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BUILDING EMPATHY TOWARD COMMUNITY AND REDUCING BIAS IN A
CHICAGO POLICE SAMPLE: A CASE FOR PERSPECTIVE TAKING AND
REAPPRAISAL WITHIN VIRTUAL REALITY

by

Sydney C. Timmer-Murillo, M.S.

A Thesis submitted to the Faculty of the Graduate School, Marquette University, in
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ABSTRACT
BUILDING EMPATHY TOWARD COMMUNITY AND REDUCING BIAS IN A
CHICAGO POLICE SAMPLE: A CASE FOR PERSPECTIVE TAKING AND
REAPPRAISAL WITHIN VIRTUAL REALITY

Sydney C. Timmer-Murillo, M.S.

Marquette University, 2021

At the societal level, there is significant concern regarding police brutality towards Black individuals. Much of the research proposes implicit racial bias as a potential cause, yet, Intergroup Emotion Theory (IET) suggests that outgroup emotion and threat perception could also play a role. Interventions using perspective taking and counterstereotypical information often have a positive effect on implicit bias in predominantly undergraduate samples. The current study used perspective taking and counterstereotypical methods, incorporated with IET, to determine the ways emotion regulation promoted changes in empathy and implicit bias within a police sample.

We examined the effects of a newly developed VR tool that showed a 360° scenario of a police-community interaction which promoted perspective taking and provided counterstereotypical information. To assess how perspective taking influences empathy, participants were shown the same scenario twice (counterbalanced across participants), filmed from two distinct angles providing an “Inner” perspective and “Outer” perspective. To convey counterstereotypical information, participants were shown “backstories” about community characters and police characters in the scenario.

Participants, ($N = 58$) recruited from the Chicago Police Department, completed a series of questionnaires and the Brief Implicit Association Task before and after the VR tool. Results showed that the VR tool was effective at promoting empathy and reducing implicit racial bias. Empathy was significantly higher after viewing the community backstories (i.e. counterstereotypical information) compared to when viewing the scenario from both perspectives and the police backstories. Further, reappraisal was a significant predictor of empathy. Additional analyses demonstrated that empathy was positively related to intention to engage with community in the future. Results suggest that while the task as a whole reduces implicit racial bias, counterstereotypical information is most effective at empathy building. Indeed, reappraisal abilities and gaining a deeper understanding about one’s outgroup members appears to be critical for building empathy when in a threatening context and desire to engage with the community in the future. This could serve as a mechanism for repairing emotional divides between police and community.

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Building Empathy Toward Community and Reducing Bias in a Chicago Police

Sample: A Case for Perspective Taking and Reappraisal within Virtual Reality

Tension between police officers and Black individuals (used in the current study for people identifying as Black, African American, Caribbean Black, etc.), can be traced throughout American history and the patterns persist to this day. There is continued evidence of differential treatment of racialized Americans compared to White Americans by police officers. For instance in 2015, of the 405 individuals who were unarmed when killed by police officers, 30% were Black. This is incongruent with the makeup of the total US population, where 13.4% of the population is Black (Dukes & Kahn, 2017; www.census.gov). Similarly, 32% of all Black Americans killed by law enforcement during that year were unarmed, compared to 15% of White Americans (Swaine, et al., 2015). Simply put, Black men, especially, are most likely to die in police custody or by law enforcement than any other subpopulation within the United States (Inquest, 2017). Yet, experiences of differential treatment extend beyond lethality. Individuals from racialized and ethnic populations are more likely to experience “nonlethal” force (Kahn, et al., 2016) and be arrested (Kochel, et al., 2011). Further, in a study of policing behaviors in New York City in 2011, nine out of ten pedestrian stops were of Black or Latinx individuals (Sewell, & Jefferson, 2016). These data demonstrate the unequal treatment of racialized groups across a spectrum of police related interactions.

Greater public attention has turned toward the issue of policing process and procedures given the highly publicized cases of excessive force and brutality toward Black individuals that have occurred in recent years (Dukes & Kahn, 2017). Movements

such as Black Lives Matter developed in direct response to the deaths of unarmed Black Americans. Similarly, while in office, President Barack Obama initiated the President's Task Force on 21st Century Policing to investigate policing behaviors as well as attempt to change disparate treatment of racialized citizens (President's Task Force, 2015). These movements continue to maintain attention as examples of police brutality persist long after the development of Black Lives Matter in 2013. In tandem with public outcry, research has explored causes and effects of police brutality on racialized groups and possible interventions to mitigate such behavior. However, the research has necessarily been incremental, beginning often with undergraduate samples or testing within laboratory settings. As the research continues to develop, these tools need to be tailored and applied to a police officer population. The purpose of the current study was to test a newly developed tool designed to target implicit bias and emotion regulation using a relevant context for a Chicago Police Department sample.

The Effects of Race-Based Discrimination

Discrimination and overtly racist behaviors are a common experience for Black individuals (Sellers, et al., 2006). In a seminal survey of 25-74 year old Black Americans, nearly half of respondents reported a "major" racist experience in their lives (Kessler, et al., 1999). Further, 81% reported having experienced discrimination at least once. These experiences also tend to increase - particularly for Black teenage boys - during adolescence, when children begin to experience greater stereotyping (Sellers, et al., 2006). Experiences of racism and discrimination have negative consequences on health, well-being and psychopathology. For instance, while general health disparities between Black Americans and White Americans have been well documented (e.g. Beck, et al.,

2014), meta-analytic work critically demonstrated that discrimination mediates this relationship (Mays, et al., 2007). Similarly, these experiences can impact mental health, including depressive symptoms (Kessler, et al., 1999), generalized anxiety (Soto, et al., 2011) and posttraumatic stress disorder (Carter, et al., 2005).

In the police context, when racialized individuals perceive that they are unjustifiably stopped, they often believe that it is due to their race or other stereotyped characteristics such as appearance or age (Nadal, et al., 2017). The effects resulting from biased policing, perception of unjustified stops, or elevated police presence present a health pattern similar to other types of race-based discrimination. Kauff and colleagues (2017) conducted a study in Europe with a sample of immigrants from several countries to explore how different types of discriminatory experiences may impact racialized individuals differentially. Participants reported that discrimination at the hands of police officers or security guards produced more negative consequences than any other type of discrimination assessed (i.e. while using public transportation or at restaurants). Within the United States, Sewell and Jefferson (2016) found that living in a neighborhood with increased police activity was associated with multiple health concerns such as poor self-rated health and asthma. There are also associations between quantity of interactions with the police and mental health for racialized males (Geller, et al., 2014). For instance, symptoms of anxiety and posttraumatic stress disorder (PTSD) were positively related to amount of contact with police officers. Similarly, men living in New York City neighborhoods with high rates of “stop-and-frisk” had elevated rates of distress and nervousness (Sewell, et al., 2016). In a qualitative study, participants discussed their perceptions of unjustified stops as well as their emotional, cognitive and behavioral

responses. Participants often identified feeling fear, anger, distress, annoyance and/or feeling offended in response to unjustified police stops (Nadal, et al., 2017). These emotions often led to changes in behavior such as changing ones appearance or engaging in greater safety behaviors (e.g. always carrying identification). Grills and colleagues (2016) also found that participants reported less help-seeking behaviors following events of police violence, which led to greater self-reported isolation.

The negative effects of biased policing are concerning, given the role that police play in communities. In Chicago, during 2018 alone, there were over 114,000 violent crimes and property crimes reported, including more than 600 homicides and 2,300 shootings (Chicago Police Department Annual Police Report 2018). Police are positioned to respond to these calls, but their reach has extended into racial profiling. Simply put, neighborhoods with higher densities of racialized groups experience higher policing. This understandably influences community perceptions about police. For example, Nadal and colleagues (2017) found that after experiencing stops by police that were perceived to be unjustifiable, individuals reported negative changes in perceptions about law enforcement (e.g. questioning competency and perceiving police as biased). Without perceived legitimacy and fairness, there is poorer support and cooperation (Kochel, 2019). This can form a harmful cycle, as evidence suggests that police are less likely to intervene when they sense greater mistrust or have fear of retaliation (Wolfe & Nix, 2016). Therefore, improvement in fair or equitable behavior from police officers could improve trust and cooperation from the community as a whole.

Understanding the Cause of Disparities in Police Behavior

Given the increased research and societal attention toward disparate police behavior, researchers have explored potential causes of this issue (Dukes & Kahn, 2017; Scott, et al., 2017). For instance, some have argued that disparities are due to justified crime-related activities, suggesting that Black Americans are more likely to be engaged in behaviors that subsequently lead to greater policing (also known as differential criminal activity; Hindelang, 1978). However, this theory has been widely disproved. For instance, Scott and colleagues (2017) used data from 21 years of police activity across 213 police departments to find that when controlling for race-based differences in criminal activity, police still shoot Black individuals at a disproportionate rate. As such, attention has turned to assessing cognition and behaviors of police officers that could explain race-based discrimination (Scott et al., 2017).

Implicit bias

Implicit bias, or unconscious negative beliefs about racialized groups, is commonly proposed as a cause of discriminatory behavior across individuals and groups. While many people today deny having overt discriminatory or stereotypical beliefs, implicit bias research suggests an underlying preference for one's ingroup and negative perceptions of outgroups. Many cognitive processes operate unconsciously, to maintain efficiency and minimal allocation of finite resources (Lai, et al., 2014; Lai, et al., 2016). However, on occasion, one opens oneself to errors in thinking such as stereotypes and implicit bias. Implicit biases, it is proposed, occur as a result of an individual's prior expectancies (though not necessarily personal experiences) that are rooted in stereotyping and beliefs in these negative attributions of outgroup members (i.e. Black men are dangerous) on a level outside of conscious awareness.

Various high profile cases suggest racially biased policing, with archival data from police departments supporting this finding as well (Kahn, et al., 2016). Kahn and colleagues reviewed and coded over 100 police case files that involved use of force to assess whether police officers more quickly engaged in force with Black and Latinx individuals than White individuals. Patterns of behavior suggested that police officers were more likely to engage in use of force early within interactions with racialized men and maintain that level of force throughout their encounter. Alternatively, police officers were less likely to use force at the onset of an encounter with White men. Use of force with White men would then escalate later in the interaction, primarily if warranted based on the suspect's behavior. This would suggest a difference in police officers' perception of threat based on suspects' race, which also influenced level of force.

Moreover, experimental research also suggests that police officers may have implicit bias consistent with common stereotypes of Black men (i.e. more criminal, dangerous; Correll, et al., 2014; Correll, et al., 2011; Correll et al., 2007). To simulate real policing scenarios, one common paradigm is to assess propensity to shoot during simulations (i.e. "shoot; don't shoot" exercises). These simulations require participants to determine if they should shoot various threats or non-threats and are often used to assess if behavior is rooted in implicit bias (i.e. differing rates of decisions to shoot or different reaction times based on race). For instance, Correll and colleagues (2011) tested whether bias would enhance inclination to shoot Black targets compared to White targets. When targets were placed in a "threatening" environment, including derelict buildings or graffiti covered backgrounds, police officers were more likely to shoot either target. This would suggest such environments carried enough of a threatening cue to put the participants on

guard regardless of race. However, when the authors removed those contexts by placing targets of both races in a neutral environment (e.g. train station, restaurant, park), police participants were more likely to shoot Black targets compared to White. Thus, the propensity to shoot Black individuals was the same rate regardless of the environment. This may suggest that police officers implicitly conceptualize Black people as threats, serving as an explanation of racially biased behaviors in police officers seen at the national level despite lack of explicit racially biased beliefs. This disproportionate responding is demonstrated in other studies as well (Correll, et al, 2007). Again, police officers demonstrated significantly faster shoot times for Black armed male targets than White armed targets. Further, police officers were significantly faster to decide *not* to shoot an unarmed White male than unarmed Black males. Similarly, in a non-police sample instructed to simulate a police officer, participants were more likely to shoot unarmed Black men than White men (Correll, et al., 2002).

Another task employed in studies on implicit bias included identifying weapons or non-weapons paired with individuals of different races. In one such study, non-police participants primed with Black faces more quickly identified a weapon as compared to a tool (Payne, 2001). Similarly, in another study, police officer participants decided whether to shoot or not when shown either a Black or White male face paired with a gun or neutral object (Plant & Peruche, 2005). Participants had a tendency to mistakenly shoot after presentations of Black faces paired with neutral objects. Together - the archival data, shoot; don't shoot rates, and faster reaction times in the lab setting - highlight police officers' tendency to more quickly assume criminality or threat on the

part of Black people relative to Whites. It appears that police officers are more likely to use Black targets' race as a cue of threat compared to others'.

The Role of Affect

In addition to biased cognitions, affective researchers propose that emotions are a critical facet to this issue. A host of research within affective science demonstrates that emotions play a role in appraisal of experience and behavior. This allows the possibility that emotion also shapes the behaviors of police officers. To better understand emotion, one should consider the constructionist theory of emotion. This theory suggests that people experience two broad categories of affective states: negative and positive, along with various levels of arousal (Cameron, et al., 2015; Lindquist, 2013). From the occurrence of positive or negative affect, one interprets their experience as specific emotions. This theory proposes that it is an individual's appraisal of the current environment (e.g. interacting with an outgroup member), their goals, and past emotional experiences that shapes affect into discrete emotions such as anger or empathy. Consider, for instance, being stuck in a traffic jam. One may use general knowledge (i.e. people get angry when stuck in traffic) and past experience (i.e. "I've yelled at bad drivers before") to inform the interpretation of a negative, high arousal state as anger (Cameron, et al., 2015).

It is through these interpretations that we perceive our environment and form our subsequent actions. First, emotion shapes what information participants attune to or, alternatively, what information they miss (Levine & Burgess, 1997). Consequently, after determining the emotional experience in response to the situation, one uses this information to shape their behavior. The identification, or labeling, of emotion appears to

differentially influence behavior. For example, two studies explored the effects of anger or fear on decision-making (Lerner, & Keltner, 2001). In the first study, the authors presented a scenario about a health outbreak and provided incrementally risky choices for how to address the situation. Individuals feeling anger were more likely to choose a riskier option that could result in more deaths, suggesting greater self-confidence and less regard for potential harm. In a second study, angry participants also appeared more optimistic, or confident, than fearful participants, leading to greater expectation for positive life events to occur rather than negative events. Considering police bias, anger (whether incidental or acute) could influence police officers' perception of their environment (i.e. interpreting threat and feeling anger to achieve a goal of safety). This could further shape decision-making when interacting with racialized men.

Additionally, demonstrating the true power of emotion, even incidental emotions, or *ambient* emotions that persist from previous experiences, can influence perception and actions (Singh, et al., 2018). In one study, Singh and colleagues (2018) elicited anger or fear by having participants reflect on a previous time in which they felt either emotion. Afterward, in an unrelated task, participants were given the incorrect amount of change after a purchase. Participants who felt anger in the previous experience were more likely to make the unethical choice of not returning the change. This again implies the potential damage of anger, whether direct or incidental, on decision making, especially in the context of policing. Overall, emotion appears to influence both interpretation of experience and behavior on an individual level. However, the emotions we experience can be shaped by group experiences as well.

Intergroup Emotion Theory

Theorists have proposed that emotion is critical to explaining positive and negative intergroup interactions. The Intergroup Emotion Theory (IET) argues that it is emotion related to the views of one's ingroup, compared to outgroups, that critically shape intergroup relationships and behavior (Mackie, et al., 2008). More specifically, it is how outgroups are evaluated regarding their impact on the ingroup that forms individual actions (Smith & Mackie, 2008). There are several factors that influence group-based emotion. First, IET underscores the importance of identity and, in particular, one's group identities. Group membership and the salience of one's group inform values, attitudes and perceptions of the self (Mackie, et al., 2008). The strength of one's group membership can vary depending on the group itself (i.e. identity as a woman compared to identity as Black) and we often have different group-based emotions based on different identities (Smith, et al., 2007). For instance, Ray and colleagues (2008) primed undergraduate participants to think of themselves as either students or as Americans and then rate their emotions toward police officers. When considering their membership as students, participants reported more anger and less respect for police officers than when primed to think of being American. This suggests that while we have multiple group-based identities, emotions may shift depending on which identities are most salient to us in any given moment. Therefore, while membership to multiple groups may be important to one's identity, specific identities can be primed and therefore shape group-level emotion more than other identities. Importantly, these *self*-reported experiences of emotions are comparable across members of the same group, but can vary depending on the strength of group identification. Findings such as these highlight how emotions are integrally tied to our identities, such as identity as police officer, even within different contexts.

IET demonstrates that the interpretations we make to inform emotion are not solely individual but can also be related to our larger group-memberships (Mackie, et al., 2008). We may feel anger, fear, or guilt at the group-level, which then motivates our individual behaviors. These emotions can supersede individual-level emotions. For instance, when primed to interpret negative affect as fear, White individuals attribute greater threat toward Black faces and report fear than if primed with a goal to feel compassion (Lee, et al., 2018). It is reasonable to assume that if a police officer is experiencing group-level anger toward their outgroup, this may enhance their desire to confront or protect boundaries regardless of whether an outgroup member is threatening them on an individual level. Indeed, anger seems to be a powerful motivator for intergroup behavior. In several studies, anger appeared to elicit both a desire to attack or harm the outgroup as well as to reduce intergroup relational interactions (Esses, & Dovidio, 2002; Mackie, et al., 2000). Similarly, participants feeling greater threat from outgroups are more likely to behave in a way to intentionally promote fear in their outgroup (Netzer, et al., 2020).

Yet group-based emotions are not always negative. For instance, emotional empathy is the experience of emotions that are similar to what another individual is experiencing (for review on types of empathy see Duan & Hill, 1996). Empathy has been demonstrated to elicit many positive outcomes, such as increased helping behaviors (Oswald, 1996). Within group-based contexts, empathy can interfere with negative emotion and behavior. For instance, greater empathy is associated with lower anxiety toward ones outgroup. Similarly, there is decreased perception of differences between the two groups (Stephan & Finlay, 1999). Therefore, the various emotions we experience at a

group level differentially shape perception and behavior just like our individual-based emotions.

Emotion Regulation and IET. Yet, emotions serve as but one indicator for how an individual processes and experiences their world (Johnson-Laird, & Oatley, 1992). As emotions arise, individuals modulate their responses to fit the environment and current context. Emotion regulation encompasses how individuals experience, manage, and express their emotions (Gross, 1998). Emotion regulation, in addition to emotion, is crucial to functioning and interacting with our environment (Gross, 2015). Emotion regulation is often either categorized based on types of strategies used to regulate or evaluated based on abilities or skills to manage emotion. For instance, one emotion regulation strategy may involve reinterpretation of how one might perceive the situation (i.e. reappraisal). On the other hand, another strategy may be to simply mask one's feelings regarding the situation (i.e. suppression). In addition to strategies, one's skills in regulation (i.e. awareness or acceptance of emotion) influence the success of regulating (these are typically assessed using the Difficulties in Emotion Regulation Scale; Gratz & Roemer, 2004). Both maladaptive strategies (for a given context) and deficits in the skills needed to regulate are tied to various forms of psychopathology, health and well-being (Aldao, & Nolen-Hoeksema, 2010; Aldao, et al., 2010; Chesney, & Gordon, 2017; DeSteno, et al., 2013; Tull, et al., 2007; Ehring, et al., 2008; Mennin, 2004). Therefore, it is important to evaluate the skills of managing emotion in addition to specific strategy use.

Surprisingly, emotion regulation is not often included within the discussion of IET. Theorists make connections about the individual and group-level emotions that

shape behaviors, but fail to account for the regulation of emotion that occurs around them. Goldenberg and colleagues (2016) recognized this missing piece and proposed the *process model of group-based emotion*, which applied Gross' (1998) process model of regulation to group-level emotion. The authors proposed that group-level emotions are regulated in the same mechanism as individual-based emotion. Just as individuals have goals that guide regulation for their own lives, there are also group-level goals that shape emotion. For example, on the individual level, we often regulate to feel more positive and less negative emotion (a hedonic motivation); this is also true of group-level emotions (Tamir, 2009). We may regulate our individual experience to encourage more positive emotion for our group as a whole (i.e. celebrating a nation's independence day to feel pride and happiness). People may also regulate for group-based instrumental purposes, which serve the purpose of regulating to lead to a specific outcome. For instance, while anger is not a pleasant feeling, it may serve the instrumental purpose of feeling affiliation toward your in-group and to promote beneficial action. Maitner and colleagues (2006) demonstrated this by inducing anger in a variety of ways toward outgroup members to explore how anger influenced behavior and duration of emotion within ingroups. In one study, participants were given hypothetical scenarios about their country being attacked by terrorists. Participants reported that their outgroup anger dissipated and ingroup satisfaction increased when their country successfully bombed the attacking nation (highlighting how attack is often an anger-based response). Alternatively, in a second study, in which undergraduates were insulted in a fabricated journal article, anger persisted toward the outgroup when the authors of the article refused to retract it. Interestingly, *ingroup* anger increased when participants were told that most students

ignored the article (Maitner et al., 2006). However, if told that students later wrote a letter causing the authors to retract the article, participants reported less ingroup anger and more ingroup satisfaction. These results highlight the nuanced interaction between goals, group-based emotion, and behavior.

We can also consider individually-based emotion regulation strategies for these group-level emotions. One strategy that has garnered attention for its benefits on the individual level is reappraisal. Specifically, it encompasses reinterpreting the meaning and impression of an experience to change the emotional response (Gross, 1998). The positive outcomes of reappraisal are demonstrated in many studies examining the emotional, cognitive, and physiological aspects of emotion. For example, reappraisal can decrease self-reported negative emotion and increase positive emotion in a number of settings (Demaree, et al., 2006; Gross, 1998). Reappraisal is a useful tool when confronted with making decisions in ambiguous or unfamiliar situations (Heilman, et al., 2010). Similarly, after being wronged, reappraisal led to decreased likelihood of seeking punishment (at the participant's cost; Wang et al., 2011). Compared to other strategies, use of reappraisal led to adaptive decision making and less negative emotion (Szasz, et al., 2016). This suggests that reappraisal may be particularly useful in reducing action based in threat (e.g. punishment, attack).

Extending beyond the individual level, reappraisal can alter one's group-based emotions. Halperin and colleagues (2013) instructed Israeli participants to reappraise or not when given information about the Israeli-Palestinian conflict. Participants who were instructed to reappraise felt less negative emotion toward their outgroup, and they also supported more reconciliation between the two groups. In a similar study, when primed

to want reconciliation with their outgroup (perhaps a form of reappraising the outgroup), individuals acted in a way to help calm their outgroup (Netzer et al., 2020). While the above studies encouraged reappraisal of information to shape emotion, reappraisal can also take the form of reappraising one's identity through group membership. It is possible to alter group salience to change perceptions about outgroups (Ray, et al., 2008). When people reappraise to view their ingroup as one that is more inclusive (i.e. human-centered as opposed to national identity), they are more likely to forgive transgressions (Wohl & Branscombe, 2005). One study, conducted by Cohen and colleagues (2019), highlighted how the approaches used even within one regulation strategy can vary across groups. When studying reappraisal use by individuals identifying politically as leftists and rightists trying to reduce fear of the outgroup, the groups used different techniques. Rightists tended to enhance positive emotion by reappraising their sense of ingroup empowerment, whereas leftists reappraised by perceiving the outgroup as weaker. As such, while group-based emotion informs behavior, group-based regulation can subsequently alter that emotion and resulting behavior. Thus, multiple factors influence how we perceive and interact with our world. Implicit cognitive processes, emotions, regulation, and goals guide us quickly and efficiently through decision-making. However, the automaticity of this process, as well as over-reliance on bias or negative group-based emotions, can lead police and others to engage in biased behavior.

Targeting Implicit Bias

Given the societal push to address implicit bias in various domains, many tools and interventions have been developed to reduce racial bias. Often, the outcome measure used to assess for change in bias is the Implicit Association Task (IAT) or Brief Implicit

Association Task (BIAT). Greenwald and colleagues (1998) developed the IAT to assess implicit cognitions in a controlled way as opposed to using a self-reported measure of bias. The IAT is a task that detects the strength of a person's automatic associations between specific concepts. Using reaction time, researchers can determine if participants categorize faces and words as more or less similar to various concepts (i.e. good or bad) using the speed with which participants sort the stimuli. As a behavioral measure assessed by reaction time, it is concluded that a faster time is indicative of a stronger association between two concepts (good and wonderful) and slower time is indicative of weaker associations (bad and wonderful). While implicit tasks are beneficial for their ability to circumvent explicit processes, like all methods, it poses some limitations. For example, the task primarily aims to evaluate strength of the association between concepts (i.e. good and White), but non-associative factors can also influence outcomes (Calanchini & Sherman, 2013; Forscher, et al. 2019). These factors can include one's ability to switch between tasks or minor experimental manipulations, such as the identity of the researcher administering the experiment (Sinclair, et al., 2005). However, within intergroup settings, IAT tasks can serve as a better predictor of discriminatory behavior over explicit measures (Greenwald, et al., 2009).

Despite some limitations, implicit tasks appear to demonstrate the subtle occurrence of racially biased cognitions in a majority of the population, making it a useful tool when self-report measures should not be the only measurement. Given this evidence, researchers developed various mechanisms to reduce implicit racial bias in addition to other forms of bias. In a recent meta-analysis, Forscher and colleagues (2019) categorized and evaluated the effectiveness of such strategies. They coded these

interventions into 12 categories, some of which appear across the literature. Two of these interventions, vivid counterstereotypical examples and perspective taking, are reviewed here, given their effectiveness and relatedness to the current study.

Vivid Counterstereotypical Examples

One common approach designed to reduce implicit bias is to provide examples that counter biases, or as Forscher and colleague label it “directly weaken associations”. Researchers can provide examples that weaken the associations between constructs (i.e. weaken the association between Black people and “bad”). Alternatively, they can also give examples that strengthen associations between distinct constructs (i.e. strengthen the association between Black people and “good”). This approach targets bias by providing new information to shape how people perceive certain situations (Dasgupta & Greenwald, 2001). By providing context that is counter to the biased view, the individual uses that information to reduce implicit bias.

While offering counter-evidence or examples is the goal of many studies, the procedures can vary. Some studies aim to do this by providing images of Black individuals that are generally admired and White individuals that are generally disliked (Dasgupta & Greenwald, 2001). Other studies present counterstereotypical information through priming methods. For example, Columb and Plant (2016) implicitly presented President Barack Obama’s name following the presentation of “negative” examples of Black individuals (i.e. Michael Vick). Alternatively, others have utilized written scenarios depicting a counter-stereotypical example. One such study presented participants with one of two stories depicting Black men starting a business after serving time for a previous conviction or after growing up in the inner-city and getting into

Harvard (Holt, 2013). Interventions can also elicit more involvement on the participant's behalf by having participants develop lists of counterstereotypical examples of Black Americans (Gawronski & Bodenhausen, 2005). While there is variation in the manner in which the counter-stereotype is presented, the aim is to expose individuals to information or stimuli that counteracts the automatic perception they may have regarding Black individuals within their current situation. These interventions aim to change the information that is ultimately used to appraise the current environment in a nonbiased manner.

Perspective Taking

Another category of tools designed to influence implicit bias is perspective taking, or under Forscher and colleagues label, "indirectly weaken associations". Perspective taking is the process through which individuals consider another person's mental state and emotional experience (Todd & Galinsky, 2014). Perspective taking has been an area of interest across multiple domains in psychology given its perceived positive influence across behavior. For instance, perspective taking can increase helping behaviors such as volunteering or supporting greater funding for students with disabilities. Perspective taking can also influence relationships and social interactions through improving non-verbal behaviors, such as eye contact (Todd, et al., 2011). Therefore, within the bias literature, researchers speculated that perspective taking could reduce implicit biases.

Perspective taking occurs through two general approaches. Both strategies aim to elicit an understanding of the outgroup member's mental state, but approach it in distinct ways. First, perspective taking can encourage imagining how a person may feel, such as through prompts to feel empathy while reading about daily experiences of discrimination

(Finlay & Stephen, 2000). Other examples include exercises where participants imagine what the perspective of a Black individual would be and write about their typical day (Todd, et al., 2012). Alternatively, perspective taking can encourage the individual to imagine themselves as an outgroup member rather than simply imagining *from the outside* what someone's experience is like. Some procedures instruct participants to view themselves as the outgroup individual or to *see themselves in their shoes* to encourage perspective taking (Dovidio, et al., 2004; Simon, et al., 2019). This is a form of perspective taking via embodying the individual to create a greater perception of similarity between themselves and the outgroup member.

Regardless of the procedure, perspective taking influences bias through two mechanisms: presenting new information and changing affect. First, researchers speculate that, like counterstereotypical examples, perspective taking provides information that may counter biases and reduce the strength of implicit associations. This then provides greater understanding of the internal experiences of outgroup members, which changes the participant's understanding of the current context (Todd & Galinsky, 2014). For instance, in one experiment, participants who were instructed to imagine themselves as a Black male reported greater acknowledgement of discrimination than those who did not use perspective taking (Todd, et al., 2012). Perspective taking goes beyond just receiving additional information or examples. For instance, in one study, participants listened to a Black individual describe their experiences with negative stereotyping. In one condition, participants were given a perspective taking exercise beforehand, whereas participants in the other condition simply listened to the story. Participants who completed the perspective taking exercise showed greater reduction in beliefs about stereotypes

compared to those who simply heard the story (Vescio, et al, 2003). This suggests that perspective taking provides greater information that shapes understanding of Black individuals' experiences that in turn reduces biases.

Perspective taking also combats implicit bias through its influence on affect. A critical component to individuals relying on implicit bias is their current affective state. As previously stated, key affective states, such as empathy, can influence how people perceive and respond to their race-based outgroups. As such, perspective taking targets affect by promoting empathy. One's ability to "step into" an outgroup member's experience encourages feeling emotions as the other individual may feel them (Vescio, et al., 2003). This may then subsequently alter one's own feelings (or perception of groups). For example, when using perspective taking, participants reported greater emotions related to a sense of injustice (i.e. anger and alarm), which led to a decrease in bias (Dovidio, et al., 2004). This suggests greater experience of empathy and feeling emotions consistent with those who have experienced discrimination. This experience of empathy subsequently influences the individual's perception of the current context and reduces the use of emotions, like anger, that may promote implicit bias.

Effects of Interventions

A host of procedures have been developed that target various underlying mechanisms of implicit bias. However, like the limitations of implicit bias assessment, there are limitations regarding the effectiveness of interventions. Many interventions often demonstrate solely acute effects with few showing longstanding outcomes (Lai et al., 2016). Further, Forscher and colleagues (2019) conducted a meta-analysis using their 12 coded categories of interventions to determine the effects on implicit bias. Not only

did they explore the acute effects of implicit bias, but also, if included within a study, assessed behavioral effects. Overall, about half of the interventions significantly influenced bias including vivid counterstereotypical examples and perspective taking having medium effects ($g = -.23$). Interestingly, the effects of perspective taking were stronger for nonstudent samples (less than 20% of the studies) than for students, perhaps suggesting stronger effects for a police sample. Explicit measures produced significant yet smaller effects than implicit bias measures for these categories ($g = -.10$ to $-.12$). These findings present some concerns given smaller effects; however, there was notable variability within explicit measures included in the study. For instance, this category included standardized questionnaires, single Likert scale questions, and behavioral measures (e.g. distance between where participant sits and an outgroup member). Given significant effects amongst the variability, this demonstrates some promise that interventions can yield consistent, meaningful change. Furthermore, combining different interventions, along with evaluation of emotional and behavioral measures, could lead to greater understanding of findings. Unfortunately, long term effects of these interventions could not be assessed given that less than 7% of all studies included in the meta-analysis had longitudinal data.

Improving Interventions

While research on implicit bias has been helpful for demonstrating the, sometimes, subtle nature of bias and racism, it may provide an excuse for lack of behavioral change (Selmi, 2018). For instance, if we state that problematic escalation in police brutality is solely due to implicit thoughts that are outside of conscious awareness, it could reduce a sense of responsibility to change. Additionally, it is evident that implicit

cognitions are not the sole factor that guides us in daily life. Consideration of how we can both influence implicit bias along with *regulating* emotion and behavior may yield more impactful tools and change. Given what IET demonstrates regarding the role of emotion within discrimination and implicit biases, emotion regulation should be assessed. Indeed, emotions play a fundamental role in how we interpret our environment and behave, making the act of regulating emotion critical. Emotion regulation should be particularly attended to when we rely on inaccurate or dangerous interpretations of our environment.

Therefore, to continue to improve upon strategies for reducing bias, it is critical to acknowledge emotion regulation within perspective taking. Perspective taking interventions are notably similar to research methodology for inducing reappraisal. Reappraisal is a top-down process of emotion regulation that encourages users to evaluate their current context to intentionally alter their emotional response. Reappraisal is successful at altering affect but also shaping behavior and decision-making (Lerner et al., 2015). Similarly, perspective taking encourages participants to access additional information and feel empathy in order to view the situation outside of their typical approach. Both of these processes encourage information gathering outside of one's previous experience or history that may alter typical responses.

Other emotion regulation strategies can be problematic for intergroup interactions. For example, while most participants report greater negative affect when viewing images of violence against outgroup members, using suppression appears to reduce acknowledgment of the outgroups' suffering (Gordon & Chesney, 2017; Gordon, et al., manuscript). Participants who use suppression report less anger and guilt when viewing these images and report more cheerfulness. This appears to be consistent with similar

work. In another study, male participants, as members of the ingroup, were better able to suppress negative emotion in response to sexist comments about women in leadership while female participants told to suppress were less successful (Johnson, et al., 2010). This suggests that suppression reduced male participants' empathy. Additionally, considering emotion regulation skills is necessary. Less awareness regarding one's use of strategies and emotions was connected to poorer intergroup responding (Gordon, & Chesney, 2017). In fact, greater difficulty with awareness was related to more cheerfulness in response to violence against outgroups, and less anger or guilt in viewing these images. Lack of acknowledgement of these experiences along with the resulting suffering diminishes successful intergroup responses (Apfelbaum, et al., 2008; Holoien, & Shelton, 2012). Therefore, whereas having skills to reappraise and recognize the experiences of others may improve intergroup interactions and reduce implicit biases, suppression and poorer awareness of regulation may impair intergroup interactions and promote biased interpretations of the situation.

Using Virtual Reality as a Medium

An additional concern regarding implicit bias interventions is that many lack ecological validity, potentially contributing to limited effects. One promising tool for addressing concerns about ecological validity is virtual reality (VR). While VR has been around for decades, only recently has it been recognized as an asset in various domains of research because of advancements in filming and portability (Steuer, 1992; Lehtonen, et al., 2005). VR creates a realistic experience by immersing people fully into a simulated setting. Using a VR headset can create the illusion of a real and distinct environment despite being physically present in another environment (Seinfeld, et al., 2018). This is

the idea of telepresence, or the sense an individual has of being in their environment presented through a medium outside of their physical self (Lehtonen, et al., 2005). VR can successfully induce both positive and negative emotions (for example, see Riva, 2009). Therefore, VR has elevated *presence* given its ability to provide real information that will mimic everyday life as opposed to the presence of a laboratory setting (Steuer, 1992). Another key benefit to VR is the vividness of the environment. VR environments can vary greatly using either animation or film. While animation has been used in various ways to create a sense of embodiment of another person, this can have constricted effects (Mori, 2012; Seinfeld, et al., 2018). For instance, animated VR has drawbacks like the uncanny valley, or a sense of eeriness or distaste for non-human objects to appear too human-like (Mori, 2012). This is why some researchers prefer to use film as a medium within VR; film can still yield heightened telepresence while avoiding the drawbacks of animation or embodiment. Since applied research aims to create meaningful change in a participant's daily life, VR has the capacity to produce stronger effects.

Given recent advances in 360° filming, VR can create significant breadth in an environment (Steuer, 1992). Another benefit of VR that enhances the vividness in the tool is elevated engagement. Within various VR experiences, participants can engage their virtual environment through head movements, physical movement (i.e. walking), or with handheld controls. Therefore, VR produces greater engagement, or effortful participation, as it requires more than passive viewing, such as when watching a video (Lehtonen, et al., 2005). Lastly, one particular benefit to VR is the way in which it balances the immersive realism with control. The ability of researchers to create the

virtual environment and dictate how the experience unfolds allows for the necessary experimental control needed to draw conclusions on effectiveness of an intervention.

Given the aforementioned benefits to using VR, it is unsurprising that initial work exploring VR shows that it effectively reduces implicit bias and improves perspective taking. To date, researchers have primarily used embodiment and animation to assess how perspective taking can influence perception of emotions and attitudes. Seinfeld and colleagues (2018) used embodiment of a female avatar to explore perspective taking within male perpetrators of domestic violence. During the VR intervention, participants saw their female avatar experience various emotions and changes in facial expressions in a mirror. Additionally, they experienced a scenario in which a male entered a room and was progressively verbally aggressive to their avatar. Through this practice, participants' ability to identify fear in female faces (a skill that was limited at baseline compared to control participants) increased. Similarly, Herrera and colleagues (2018) had participants complete either a traditional perspective taking training or a VR experience embodying a homeless individual. The authors found that all participants reported greater empathic concern for homeless populations after their interventions. Yet after the VR intervention, participants reported more positive attitudes toward homeless individuals than those in the traditional perspective taking intervention. Moreover, participants in the VR condition were more likely to sign a petition supporting homeless individuals. This shows promise for VR perspective taking changing implicit attitudes but also promoting behaviors, a critical component to creating meaningful change.

VR-embodiment interventions have also been used to address interracial interactions and implicit racial bias. Peck and colleagues (2013) explored the difference

in implicit bias, as measured using the IAT, when participants embodied a “light-skinned”, “dark-skinned” or purple-skinned avatar. Participants who embodied a dark skinned avatar showed a significant decrease in bias after embodying their avatar and a greater reduction in bias than all other conditions. Unfortunately, other variables such as self-reported emotions or behavioral measures were not collected. In a similar study, participants were embodied in a White or Black avatar while watching an instructor teach them Tai Chi in the VR realm (Banakou, et al., 2016). Participants embodied in the Black avatar showed a reduction in implicit bias, measured by the IAT, 1 week after their intervention and an increase in bias for those in a White avatar. However, the authors also had participants complete one to three VR exposures. Interestingly, amount of exposures had no effect on changes in implicit bias. Again, participants in this study did not complete other measures beyond the IAT. However, these two studies demonstrate the utility in VR for reducing implicit bias immediately after exposure and for an extended period.

One study sought to determine how embodying another race could influence interactions with a VR partner (Hasler, et al., 2017). Participants embodied either Black or White avatars and then interacted with counterbalanced virtual characters of the two races. Results showed that while the VR experience did not influence implicit bias, it influenced interactions. More specifically, when participants interacted with a virtual character with the same race within VR (regardless of their own physical race) they experienced greater mimicry during interaction. Further, those who were in a Black avatar reported greater liking of the Black character. Given the importance of mimicry in positive interpersonal interactions (Duffy & Chartrand, 2015), this could suggest some

possible positive behavioral effects from using VR. However, continued research is needed to explore the various manners in which VR can impact bias and intergroup interactions through perspective taking.

Current Study

Therefore, while researchers have successfully begun to consider the multiple factors that contribute to implicit bias and discrimination at the hands of police officers, there is limited work on applicable and relevant tools to reduce this bias. When considering the research, over 80% of these interventions were tested with undergraduate populations (Forscher et al., 2019). But perhaps of most concern, a majority of studies only assessed for reduction in implicit bias as measured by tasks such as the IAT. Given the literature highlighting the multiple facets that can contribute to biased behavior including implicit cognitions and emotion regulation, our scope needs to broaden.

As such, the current study aims to implement and assess the utility of a newly developed VR tool incorporating perspective taking and counterstereotypical examples. The intervention was designed to be employed with both police officers and community members in Chicago, though the current study focused on the police officer sample. Given a desire for the tool to be ecologically valid and enhance empathy in police officers in scenarios that reflect their lived experiences in the community, the tool was developed using a community-based devising method. Integrating perspectives from Chicago community members and police officers led to the development of a tool relevant to that community. Further, based on previous research, we aimed to evaluate this tool's effectiveness on multiple outcome measures using both perspective taking and providing counterstereotypical examples, while considering the role of emotion

regulation. The current study used VR to present a police-community member interaction (i.e. scenario) in a wearable headset to enhance the acute experience of emotion regulation and perspective taking. VR allows individuals to engage in the scenario in a dynamic way through the experience of a 360° environment. Participants viewed the scenario from two vantage points or perspectives: an up-close perspective (Inner Perspective) and a broader perspective (Outer Perspective). To provide counterstereotypical examples, backstories of the characters were also provided for additional context regarding their motivations within the scenario (labeled Community Backstories and Police Backstories). The current study had the following aims:

Aim 1: Empathy Toward Community Member

The first aim of the study was to experimentally test whether perspective taking and counterstereotypical examples in the VR tool improve empathy towards community members. We were also interested in whether reported state or trait reappraisal predicts empathy. Previous studies have primarily explored the effects of perspective taking and counterstereotypical examples on implicit bias measures. Yet, successful perspective taking could also enhance empathy for outgroup members. Empathy is a critical skill that enhances relationships, prosocial behaviors, and one's positive interactions (Telle & Pfister, 2016). Similarly, empathy appears to be a valuable outgroup emotion for encouraging positive group-based responses (Stephan & Finlay, 1999). Since regulation is needed to promote empathy (and reduction of perceived threat of outgroups), we aimed to evaluate whether trait or state use of reappraisal plays a role in empathy felt during the VR components. For hypothesis 1a, we hypothesized that empathy would increase for the community member after viewing the Inner perspective and community backstories.

Further, in hypothesis 1b, we hypothesized that participants' trait and state reappraisal use would positively predict empathy felt in the VR tool, demonstrating the role of emotion regulation within perspective taking.

Aim 2: Implicit Bias

The second aim of the study was to experimentally test whether incorporating both perspective taking and counterstereotypical examples in the VR tool decreases implicit bias in police officer participants. While the scenario is not explicitly about race, predominantly Black neighborhoods experience differential treatment and police violence. This has impacted trust and perceptions of police (Grills et al., 2016; Kochel, 2019). We placed the scenario within this context to promote ecological validity without needing to draw explicit attention to race. Therefore, we sought to evaluate whether the tool reduced implicit biases toward Black Americans. Implicit bias was evaluated using the Brief Implicit Association Task (BIAT) at baseline and following the VR tool. It was hypothesized that following the VR, participants would display reaction times indicative of reduced implicit bias toward Black faces.

Aim 3: Intended Future Community Engagement

The third aim of the study was to experimentally test whether empathy influences intended future community engagement in participants. We sought to explore whether the experience, including any changes in emotion and cognition, influenced intended behavior with their community. There is a need to demonstrate that interventions can extend beyond the acute intervention to behavioral change within the community. The current study evaluated whether reappraisal use and empathy cultivated in the VR tool

predicted greater desire to engage in future police-community activities. It was hypothesized that greater self-reported empathy and reappraisal use would predict greater endorsement of desire to engage in these activities.

Aim 4: Role of Emotion Dysregulation

The fourth aim of the study was to determine the role of emotion dysregulation, namely difficulties in emotion regulation abilities and both trait and state use of suppression, in experiencing empathy following perspective taking and counterstereotypical examples. We aimed to better account for the role of emotion dysregulation within research on intergroup interactions and perspective taking. Initial work suggests use of suppression and deficits in regulation skills appear to play a critical role in how individuals respond to outgroup's experiences of violence (Gordon & Chesney, 2017). Therefore, we hypothesized that greater difficulty regulating emotion, trait suppression and state suppression use would predict decreased empathy after the VR components designed to promote empathy

Method

Participants

A total of 58 participants were recruited from the Chicago Police Department. Based on a power analysis (G*power; Faul, et al., 2007; with power = 0.80, and $\alpha = 0.05$) using estimates from Forscher and colleagues (2019), we exceeded the recommended sample of 27 participants. The mean age of participants was 36.86 years ($SD = 8.62$). The majority of the sample was male (73.2%). Race and ethnicity of the sample was relatively evenly distributed between Black (23.6%), White (38.2%), and Latinx (30.9%),

with the remaining participants identifying as biracial/multiracial (7.3%). The sample was evenly split between married and single/divorced. Participants reported incomes ranging from \$50,000 - \$74,999 (23.6%), \$75,000 - \$99,999 (45.5%), and \$100,000 or greater (30.9%).

Participants were recruited with the aid of the Chicago Police Community Affairs Department using emails and announcements at roll call. Inclusion criteria included employment at the Chicago Police Department at the time of the study. While 58 participants went through the informed consent process, two participants did not complete testing (one completed pre-questionnaire measures only; the other declined participation after the consent process).

Materials

Virtual Reality Tool

Virtual Reality Equipment. To view the VR tool, participants were fitted with an Oculus Quest VR head mounted display with six degrees of freedom (i.e. ability to move in three dimensional space to look around). The VR experience was developed using 360° filming and allowed for 360° field of view in the headset. Participants also used handheld controllers to navigate through the testing sessions (e.g. answer questions displayed in the headset).

Virtual Reality Tool Development and Description. Several community based organizations collaborated to develop the content of the scenario. The goal was to enhance ecological validity and ensure a product that best reflected the real, lived experiences of Chicago police officers and their fellow community members. As such, a

two-day devising workshop with nine police officers and five community members was used to elucidate possible, relevant scenarios that reflected real experiences in Chicago between police and community members. The content of the scenario and backstories were developed using a theatre-based approach called devising – a method of using exercises and activities to build comfort, share experiences, and develop stories about a specific topic. During the two-day devising, exercises such as small group discussions and role-play were used to discuss personal police-community experiences in Chicago. On the second day, participants role-played three distinct stories that addressed themes of police-community relations. The devising group then developed a storyline from one of the scenarios portrayed, which they felt reflected a common police-community interaction in Chicago. To ensure external validity, a second group of 24 community members and police officers reviewed the script for accuracy and relevance to the Chicago community.

The VR tool involved viewing a 360° live action scenario about police responding to a mental health crisis at a home. To assess how perspective influences empathy, participants were shown the same scenario twice, filmed from two distinct angles. The *Inner* perspective showed the scenario with a vantage point centered between the primary community member (Antwaun) and police officer (Tony) characters. This perspective serves as a proxy for perspective taking as participants largely see and hear the experiences of the community member and police officer. The *Outer* perspective shows the same scenario from a further vantage point. This perspective presents a broader view of the entire scene unfolding. The Outer perspective is placed slightly behind the community member's wife, Santana, on the other end of the room. Backstories, which

provide greater detail about the primary characters, were also a feature of the tool. Two backstories were included for community members and two for police officers in the scenario. The tool had four components in total: 1) the Inner perspective; 2) Outer perspective; 3) Community Backstories; 4) Police Backstories.

The scenario depicted a police-community interaction in which the police went to a mental health crisis call. The scenario portrayed a community member, Antwaun, threatening self-harm while in his home with his family. The scene begins with Antwaun facing off with one police officer, Tony, who had his gun trained on Antwaun. Antwaun, in return, held a gun to his own head. Antwaun and Tony go through a tense conversation, with Tony showing fluctuating emotions from concern to frustration. Tony was unsuccessful with both un-empathic pleas (“Don’t go nuts on me”) and threats (“Don’t make me do something I don’t want to do”). Another officer repeatedly and unsuccessfully tried to remove Antwaun’s wife, Santana, from the room, which added to the stress of the situation. Toward the middle of the scenario, a second police officer, Danny, and his partner, Carolina, came to the scene. Through the course of conversation, it was understood that Danny had previous positive connections with Antwaun. Carolina was able to successfully reduce Santana’s distress while Danny focused on Antwaun. Danny was able to deescalate the situation and successfully apprehend Antwaun by demonstrating empathic concern throughout (“What can I do for you?” “C’mon, Ant. We’re gonna get through this.”)

To assess the role of counterstereotypical information, backstories about each of the characters were also created. Backstories were filmed as informal interviews in the aftermath of the scenario with the principal characters describing their experience during

the scenario. There were four backstories: Antwaun's, his wife, Santana's, Tony's, and Danny and Carolina's together. Antwaun and Santana's backstory immediately followed the Inner perspective while the two police backstories followed the Outer perspective. Counterstereotypical information about the community member in the scenario was presented through Antwaun and Santana's backstories which highlighted Antwaun's humanity. While police are responding to a mental health crisis, police may assume a stereotype that a Black community member like Antwaun is a dangerous threat given his identity. Thus, during Antwaun's backstory he discusses his remorse for the situation and highlights several unexpected life stressors that impacted him financially, his mental health, and well-being. His backstory counters typical stereotypes by showing he is college educated and recently lost his job. He also describes his pride in his family as a point of comparison for how he is currently struggling. Santana's backstory focuses on her and Antwaun's relationship and her concern about his well-being, with the aim of Santana's backstory again countering a stereotype of Antwaun being dangerous as one of him being a loving husband and father. In Tony's backstory, he acknowledges his mistakes during the scenario. He also explains his years of experience on the force, including witnessing multiple suicides, negatively impacting his emotion on the scene. Lastly, in Danny and Carolina's backstory, they describe their previous interactions with Antwaun. They also demonstrate their concern for community members when they go to these calls. The total viewing time of the scenario from both perspectives and all backstories was 13 minutes and 18 seconds.

Questionnaires

Difficulties in Emotion Regulation Scale (DERS). The DERS (Gratz & Roemer, 2004) is a 36-item measure designed to assess difficulty with six factors (Awareness, Clarity, Impulse, Goals, Acceptance, and Strategies) of emotion regulation, along with a total score of general ER Difficulty. Respondents report the extent to which they believe each item applies to them; item responses range from 1 (*almost never* (0-10%)) to 5 (*almost always* (91-100%)). Items are summed for a total score and six subscale scores; higher scores indicate greater self-reported emotion dysregulation. The DERS total scale has high internal consistency (Cronbach's $\alpha = .93$) and reliability ranges from .80 – 89 for the six subscales (Gratz & Roemer, 2004). For the current study, the measure had excellent reliability (Cronbach's $\alpha = .94$).

Emotion Regulation Questionnaire (ERQ). The ERQ (Gross & John, 2003) measures participants' trait use of reappraisal and suppression. The ERQ is composed of 10 items on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with greater scores indicating greater use of specific strategies. Scores range from 6-42 for the reappraisal subscale and 4-28 for the suppression subscale. The internal reliability is .79 and .73 for Reappraisal and Suppression, respectively. Test-retest reliability after 3 months was .69 for both scales (Gross & John, 2003). For the current study, the Reappraisal subscale had good reliability (Cronbach's $\alpha = .83$) and the Suppression subscale was acceptable (Cronbach's $\alpha = .73$).

Emotion Regulation Questionnaire-short form (ERQ-SF). The ERQ-SF (Egloff, et al., 2006) is a 6-item questionnaire that assesses the acute use of reappraisal and suppression. Items are measured on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items aim to evaluate use of the two strategies in the

moment (e.g. “During the situation, I controlled my emotions” or “I viewed the situation as a challenge”). Suppression and reappraisal items are summed separately, with higher scores indicating greater reported use of that strategy during the current situation. The ERQ-SF has good internal consistency (Cronbach’s $\alpha = .70$; Egloff et al., 2006) and high convergence with the ERQ (Egloff et al., 2006). For the current study, the Reappraisal subscale had below acceptable reliability (Cronbach’s $\alpha = .60$) and the Suppression subscale was acceptable (Cronbach’s $\alpha = .72$).

Future Community Engagement Questionnaire. Participants were asked four questions to assess their intention to engage with community members in the future. Items were measured on a 5-point Likert scale to assess likelihood with which they would participate in the activity ranging from 1 (*very unlikely to attend/participate*) to 5 (*very likely to attend/participate*). The community engagement activities were selected from the aims for community building in the 2019 Chicago Police Department Strategic plan: crisis intervention training, youth councils/Peace circles, ride-along programs, and D.A.R.E./G.R.E.A.T. programs. The items had good reliability (Cronbach’s $\alpha = .84$).

Within VR Measures

Brief Version of Implicit Association Task (BIAT). The IAT (Greenwald et al., 1998) measures automatic associations between various constructs. While the IAT is widely accepted as a task that measures implicit associations, its complex procedure and multiple conditions requires extensive practice trials and a long administration time (e.g. often ranging 10-15 mins). The BIAT (Nosek, et al., 2014) is an abbreviated form of the IAT that can comparably evaluate implicit associations including between Black and White faces and positive and negative words, but in a shorter timeframe (Nosek, et al.,

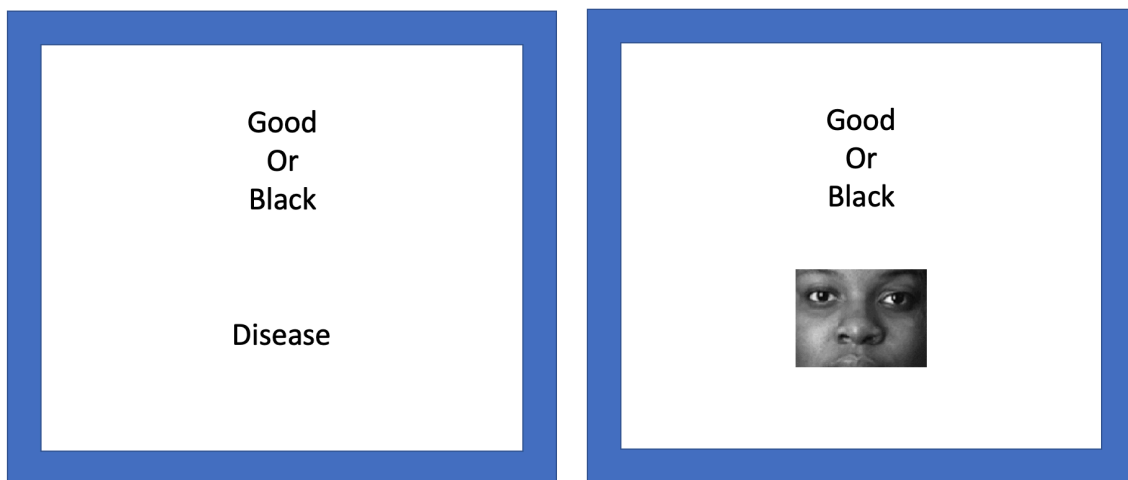
2014). For the current study, use of one practice block and two conditions with two blocks each allows for the task to be completed in about five minutes. The current study used the BIAT because of its shorter time frame, simplified instructions, and to reduce overall fatigue of participation in the study. To complete the task, participants categorize stimuli that belong to four different categories: White faces, Black faces, good words, and bad words. Distinct from the IAT, participants only identify stimuli as fitting two of the four categories in a given block. Figure 1 illustrates what participant see during the task. Specifically, two categories are presented at the top of the screen with the trial word or face presented immediately below. Stimuli that belong to either of the categories are categorized with one response as fitting the category or another response of not fitting the category. Participants first complete a practice block (16 trials) of identifying images of animals as “birds” and words as “good”. The participants then completed four blocks of 20 trials alternating two conditions: categorizing good words/Black faces and categorizing good words/White faces. Note that the word category was kept fixed as “good” while face categories alternated to simplify instructions. Participants are instructed to complete the task as quickly and accurately by moving the toggle bar on the VR controller to the left if the stimulus fits the category or to the right if it does not fit the category.

To evaluate the strength of associations, the reaction times for categorizing one set of faces and words are compared to another set. The BIAT developers’ instructions for data scoring procedures were used (Nosek et al., 2014). It is recommended that participants’ data be eliminated if 10% of total response times were under 400 ms (indicative of hasty responses), leading to removal of four participants data. An additional

11 participants did not have post-BIAT scores given an administration error, leaving a total of 43 participants with complete BIAT data. *D* scores were created using the D2 algorithm recommended by Greenwald and colleagues (2003). Specifically, *D* scores were calculated by obtaining the difference score of the mean reaction times of each set of categories, then dividing by the total task standard deviation. Positive *D* scores indicate faster reaction times when White faces are paired with good words. Therefore, positive reaction times suggest an implicit preference for White faces, through its greater association to positive words.

Figure 1

Schematics of Two Response Trials in the BIAT



Note. In the left example, the correct response would be to toggle right because “Disease” does not belong in the category of Good or Black. In the right example, the correct response would be to toggle left because the face belongs in the category of Good or Black.

Visual Analogue Scale. To assess for self-reported empathy, participants completed ratings on a Visual Analogue Scale (VAS). Specifically, participants were shown a still image of the scenario that included the four main characters: Antwaun (community member), Tony (police officer), Santana (Antwaun’s wife), and Danny

(police officer). They provided empathy ratings separately for each character, though for the current study, only empathy for Antwaun was used in analysis. Specifically, participants rated how much empathy they felt on a 10 cm Visual Analogue Scale (VAS) from not at all (1) to very high (10). They were instructed to use the toggle to select each character and then use the toggle again to move the marker, which was centered to start, across the scale to provide an empathy rating which was automatically recorded in the VR. After all empathy ratings were complete, participants rated four emotions (angry, anxious, happy, and sad) individually on the same scale. Single item VAS questions about affect are frequently used within the literature as a successful indication of participants' current emotional experience (Brown, et al., 2002).

Procedure

Police officers participated in the study while on duty. As such, police identity was more salient to participants given a majority were in uniform and testing occurred in education rooms within district buildings. Upon arrival for participation, trained research personnel took participants through the informed consent process, where the purpose, length of study, expectations, confidentiality, and risks were reviewed. Participants were allowed to read through the consent form and then provide their verbal consent. They were then given pre-VR self-report measures, including DERS and ERQ, to complete. Next, participants were fitted with the Oculus Quest VR headset and received instructions on navigating through the testing session.

In the headset, participants first completed the baseline BIAT using the VR controller. Participants then saw either the Inner or Outer perspective of the scenario, counterbalanced across participants. Once the scenario faded to black, Once ratings were

completed after the first perspective, the backstories paired with that perspective (e.g. *Inner* perspective with community backstories) were shown. Ratings were again completed after the set of backstories. Participants then repeated this process for the second perspective and set of backstories. Once all VR components were complete, participants completed a second round of the BIAT. Headsets were then removed and participants completed additional self-report measures including the ERQ-SF and questions related to future community-engagement activities. Upon completion, trained personnel debriefed participants and assessed for emotional distress. Given the sensitive nature of our study, all participants were offered a list of mental health resources.

Results

Statistical analyses were conducted using SPSS 22.0 (IBM Corp., 2013) with an alpha level of .05 to determine significance of the results. When sphericity was violated, a Greenhouse Geisser correction was used. See Tables 1 and 2 for descriptive statistics of measures.

Aim 1: Empathy Toward Community Member

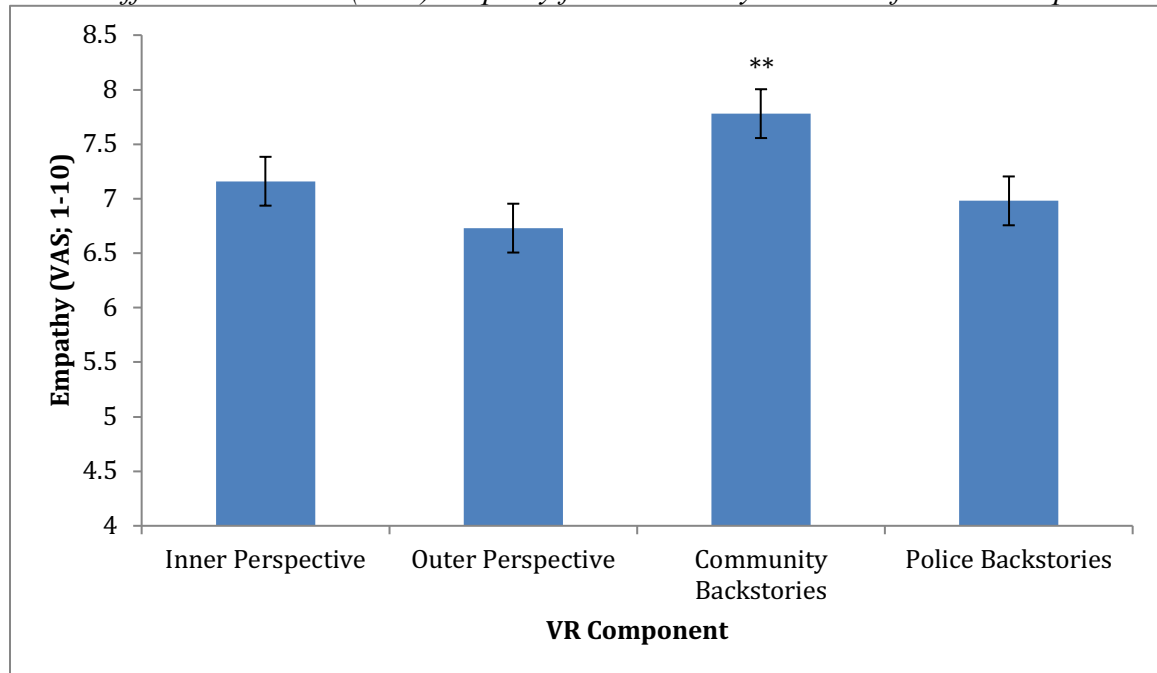
The first aim of the current study was to assess whether empathy toward the community member changed given the opportunity to engage in perspective taking and gain counterstereotypical information after the different VR components. Order effects for perspective were first analyzed and found not to be significant. Hence data were collapsed across order for all remaining analyses. To assess changes in empathy toward the community member, a repeated measures analysis of variance (rmANOVA) examined empathy after the four different VR components: Inner perspective, Outer

perspective, community backstories and police backstories. The rmANOVA was significant, $F(2.50, 134.91) = 6.55, p = .001, \eta_p^2 = .108, \text{power} = .945$, and post hoc analyses showed that *mean (SEM)* empathy was significantly different after community backstories than all other components (See Figure 2). There were no significant differences in empathy between other components. As such, hypothesis 1a was partially supported given that empathy was greater following the community backstories (when gaining counterstereotypical information) but not the Inner perspective.

We further aimed to evaluate whether reappraisal (both trait and state use) predicted empathy after the community backstories. This would allow us to demonstrate the role of emotion regulation during the component with the highest empathy. An initial correlational analysis revealed that only trait reappraisal was significantly related to empathy after the community backstories, as such state use of reappraisal was not incorporated in the linear regression. The linear regression was significant, $F(1,53) = 7.52, p = .008, \beta = .36$. Results suggest that trait reappraisal use positively predicted empathy toward the community member after viewing the community backstories. Reappraisal predicted 36% of the variance in empathy. As such, hypothesis 1b was partially supported that trait reappraisal predicted empathy after the community backstories, suggesting a relationship between regulation and empathy building

Figure 2

Aim 1 Difference in Mean (SEM) Empathy for Community Member after VR Components



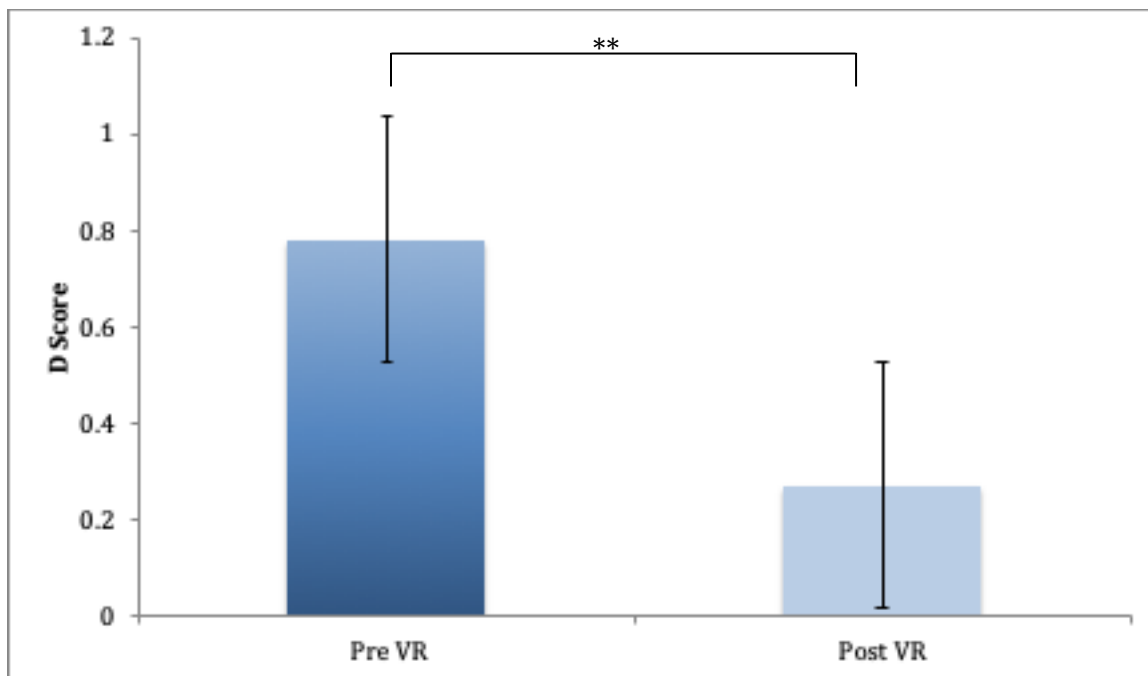
Note. Results show mean empathy after community backstories was significantly higher than after the three other components. ** $p < .001$

Aim 2: Implicit Bias

The second aim of the current study was to evaluate if the VR tool successfully decreased implicit bias toward Black individuals, as assessed by D scores on the BIAT. To examine our second aim, a paired samples t -test evaluated differences in BIAT D scores before and after the VR tool. Figure 3 illustrates the significant mean difference ($t(48) = 9.22, p < .001$) between scores before and after the tool. As such, hypothesis 2 was supported that mean D scores were significantly smaller after the VR. This suggests that implicit preference for White faces significantly decreased after the VR task.

Figure 3

Aim 2 Mean (SEM) D Scores from Pre-VR to Post-VR



Note. Results show a significant decrease in mean *D* Scores on BIAT from pre VR to post VR. ** $p < .001$

Aim 3: Intended Future Community Engagement

The third aim of the current study was to test whether reappraisal and empathy resulting from the VR tool influenced intent to participate in community engagement activities. We only used the empathy ratings after the community backstories given their significance in previous analyses. Participants reported the likelihood with which they would engage in four activities with the community members on a 5-point likert scale: crisis intervention training, youth councils/Peace circles, ride-along programs, and D.A.R.E./G.R.E.A.T. programs. Table 1 shows that initial correlational analyses found that empathy but, not trait or state reappraisal, was significantly related to two specific activities. Specifically, empathy was positively related to crisis intervention training ($r = .49, p < .001$) and youth councils/peace circles ($r = .36, p = .006$). Given that two of our three predictor variables were not significantly related to the community activities, a

linear regression was not performed. This is partially consistent with hypothesis 3; empathy but not reappraisal was positively related to intention to engage in activities related to the content of the VR training (i.e. building community relationships and mental health crisis training).

Table 1

Aim 3 Mean, Standard Deviations, and Correlation Statistics for Community Engagement Questions, Reappraisal and Empathy for Community Member

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
Future Community Engagement Activity								
1. Crisis Intervention Training	3.94	1.42						
2. Youth Councils/Peace Circles	3.47	1.31	.64**					
3. Ride Along	3.26	1.58	.41*	.52*				
4. D.A.R.E./G.R.E.A.T	3.52	1.30	.49**	.81*	.47*			
VR Measures								
5. Empathy post Community Backstories	7.74	2.43	.49**	.36*	.10	.18		
6. ERQ Reappraisal	31.26	6.57	.15	.21	.11	.08	.25*	
7. ERQ-SF Reappraisal	10.75	4.10	.14	.02	.20	-.11	.06	.10

Note. * $p < .05$, ** $p < .001$

Aim 4: The Role of Emotion Dysregulation

The fourth aim of the current study was to assess if other aspects in emotion regulation, namely difficulties in emotion regulation abilities and state and trait use of suppression, negatively influenced empathy toward the community member. Table 2 shows initial correlational analyses that examined relationships between empathy after the four VR components (Inner perspective, Outer perspective, community backstories, police backstories and difficulty in regulation as assessed by the DERS and trait and state suppression use as measured by the ERQ and ERQ-SF, respectively). Results showed significant, negative relationships with DERS and empathy after the Inner perspective ($r = -.35, p = .005$) and police backstories ($r = -.28, p = .022$). However, trait and state suppression had no significant relationship with empathy after each component and was not used in subsequent analyses. With limited relationships between our primary variables of interest, linear regressions were not preformed. Hypothesis 4 was partially supported such that DERS score was negatively related to empathy during two components, but suppression was not.

Table 2
Aim 4 Mean, Standard Deviation and Correlation Statistics for Emotion Dysregulation and Empathy for Community Member

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
Emotion Regulation								
1. DERS	60.45	14.96						
2. ERQ Suppression	13.87	4.77	.64**					
3. ERQ-SF Suppression	8.58	4.09	.03	-.01				
Empathy after VR Components								
4. Inner Perspective	7.16	2.54	-.35*	-.04	-.02			

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
5. Outer Perspective	6.70	2.51	-.25	-.08	-.08	.75**		
6. Community Backstories	7.74	2.43	-.25	-.03	.05	.84**	.62**	
7. Police Backstories	6.95	2.65	-.28*	-.01	-.04	.76**	.67**	.81**

Note. * $p < .05$, ** $p < .001$

Discussion

Within the past decade, outcry regarding police discrimination against racialized groups has increased. While researchers have sought to reduce or eliminate implicit racial biases using various mechanisms such as perspective taking or counter stereotypical examples, this has been predominantly done with undergraduate samples. The current study relied on IET to extend current methodologies and incorporate the ways emotion regulation and perspective taking interact to promote changes within a police sample. We tested the effects of a VR tool designed to promote police participants' empathy toward a community member experiencing psychological distress through perspective taking and receiving counterstereotypical information. Results showed that the VR tool positively influenced several domains including empathy, and implicit bias. Notably, providing counterstereotypical information in the form of "backstories" about community characters yielded the greatest empathy. This improved empathy was greater than when seeing either perspective of the scenario or the police backstories, with reappraisal predicting greater empathy. Additionally, implicit bias against Black individuals significantly decreased after viewing the VR tool. Lastly, there was a significant relationship between empathy developed for the character in the VR tool and desire to interact with community members in the future. Indeed, greater empathy was positively

related to intent to engage in two relationship-building activities: youth councils/peace circles and crisis intervention training. These results suggest that empathy felt in the VR has a relationship to endorsing desire for more positive connections with their community member outgroup.

Aim 1: Empathy Toward Community Member

IET suggests that emotions are tied to our group identities. Negative emotions toward outgroups can lead to less positive intergroup interactions whereas positive emotions and interactions improve outgroup relationships (Gordon & Chesney, 2016; Halperin, et al., 2013; Mackie et al., 2008; Ray et al., 2008; Wohl & Branscombe, 2005). Empathy, in particular, is an adaptive emotion that can foster positive intergroup relationships (Stephan & Finlay, 1999). Additionally, perspective taking can promote empathy (Finlay & Stephen, 2000). While extensive literature suggests that police officers carry implicit racial bias (e.g. Kahn et al., 2016), more work is needed to examine the role that their intergroup emotions play during experiences of discrimination or brutality toward Black men.

In the current study, police participants felt the greatest empathy for the community member when they gained counterstereotypical information about the character. These data show that when police officers were able to consider the individual on a deeper level, such as knowing a character's values or history (i.e. backstory), they gained more empathy toward an outgroup member. This supported our hypothesis that empathy would be higher after the community backstories compared to the Outer perspective or police backstories. The current results are largely consistent with IET and emotion regulation literature on reappraisal. Indeed, similar to reappraisal, the

community backstories present information intended to promote re-evaluation of the community member during the scenario. By gaining insight into the character's experience, police successfully reassessed how they understand him, thereby promoting empathy. By gaining the counterstereotypical information (e.g. this individual threatening self harm cares for his family and has a greater history than this moment), one can successfully see the scenario in a different light (e.g. this is someone who needs my help) and thus successfully regulate their emotions.

However, contrary to our expectations, empathy was not higher during the Inner perspective, which creates a sense of being in the action. Forscher and colleagues' (2019) meta-analysis suggested that perspective taking and counterstereotypical examples yield comparable effects. The difference between our findings and Forscher and colleagues (2019) could be related to assessing the effects of this tool on empathy. Previous work focused predominantly on implicit bias. Additionally, perspective taking often uses embodiment or instructions of directly imagining someone's experience, whereas through the Inner perspective, participants stood alongside the community member to try to promote perspective taking. This was intentional to produce a higher degree of realism through live-action as opposed to animation. Live action poses several benefits (e.g. avoiding the uncanny valley), yet it limits the ability to view the scene directly from Antwaun's eyes, possibly leading to a smaller effect. Additionally, our study used a scenario with a higher degree of threat than some previous work. Since the scenario involved a community member with a weapon and several people in the room, many participants reported feeling a high level of danger in the scenario. A handful of studies

have found that when threat is high, perspective taking is not successful (Groom, et al., 2009; Pierce, et al., 2013), thus potentially explaining this null finding.

Within our first aim we also examined the relationship between reappraisal use and empathy within the VR. Trait reappraisal use positively predicted higher levels of empathy after the community backstories, thus supporting our hypothesis. This was consistent with previous work suggesting that reappraisal can be useful within intergroup contexts (Halperin et al., 2013; Lee et al., 2018; Wohl & Branscombe, 2008). Reappraisal can be successful at promoting empathy and positive intergroup interactions through several mechanisms such as by reducing negative outgroup emotion (i.e. reducing sense of threat), minimizing ingroup salience, or creating a more inclusive ingroup. For the current study, it is possible that the tendency to engage in reappraisal fostered greater re-evaluation of the current scene to feel more empathy for the outgroup character.

Therefore, it appears that reappraisal could be an important emotion regulation strategy to assess when trying to foster police officer's empathy for their community.

Aim 2: Implicit Bias

A wealth of the literature on the underlying cause of police brutality focuses on implicit racial bias toward Black people. Given the automaticity of how we interpret the environment to shape our day-to-day behaviors, implicit attitudes and cognitions are an important consideration to the issue of policing disparities. Further, when looking specifically at the police population within the United States, there is empirical and archival evidence of implicit bias against racialized groups in general, and Black men in particular (e.g. Correll et al, 2014; Correll et al., 2011; Kahn et al., 2016). While many tools have successfully reduced implicit bias, most have used non-police samples. So we

sought to evaluate the effectiveness of a tool designed for police on reducing their implicit bias. In the current study, there was a significant reduction in implicit bias toward Black individuals after viewing the VR tool. Notably, the tool successfully reduced implicit bias without the scenario and backstories having an overt message about race. The four main characters were all Black to prevent participants from identifying with one character over another based on race alone. Further, testing was done while on duty, in uniform and in police departments, likely priming this identity above other aspects of one's identity. Therefore, these results suggest that by depicting a typical interaction involving Black individuals and gaining an understanding of one Black community member's experience were enough to reduce implicit attitudes immediately following the VR.

The current results were consistent with previous work demonstrating that interventions using perspective taking and counterstereotypical information reduce implicit racial biases (Holt, 2013; Todd & Galinsky, 2014). Further, the current study added to the newer body of literature using VR as a medium to reduce implicit bias. To date, other VR interventions have used embodiment as a form of perspective taking to reduce bias. While two previous studies demonstrated a reduction in implicit bias after embodying a Black or "dark skinned" avatar (Banakou, et al., 2016; Peck et al., 2013), one study demonstrated no effect (Hasler, et al., 2017). The current study did not use embodiment; it instead used VR to create an immersive, live action environment. As such, the study was able to demonstrate that VR can maintain positive effects on implicit bias and other outcome measures outside of embodying approaches. This opens up

opportunity to build other relevant scenarios and backstories that could apply to police-community tension using a similar paradigm.

Importantly, we saw significant reduction of implicit racial bias within a high-threat scenario where officers could escalate to use of force. This was in contrast to some studies suggesting that high-threat scenarios maintain or enhance implicit bias even when instructed to use perspective taking (Groom, et al., 2009; Pierce, et al., 2013). This also suggests that while perhaps high threat impeded empathy when perspective taking, implicit bias was still reduced by the tool. It is possible that the additive effects of the VR tool (using both perspective taking and counterstereotypical information) promoted bias reduction. When threat interpretation appears to be a critical component to (unjustified) violence by police, it is important to find ways to mitigate bias in these contexts. As such, continued work should explore the mechanisms behind reducing implicit bias during high threat scenarios, particularly within the context of policing.

Aim 3: Intended Future Community Engagement

While the current VR tool reduced implicit bias and enhanced empathy, these are relatively acute, cognitive processes. With that in mind, intention to engage with community in the future was also assessed. ‘Intended future behavior’ generally has a positive relationship to actual behavior within intergroup contexts, making it a useful self-report tool (Oh, et al., 2016). Though self-report does not always mirror actual behavior, intention can assess the interest in future behavior even if not actually realized (Sheeran & Webb, 2016). While regression analyses were planned to explore the role of empathy and emotion regulation on community engagement, we were limited to exploring the associations. specific community activities: crisis intervention training and

peace circles/youth councils. This was due to lack of significant relationships between reappraisal and intention to engage in activities. However, relationships with empathy converged with findings on implicit bias and empathy, given that these activities were related to the themes of the VR tool. Indeed, there was generally lower intention for engagement in the other two community activities, ride along, and D.A.R.E./G.R.E.A.T. programs and, these activities demonstrated no relationship with empathy. These findings support the role that emotion plays in behavior. By empathy positively relating to intended behavior, it suggests that the ability to regulate and change emotion toward an outgroup member may change motivation and predict future positive outgroup interactions. Consistent with IET, this could be resulting from a change in perception of the outgroup and desire for greater restoration seeking between the two groups (Halperin et al., 2013).

By endorsing a desire to engage in these activities, participants acknowledged a desire to (re)build police-community relationships. During the devising session, participants reported that mental health crises are a challenging and frequent call that police in Chicago respond to, yet crisis intervention training is not a requirement for police. Therefore, building a greater intention to participate in such trainings could yield positive outcomes in Chicago specifically. This shows a promising connection between feeling empathy for one community member in a training tool to behaviors that would improve greater community relationships. These findings were consistent with two VR studies that assessed behavior in addition to implicit bias (Hererra et al., 2018; Hassler et al., 2017). Both previous studies found that a VR perspective taking tool could positively influence behaviors related to addressing homelessness and interacting with outgroup

members. While the current study was unable to determine causality, future work should continue to explore if VR tools can promote a desire to improve on community engagement.

Aim 4: Role of Emotion Dysregulation

Lastly, the literature suggests that other aspects of emotion regulation could play critical roles in outgroup emotion. Suppression and difficulties in emotion regulation appear most detrimental to intergroup interactions and adaptive regulation of negative emotion (Apfelbaum et al., 2008; Gordon & Chesney, 2017; Johnson, et al., 2010). Contrary to previous literature, in initial exploratory correlations, suppression was not related to empathy, thus limiting the ability to conduct linear regressions. However, hypothesis 4 was partially supported; greater difficulty in regulating emotion was negatively related to empathy after the Inner perspective and police backstories.

Difficulties in regulating appeared to have a negative relationship with empathy when participants were experiencing the Inner perspective, *the VR component perhaps most distinct from their identity and most connected to outgroup emotion*. Further, this VR component may lead to the highest level of perceived threat toward their ingroup, given heightened emotionality and threatening behavior. Greater sense of threat can interfere with perspective taking (Groom, et al., 2009; Pierce, et al., 2013), thus potentially serving as an explanation for the relationship between difficulty regulating and empathy. An inability to regulate an initial threat perception could lead to less empathy toward one's outgroup which negatively shapes the interaction. Similarly, difficulties in regulating was negatively related to empathy after the police backstories, *the VR component most consistent with their ingroup identity* (i.e. police characters). It is

possible that difficulty in regulating emotion toward their outgroup is negatively related to the ability to experience empathy toward the community member when focused on their ingroup characters' backstories and perception of the scene. Again, this is consistent with previous research examining IET and the role that ingroup identity can play on individual emotions. When ingroup identity is heightened, participants may feel greater negative emotion toward the outgroup, even if the outgroup is not directly threatening participants (Mackie et al, 2018; Smith et al., 2007). Notably, results were inconsistent with literature implicating suppression as a strategy that can influence group-based emotion. Previous work found that suppression leads to unhelpful reduction of emotion during intergroup interaction (Gordon & Chesney, 2017; Johnson et al, 2010).

Interestingly, literature exploring the impact of dysregulation on mental health in police implicates suppression and difficulties in regulation as well; poorer regulation skills and tendency to use expressive suppression predict greater depression and burnout in police (Berking et al., 2010; Schaible & Six, 2016). Future work should continue to evaluate whether suppression and regulation difficulties play a role in IET and intergroup experience between police and community members.

Implications and Future Directions

The current study aimed to evaluate the effectiveness of a novel VR tool on several outcome measures within a Chicago police sample. Given research suggesting biased policing of racialized individuals within the United States, we sought to determine the role of perspective taking, counterstereotypical information and reappraisal within a VR tool designed to enhance empathy, reduce implicit bias and promote intended community engagement. To our knowledge, this was the first VR tool of its kind to be

developed using police and community voices within the population of interest to create a relevant scene related to community-police tension. Additionally, this was the first VR tool to be tested within a police sample to evaluate empathy toward community and reduction of implicit bias (though other VR-like trainings are used in shoot; don't shoot paradigms and training purposes within police departments).

In the current study, the VR tool successfully reduced bias immediately following the tool. Yet, given evidence that community backstories most effectively increased empathy, counterstereotypical information may be most critical to producing change. By repeatedly measuring empathy, we were able to elucidate which component best promoted empathy toward a community member. Assessing empathy for one's outgroup member proved to be a necessary and informative aspect of the study. Consistent with previous work, outgroup emotion predicts behavior with one's outgroup. In this case, empathy after community backstories (i.e. receiving counterstereotypical information about the outgroup) predicts greater intention to engage with one's community in potentially restorative ways.

We were further able to demonstrate that emotion regulation plays a role in this empathy building. Indeed, not only was reappraisal predictive of greater empathy, difficulties in regulation seemed to predict poorer empathy during critical moments of the tool. Reliance on implicit biases and negative outgroup emotion are likely to occur when there is perception of threat or infringement on ingroup identity (Mackie, et al., 2008). This highlights the need for continued integration of emotion regulation in research on biased policing. Regulation is integral to how we interpret our experience. In the current study, it is possible that reappraisal mitigated a threat response and promoted empathy by

reframing the threatening scene as one couched within the greater context of someone's life. This demonstrates how emotion regulation can promote less biased interpretations of the community, particularly when considering the role that threat cues have in police decision-making. Lastly, while police who reported greater ability to utilize reappraisal reported feeling more empathy, acute reappraisal use was not significantly related to empathy. It is possible that the items on the ERQ-SF (Egloff et al., 2006) looking at acute reappraisal did not appropriately capture reappraisal of group-based emotions in the given context (i.e. reappraising a "threatening" community member as someone needing support). Yet, variability in empathy ratings suggests varying degrees of regulation throughout the VR tool. There is a need to better evaluate group-based regulation within police officers interacting with community members. While reappraisal is one adaptive strategy, research suggests that individuals can use a multitude of strategies in any one situation (Chesney, et al., 2019). By examining several strategies, we can begin to better understand how strategies can successfully be employed to promote greater empathy in police officers. Indeed, improving emotion regulation skills is promising for improving mental health outcomes in police and could be a useful tool when working with police officers who often misinterpret racialized individuals as a greater threat (Berking et al., 2010; Schaible & Six, 2016). And while emotion regulation is often at the forefront of many clinical interventions within mental health treatment (e.g. dialectical behavior treatment; Linehan, 1993), very limited work has explored emotion regulation in police officers. Given the critical role negative emotion and threat within cases of police violence, it is imperative to begin evaluating emotion regulation as a mechanism to reduce police brutality.

Limitations

While the current study extends the literature on outgroup emotion regulation in police, it is not without limitations. Our first limitation was the lack of manipulation of emotion regulation in the VR tool. Specifically, we were able to demonstrate that reappraisal predicted empathy, yet unable to definitively determine a causal relationship. Another limitation is the manner in which the perspectives were filmed and viewed. While we intentionally used live-action to avoid the limits of VR animation, the angle of the Inner perspective served as a proxy for perspective taking without necessarily seeing the scenario from the community member's eyes. As such, it was possible for participants to avoid viewing the community member's viewpoint and experience throughout the scene (e.g. solely looking at police characters or other aspects of the scene). While this promotes ecological validity, the limited control over what participants chose to view is one drawback to a 360° VR environment in an experimental design.

Additionally, our study focused predominantly on acute emotional and cognitive outcome measures. We incorporated intended future community engagement as a proxy for behavior. However, self-reported intended behavior is subject to social desirability and not always consistent with actual behavior (Sheeran, 2002; Sheeran & Webb, 2016). Further, while there was an immediate reduction in implicit bias, we were unable to evaluate long-term effects on implicit bias. Given the promise of our findings, future steps should include evaluation of long-term effects of the VR tool on cognitive and behavioral outcome measures as well as community level data (e.g. changes in policing of racialized neighborhoods). Lastly, the current study aimed to better account for the role of group-based emotion regulation and IET within police violence. However, given

the limited scope of our study, we were unable to evaluate other factors that likely influence participants' experience of the VR tool. It is possible that other individual characteristics (e.g. years in the force or previous experiences with mental health crises) could play a critical role in their perception of the VR tool.

Conclusion

Systemic racism in policing is long-standing in the United States. Affective science and literature on emotion regulation have demonstrated the fundamental role that regulation plays in our daily lives. IET further emphasizes how group identities shape emotion and the power of empathy when one can regulate perceived threat from outgroups. The current study highlighted the importance of emotion regulation in our police and building empathy to reduce implicit bias toward their fellow community members.

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