a Graduate Research Fellowship from the National Science Foundation.