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| **Author(s):** | **M. Lyn Exum, Ph.D.; Shelley L. Johnson, Ph.D.; Joseph B. Kuhns, Ph.D.; and Samuel E. DeWitt, Ph.D.** |
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**PRINCIPAL INVESTIGATORS:** M. Lyn Exum, Ph.D.[1]
Associate Professor

**CO-INVESTIGATORS:** Shelley L. Johnson, Ph.D.[1]
Professor

Joseph B. Kuhns, Ph.D.[1]
Professor

Samuel E. DeWitt, Ph.D.[1]
Assistant Professor

**CONTACT INFORMATION:** [1]Department of Criminal Justice & Criminology
The University of North Carolina at Charlotte
9201 University City Boulevard
Charlotte, NC 28223
lexum@uncc.edu
704.687.0739

**AWARD RECIPIENT:** The University of North Carolina at Charlotte
9201 University City Blvd
Charlotte, NC 28223

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## EXECUTIVE SUMMARY

### Background

Although a comprehensive account of police use of force in the US does not currently exist, the available research suggests that approximately 2% of official police contacts with civilians (and approximately 20% of all arrests) result in an officer's use of force (Eith & Durose, 2011; MacDonald, Kaminiski, & Smith, 2009; Smith, Kaminski, Alpert, Fridell, MacDonald, & Kubu, 2010; cf: Garner, Hickman, Malega & Maxwell, 2018). Estimates of civilian injury during these events is nearly 40% (Smith et al., 2010), with officers being injured during these encounters just as often as civilians (Smith et al., 2010; cf. Federal Bureau of Investigation, 2016b). Given the number of civilians and officers injured each year, police use of force has been labeled by some as a public health crisis in the US (MacDonald et al., 2009).

While most injuries stemming from police use of force are relatively minor, high-profile events (including officer-involved shootings) and the corresponding media coverage surrounding these events has helped to erode the public's trust in the police (Nix & Wolfe, 2017; Verhaeghen & Aikman, 2021). In the wake of the killing of George Floyd in 2020 by a Minneapolis police officer, Gallup reported that the percentage of Americans who had confidence in the police fell below 50%, a historical low (Brenan, 2020). Thus, policing in America is currently experiencing a legitimacy crisis of unprecedented levels (Nix, Campbell, Byers & Alpert, 2017).

While much is known about the *situational factors* of a police encounter that contribute to escalation and use of force (e.g., Alpert & Dunham, 2004; Kuhns & Knutsson, 2010; Smith & Visher, 1981; Kavanagh, 1997; Terrill & Reisig, 2003), far less is known about the *individual-level factors* that shape these decisions. Therefore, the current study sought to examine the

impact of select psychological, cognitive, professional experience and social network factors on police officers' decisions to use force. Additionally, the study examined the impact of a brief citizen education intervention (i.e. the completion of police officer training simulations) on citizens' attitudes toward police and use of force.

**Methodology & Measures**

The analyses in the current study are based on a sample of 64 law enforcement officers and 101 civilians. Participants completed a series of questionnaires designed to measure, among other things:

1. The personality traits of Positive Emotionality (contentment), Negative Emotionality (irritability) and Constraint (self-control)
2. Need for Cognition (how much one enjoys and engages in higher-order thinking)
3. Cognitive Reflection (the tendency to scrutinize one's own gut reactions)
4. Professional experiences as a police officer (law enforcement participants only)
5. The size of friendship networks within the workplace (law enforcement participants only)
6. The participant's perceptions of how their friendship networks would be impacted if the participant were to use excessive force (law enforcement participants only)

All participants completed three training scenarios inside a firearms training simulator. Participants interacted with noncompliant suspects on video screens and could attempt to resolve the conflict with de-escalation tactics, non-lethal force options (pepper spray or taser), or lethal force (firearm). All participants completed the same three scenarios, each with a separate task for the participant to complete. The tasks were:

1. Removing a homeless man with an apparent mental illness from the town park after hours (low threat encounter)
2. Subduing a suspect who is actively avoiding arrest and is about to about to stomp on a police officer who was pushed to the ground (medium threat)
3. Subduing a suspect who has overpowered a police officer and is holding a gun to the officer's head (high threat)

Data collected from these training exercises included:

1. Whether or not the participant used any type of force
2. If force was used, the length of time required to make that decision
3. The type of response tactic the participant used, be it de-escalation techniques, non-lethal force options (pepper spray or taser), or lethal force option

Finally, immediately before and after civilians completed the training scenarios, they completed a series of questions designed to measure their attitude toward police and police use of force. These questions can be grouped into four broad categories:

1. Civilians' impressions of the difficulty and dangerousness of police work
2. Civilians' views of police officer professionalism and decision making
3. Civilians' views on the appropriate level of force in various confrontational situations
4. Civilians' global perceptions of the police

**Analyses & Results**

A series of logistic, multinomial and ordinary least squares analyses were conducted to explore the effect of the individual-level factors on use of force decision making. Overall,

personality traits were largely unrelated to use of force decisions, with the exception of high levels of Negative Emotionality being associated with a higher likelihood of using lethal force relative to non-lethal force. Similarly, Need for Cognition and Cognitive Reflection were largely unrelated to use of force decisions, with the exception of higher Cognitive Reflection scores predicting greater use of de-escalation techniques compared to lethal force.

Professional training as an officer (compared to civilians with no police training) was associated with several use of force outcomes. For example, officers were less likely to use force in the scenario than civilians, especially in the low- and medium-threat situations. Officers are more likely than civilians to use de-escalation tactics than pepper spray/tasers, but more likely to than civilians to use lethal force versus non-lethal force. Compared to officers with greater years of experience, officers with fewer years of experience are more likely to use force in the low-threat (Homeless Man) scenario. At the same time, officers who have had more prior complaints and/or sanctions for misconduct were more likely to use force than de-escalation techniques, but less likely to use lethal force than non-lethal options.

Officers' professional friendship networks mattered as well. Officers with larger social networks were more likely to use force of any type. Furthermore, officers who felt that the strength of their network ties would grow *stronger* if they were suspended for excessive force (a measure of peer support surrounding use of force) were more likely to use force of any type, more likely to use force in the low-threat (Homeless Man) scenario, used force more quickly, and were more likely to use pepper spray/taser relative to de-escalation techniques.

Finally, a series of paired sample t-tests were used to compare civilians' pretest and posttest measures of attitudes toward police immediately before and after their simulator

exercises. Despite the civilians in the study having highly favorable opinions of the police at baseline, their appreciation of the difficulties, stressfulness and dangerousness of police work grew even higher following the simulator training. After completing the simulator exercises, civilians also were more likely to believe that the police behave professionally, that they are treated too harshly by the media, and that they should be paid more for what they do. Civilians also were less likely to feel that the police are too quick to use force or are "trigger happy." In terms of their views on use of force, after the simulator training civilians generally felt that *higher* levels of force were appropriate across a variety of circumstances–but not *every* circumstance. For example, there was no change in use of force acceptance levels in situations where there is very little threat to officers or where there is great threat. Civilian use of force attitudes appear to be most malleable for circumstances in-between these extremes.

**Conclusions & Implications**

While personality traits were largely unrelated to use of force decision making in this study, the fact that individuals scoring higher in Need for Cognition were more likely to use de-escalation techniques compared to lethal force suggests that these individuals are more cognitively flexible and are willing to consider additional means for resolving conflict besides lethal force. Police departments may benefit from assessing the cognitive flexibility of their officers as they conduct de-escalation training in order to determine which officers may be better equipped to defuse potentially combative situations without resorting to force (when this can be done safely).

The differences in how police responded to the training scenarios compared to civilians (e.g., more frequent de-escalation techniques in low-threat situations) suggest that when it comes

to use of force decisions, *officer training matters*. However, an officer's past history of citizen complaints and/or confirmed acts of misconduct are also important predictors of using force. Police departments may benefit from the use of early intervention/warning systems (Alpert & Walker, 2000; Walker, 2003) that can capture historical data on officer misconduct, and use that as a tool for identifying officers who may need further training.

The social network of police officers (and in particular, the network's endorsement of excessive uses of force) also impacts the decision making process. Law enforcement leaders should be mindful of this and pay attention to officers who maintain close friendships with officers who accumulate numerous and documented excessive force complaints. Leaders should also understand that those attitudes about excessive force can be coached and be contagious, and can also migrate across social networks.

Finally, educational opportunities for citizens to experience the complexities and challenges of use of force decision making can positively impact their attitudes toward the police. Communities and law enforcement agencies that are continually challenged by misuse/excessive force complaints, or by recent officer-involved shooting events, may wish to consider educational tools such as firearms training simulators or other virtual reality technology as one method of improving police-community relationships.

## INTRODUCTION

Although a comprehensive account of police use of force in the US does not currently exist, the available research suggests that approximately 2% of official police contacts with civilians (and approximately 20% of all arrests) result in an officer's use of force (Eith & Durose, 2011; MacDonald, Kaminiski, & Smith, 2009; Smith, Kaminski, Alpert, Fridell, MacDonald, & Kubu, 2010; cf: Garner, Hickman, Malega & Maxwell, 2018). More than half of these incidents (53.5%) involve the officer pushing or grabbing the suspect. Kicking or hitting occurs in far fewer cases (12.6%), as does the use of chemical/pepper spray (4.9%) and electroshock/stun gun (4.1%). In approximately one-fourth of these use of force incidents, officers point their firearm at the suspect. Among all persons experiencing these various types of force, 80.6% felt the officer's actions were excessive (Eith & Durose, 2011). Regardless of their veracity, these pervasive perceptions of mistreatment serve to undermine citizens' trust in law enforcement, and ultimately weaken police/community relations (Correll, Park, Judd, Wittenbrink, Sadler, & Keese, 2007; Landman, Nieuwenhuys, & Oudejans, 2015; Rosenbaum, Schuck, Costello, Hawkins, & Ring, 2005; Verhaeghen & Aikman, 2021; Weitzer & Tuch, 2005).

In addition to this social harm, police use of force often leads to physical harm. Approximately 20% of civilians who experience force during a police contact report being injured as a result (Eith & Durose, 2011), while official agency records suggest the prevalence of civilian injury is nearly 40% (Smith et al., 2010). Police officers are also subjected to harm during use of force incidents, and are injured at rates comparable to those of civilians (Smith et al., 2010; cf. Federal Bureau of Investigation, 2016b). Most of the injuries to civilians (and

officers) involve bruises, abrasions, and muscle strains; however, fatal injuries do also occur. According to the Federal Bureau of Investigation (2020), approximately 400 cases of justifiable homicide by law enforcement officers occur each year in the US; yet, according to *The Washington Post* (n.d.), approximately 1,000 people are fatally shot by police (justified or not) in a given year. An additional 73 police officers in the US were feloniously killed in 2021 while serving in the line of duty (Federal Bureau of Investigation, 2022).

Non-lethal weapons such as oleoresin capsicum spray (i.e., OC spray, commonly referred to as pepper spray) and conducted energy devices (i.e., CEDs, commonly referred to as tasers) afford officers additional means through which to control non-compliant suspects. While these weapons may indirectly lead to civilian deaths in certain situations (see Amnesty International, 2011; National Institute of Justice, 2008), the use of less lethal weapons—especially CEDs—is generally associated with a *decrease* in the likelihood of injury to both officers and civilians, reducing the monthly incidence of injury by as much as 62% (MacDonald et al., 2009; see also Smith, Kaminski, Rojek, Alpert, & Mathis, 2007; Moribito & Doerner, 1997). Thus, the availability of these weapons generates a net savings in harm by altering police officers' use of force decisions—at least, under certain conditions.

For example, when Las Vegas police officers were randomly assigned to carry a CED (or not) and then completed field training scenarios with varying degrees of suspect resistance, the availability of the CED did not influence how officers responded to non-aggressive suspects (Sousa, Ready, & Ault, 2010). In these situations, officers with and without a CED generally used empty hand force even though less lethal weapon use was an approved response. However, when suspects displayed aggressive resistance, many officers with a CED made a *decisional shift*

away from using OC spray (34.4 percentage point difference) and batons (28.2 percentage point difference), and instead chose to use the CED. Furthermore, when faced with possible lethal resistance by the suspect, many officers with a CED made a shift away from using their firearm (31.2 percentage point difference). Note that despite being subjected to the same set of training scenarios, only certain officers with a CED experienced a decisional shift, suggesting that individual differences are influencing officers' use of force decisions.

While much is known about the *situational factors* of a police encounter that contribute to escalation and use of force (Alpert & Dunham, 2004; Kuhns & Knutsson, 2010; Smith & Visher, 1981; Kavanagh, 1997; Crawford & Burns, 1998; Garner, Maxwell, & Heraux, 2002; Terrill & Mastrofski, 2002; Terrill & Reisig, 2003), far less is known about the *individual-level factors* that shape these decisions. Therefore, the current study sought to examine the impact of select psychological, cognitive, social and professional factors on police officers' decisions to use force. Given that police use of force is a "public health problem" in the US that injures tens of thousands of civilians and officers annually (MacDonald et al., 2009:2273), understanding the factors that shape an individual officer's decision to use force may ultimately enhance outcomes in police-citizen interactions.

As a secondary focus, the current study also sought to examine the impact of first-hand experiences with making use of force decisions on citizens' attitudes toward the police. Despite the fact that most US residents have had no face-to-face interactions with police officers (Eith & Durose, 2011), the general public holds well-defined opinions about the policing profession. These attitudes about policing–and about the criminal justice system more broadly–appear to be influenced *not* on personal experiences, but on portrayals in the media (Dowler, 2002; Dowler &

Zawilski, 2007; Intravia, Wolff & Piquero, 2018; Surette, 2007). Therefore, the current study provided civilians with an opportunity to assume the role of an officer and make use of force decisions inside a video simulator. Pre-post changes in participants' attitudes toward the police were recorded to see if first-hand educational experiences (such as the video simulator) could impact pre-existing public perceptions.

## LITERATURE REVIEW

Decision making has been conceptualized as a "dual process model" consisting of two interrelated cognitive systems, sometimes referred to as System 1 and System 2 (Chaiken, 1980; Kahneman, 2003, 2011; Petty & Cacioppo, 1986; Shiffrin & Schneider, 1977; Stanovich & West, 2000). System 1 processing occurs subconsciously and makes decisions quickly and instinctively, or based on mastery that comes from repeated training. System 2 processing occurs within conscious thought and makes decisions more slowly, thoughtfully, and under the control of human agency. While many everyday decisions are made without deliberation (System 1), additional cognitive resources (System 2) may be invoked when the decisions are particularly complex, involve a high degree of uncertainty, and/or require further evaluation (Kahneman, 2011). This dual process model can not only help us to understand the mundane decisions we all make in our daily lives, but also the potentially injurious decisions that law enforcement officers make while on duty (see Mears, Craig, Stewart & Warren, 2017).

Police officers are required to make critical decisions under stress, such as the split-second decision to use force in situations involving "a rapidly evolving scenario, complex environment, a great deal of uncertainty and a high degree of fear" (Saus, Johnsen, Eid, Riisem, Andersen, & Thyer, 2006: S4). Heightened emotional/arousal states—such as stress—impact the

neurocognitive foundations that underlie decision making (Bechara & Damasio, 2005; Dror, 2007; Exum, Austin, & Franklin, 2017; Starcke & Brand, 2012), including the decisional processes of police officers (Kleider & Parrott; 2009; Kleider, Parrott & King, 2010; Nieuwenhuys, Savelsbergh, & Oudejans, 2012). For example, in simulation studies, anxiety has been found to alter the "shoot/don't shoot" decision, prompting officers to shoot suspects more frequently, more quickly, and more often in error (i.e., when suspects are surrendering; Nieuwenhuys et al., 2012). The process by which heightened emotional states impact decision making can be understood through the lens of the dual process model (Dror, 2007; Exum et al., 2017; Mears et al, 2017).

By the time an individual becomes consciously aware of a highly charged situation, System 1 has already completed a series of quick, pre-attentive cognitions designed to assess the level of risk. As the individual becomes increasingly alarmed, the brain focuses its attention more heavily on relevant threat-related cues while simultaneously ignoring many other aspects of the encounter. This form of tunnel vision (or "attention narrowing;" see Loewenstein, 1996) constrains the amount of information being processed at that particular moment (Exum et al., 2017). Any decision made at this stage could be considered a gut reaction rather than a deliberative decision. Given the countless number of actions individuals make each day and the increased cognitive effort required to operate System 2, much of the brain's decision making activity resides solely under System 1's control (Kahneman, 2011). Very often, these gut reactions are our *best* course of action.

Note that with some additional cognitive effort, gut reactions can be submitted to System 2 for further evaluation (Exum et al., 2017). System 2 then gathers information from elsewhere

in the brain to assess more deliberatively and more thoughtfully the quick, instinctual decision submitted by System 1. However, during heightened emotional states, System 2 may experience difficulty in accessing and processing this additional information (Exum & Zachowicz, 2014; Exum et al., 2017), thereby compromising the individual's ability to make more fully informed decisions. Regardless of these constraints, the interplay between System 1 and 2 yields a decision that appears to be the most optimal to that particular *individual* at that particular *time* and in that particular *state of mind*. Seemingly in recognition of this, the Supreme Court affirmed in *Graham v. Connor* (1989) that when assessing the reasonableness of a police use of force event, one must consider that "police officers are often forced to make split-second judgments in circumstances that are tense, uncertain, and rapidly evolving," and must view the event from the perspective of the "officer on the scene, rather than with the 20/20 vision of hindsight."

## Decision Making under Stress: Risk & Protective Factors

There are risk and protective factors that can, in theory, impact the influence of stress on decision making. These factors include (1) personality traits, (2) cognitive styles, (3) professional training/experience, and (4) officer social networks.

### *Personality Traits*

Personality refers to the relatively stable pattern of thoughts, attitudes and beliefs that shape how we see the world around us. It influences our emotions, our motivations, and our behavior (Derlega, Lewis, Harrison, Winstead, & Costanza, 1989; Magnusson, 1990). Although there is a large literature examining if there is a "police personality" and how the personality traits of officers may be predictive of general job performance (e.g., Barrick & Mount, 1991; Detrick & Chinbnall, 2002; Gerber, 2019; Sanders, 2008; Twersky-Glasner, 2005), there is scant

research on the relationship between personality traits and use of force decision making. This is surprising given that global personality assessments commonly measure a wide variety of individual personality traits that are relevant to decision making, including use of force decision making.

One such personality assessment that can be useful in studying police officer decision making is the Multidimensional Personality Questionnaire-Brief Form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002). The MPQ measures a series of individual personality traits that can be grouped into three higher order superfactors known as constraint, negative emotionality, and positive emotionality (Patrick et al., 2002). As Caspi and Silva explain (1995:492):

> Constraint is the combination of the traditionalism, harm avoidance, and control scales. Individuals high on this factor tend to endorse social norms, act in a cautious and restrained manner, and avoid thrills. Negative emotionality is a combination of the aggression, alienation, and stress reaction scales. Individuals high on this dimension have a low general threshold for the experience of negative emotions such as fear, anxiety, and anger and tend to be involved in antagonistic relationships. Positive emotionality is a combination of the achievement, social potency, well-being, and social closeness scales. Individuals high on positive emotionality have a lower threshold for the experience of positive emotions and tend to view life as being essentially a pleasurable experience.

Positive emotionality, negative emotionality, and constraint are highly correlated with a number of other personality measures including Goldberg's (1990) five factor model[1] (see Church, 1994; Tellegen & Waller, 2008) and the MMPI (see DiLalla, Gottesman, Carey, & Vogler, 1993). The MPQ-BF's relationship with the MMPI is especially noteworthy given that the MMPI (and MMPI-2) has been used extensively by police agencies to screen potential recruits (Dantzker & McCoy, 2006) and is associated with various measures of officer performance, including professional misconduct (see Cullen, Ones, Drees, Viswesvaran, & Langkamp, 2003; Davis, Rostow, Pinkston, Combs, & Dixon, 2004; Sellbom, Fischler, & Ben-Porath, 2007; Weiss, Davis, Rostow, & Kinsman, 2003). MPQ scores are also predictive of a variety of behavioral measures (Tellegen, 1985), including academic performance, health and wellness, juvenile delinquency, aggressive behavior, and non-aggressive rule breaking (Burt & Donnellan, 2008; Caspi, Moffitt, et al., 1994; Kreuger, Schmutte, et al., 1994; Kreuger, Caspi, Moffitt, White, & Stouthamer-Loeber, 1996; Komarraju & Karau, 2005).

The MPQ-BF is well suited to identify personality factors associated with police use of force decisions. For example, negative emotionality—which is correlated with trait anxiety—refers to a tendency to construe life in a very negative and anxious way, often leading individuals to perceive relatively benign situations as threatening (Caspi et al., 1994). This dispositional tendency to see threat can trigger System 1's pre-attentive cognitions to focus on selected cues in the environment, which in turn influence the officer's gut/instinctual decision. Additionally, individuals who are weak in constraint tend to engage in risky (and even aggressive) behaviors

[1]Research suggests negative emotionality is correlated with neuroticism and agreeableness, positive emotionality is correlated with extraversion and conscientiousness, and constraint is a controlled aspect of conscientiousness and openness to experience.

with little concern for the consequences (i.e., with little System 2 oversight). Thus, in much the same way that individuals who are high in negative emotionality and weak in constraint are more prone to crime and delinquency (including violent behaviors; see Baglivio, Wolff, DeLisi, Vaughn & Piquero, 2016; Caspi et al., 1994; DeLisi & Vaughn, 2014; Krueger, Schmutte, Caspi, Moffitt, Campbell & Silva, 1994), we would expect that officers with this same clustering of superfactors are more prone to reacting to stressful situations with quick, impulsive, and potentially unnecessary force rather than deferring to their professional use of force training.

***Cognitive Styles***

*Need for Cognition.* Need for Cognition (NFC) represents one's motivation to engage in—and the personal enjoyment received from—effortful, higher-order thinking (Cacioppo & Petty, 1984; Cacioppo, Petty, Feinstein, & Jarvis, 1996). Individuals who are high in NFC are not necessarily more capable of engaging in more challenging cognitive tasks; they are simply more intrinsically willing to do so and therefore they scrutinize their environment more closely.

We are unaware of any research that has examined the role of NFC in police use of force; however, there is evidence to suggest that NFC impacts other criminal justice-related judgements and decisions. For example, mock jurors who are high in NFC (compared to low NFC) are better able to discriminate between a weak versus strong case against a defendant (Leippe, Eisenstadt, Rauch, & Seib, 2004), to discriminate between competent versus flawed expert witness testimony (McAuliff & Kovera, 2008), to remember jury instructions as provided by a judge (Allison & Brimacombe, 2010), and to heed those instructions as they pertain to disregarding evidence deemed inadmissible (Sommers & Kassin, 2001). Furthermore, high NFC individuals are more likely to attribute an offender's illegal behavior to a complex set of factors (e.g., lack of

wealth and power), are less likely to impose a guilty verdict on a defendant, and are less likely to support highly punitive sanctions (Petrocelli & Dowd, 2009; Pope & Meyer, 1999; Sargent, 2004). Given this body of research, it is reasonable to conclude that when high NFC and low NFC police officers encounter a suspect, the two groups scrutinize that suspect's behavior (and culpability) differently. This, in turn, impacts the information available to System 1 and System 2, and may ultimately result in different use of force decisions.

*Cognitive Reflection.* Cognitive Reflection (CR) is conceptually similar to and statistically correlated with NFC, but nevertheless constitutes a separate, unique construct (Frederick, 2005). CR refers to the mental discipline one must have to look beyond an impulsive gut reaction in favor of a more thoughtful, deliberative response (Frederick, 2005; Toplak, West, & Stanovich, 2011). For example, consider the following math exercise: *Divide 30 by ½ and then add 10*. Individuals who are more cognitively reflective will look beyond the intuitive answer (25) and, after further thought, correctly state that the answer is 70.

Individuals who differ in CR make different choices. Illustratively, when faced with a choice between an immediate reward now and a larger reward in the near future, high CR individuals are more likely to choose the delayed reward whereas low CR individuals prefer immediate gratification (Frederick, 2005). When faced with hypothetical moral dilemmas, high CR individuals are more likely than low CR individuals to choose the more utilitarian solution, thereby selecting the greatest good for the greatest number of people (Paxton, Ungar, & Greene, 2011; see also Baron, Scott, Fincher, & Metz, 2015). In a test-taking environment, low CR students are more likely to cheat in order to earn a financial reward whereas high CR students choose to remain honest and forgo any ill-gotten gains (Nagin & Pogarsky, 2003). In gambling

tasks, low CR individuals tend to be risk-seeking in the face of a loss but risk-averse to achieve gains (Frederick, 2005), just as Prospect Theory would predict (Kahneman & Tversky, 1979). However, high CR individuals do not follow this same pattern and instead choose risky options for losses and gains at comparable rates (Frederick, 2005; see also Campitelli & Labollita, 2010).

Whether the high CR preferences in each of the above examples represent "better" or "smarter" choices is largely a matter of opinion. However, the point we wish to make is that high and low CR individuals think about risk and reward *differently*, which leads them to make *different* decisions. To our knowledge, there are no studies examining CR and police decision making; however, research on a sample of academics, students and professional judges has found that high CR individuals (compared to low CR) were more lenient and less likely to convict a hypothetical defendant charged with a crime (Rassin, 2015). While we do not know if high CR police officers behave in a more lenient fashion when it comes to their use of force decisions, given the available research it is reasonable to conclude that high CR officers will be more willing to engage in System 2 processing and less likely to rely solely on gut instinct.

***Professional Experience***

Policing is often viewed as a "craft" that cannot be easily taught in the classroom (Bayley & Bittner, 1997), and is best learned through repetitive exposure to real world situations. Veteran officers—i.e., those with more years of experience—are generally viewed by their colleagues as being better able to manage encounters with non-compliant citizens (Bayley & Garofalo, 1989); and in fact, empirical evidence suggests they are less likely than rookie officers to use both physical and verbal force during encounters with civilians (Paoline & Terrill, 2007). To help rookie officers gain more exposure to these types of encounters and in a more timely manner,

police departments routinely offer professional use of force training. Training has been shown to hone officers' *behavioral skills*. For example, compared to rookie officers, police officers trained extensively in dealing with firearm incidents are more likely to focus their eye gaze in areas where a weapon might be hidden, are better able to anticipate a suspect drawing a weapon, and are faster at drawing, aiming and firing their own firearm (Vickers & Lewinski, 2012).

In theory, training should also hone officers' *decisional skills*. Use of force exercises—especially those involving life-like simulations that induce heightened states of stress/anxiety—should: (1) acclimate officers to high pressure situations, (2) reduce the detrimental cognitive effects officers experience in these situations, and as a result, (3) lead to better decision making under stress (Bennell, Jones, & Corey, 2007). In actuality, however, the research on training and decision making is mixed. For example, Oudejans (2008) found that officers who first trained in a realistic shooting simulation under the threat of physical harm showed greater shooting performance (i.e., they correctly shot armed targets and refrained from shooting unarmed targets). However, in a more recent study, Nieuwenhuys, Savelsbergh and Oudejans (2015) were unable to replicate these initial findings. Training under stressful conditions was unable to mitigate the impact of stress on officers' shooting decisions. Collectively, this line of research suggests that more years of professional experience *may* influence police decision making under stress, but additional research is needed.

***Social Networks***

Most law enforcement agencies have a defined organizational culture (Paoline & Terrill, 2014). These cultures develop, to some degree, around how police officers interact with one another, with their supervisors, and with citizens and other external constituents. Organizational

cultures are important because they help to define the collective attitudes and values of the group. As Louis (1983:25) notes, "culture embodies the identity of the social group. What we, as members, stand for and how we deal with one another and with outsiders is carried in and through our culture." The values that a person stands for and the belief system for how to deal with one another are ideals that become cognitively entrenched within the individual. As a result, they help to influence the cognitions (and pre-attentive cognitions) that underlie System 1 processing, and when the individual is faced with especially complex moral dilemmas, they may be called upon to guide System 2 deliberations.

Police officers' perceptions about the limitations and justifications for using force are partially informed by the unit's organizational culture (Weisburd, Greenspan, Hamilton, Bryant, & Williams, 2001). This is not a recent discovery. Nearly 50 years ago, Rubinstein (1973:46) observed that "…the amount of force a policeman uses does not depend solely on himself, but also on the character of the people he polices and on the policies of his department." Given that social networking processes help to constitute organizational culture and that police culture impacts the belief system of the officer (including beliefs about using force), it follows that use of force decisions are influenced by police officers' social networks.

In spite of the rich history of police subculture research (see Crank, 2004; Paoline & Terrill, 2014), social network methods have yet to be widely employed to examine discretionary officer behavior. There are various reasons for this that are not limited to barriers between police officers and the public in general (i.e., the "blue code of silence"), but recent innovations in evidence-based police practices, closer relationships between researchers and the police, and an overall movement toward transparency have created an opportunity to reinvigorate research into

the influence of police subculture on discretionary officer behaviors. Considering that recent research suggests that features of an officer's social network explain police behavior better than individual-level characteristics (e.g., experience, age, race; Gravel, Hashimi, Oullet, & Chi Tong, 2017), research is needed to explore how officer peer groups and social relationships influence the way officers make decisions, including those made under stress.

**Citizen Education Programs & Attitudes Toward Police**

The year 2020 was a watershed moment in terms of the public's perception of the police. In the wake of the killing of George Floyd by a Minneapolis police officer, Gallup reported that the percentage of Americans who had confidence in the police fell below 50% for the first time in the company's history of tracking these attitudes (Brenan, 2020), and public's outcry for police reform gained enough traction to become a talking point in the 2020 Presidential race (Pierce 2020). Much of this loss of confidence can be traced to high-profile use of force events like the George Floyd killing, and the corresponding media coverage (Nix & Wolfe, 2017; Verhaeghen & Aikman, 2021). As confidence fades, a vast disconnect between the police and the public they serve grows. For example, whereas 83% of Americans feel they understand the "risks and challenges" of police work, a nearly identical percentage of officers (86%) feel the public does not understand these aspects of policing (Pew Research Center, 2017a).

Citizen education and awareness programs are tools commonly used by police departments to reconcile the disconnect and distrust between them and the public. One such program is the Citizen Police Academy (CPA), which first began in the US in 1985 (Lee, 2016). While the format and content of CPAs may vary from department to department, the general purpose of the program is to provide citizens with insight into the operations, personnel, and

policies/procedures of their local police force. Citizens are able to meet with sworn officers, participate in ride-alongs, and learn about local crime trends, patrol/investigation practices, and use of force policies (Lee, 2016). Completion of these multi-week programs has been shown to grow a more favorable impression of local law enforcement, and of the criminal justice system more broadly (Lee, 2016; Perez, Nguyen & Vogel, 2021; 2022). Whether a more *acute* educational experience–such as brief exposure to use of force training exercises–can also impact citizen attitudes toward police remains largely untested. Therefore, the current study sought to examine the impact citizens' experiences in a firearm training simulator on their attitudes toward use of force decisions.

## RESEARCH GOALS AND QUESTIONS

The purpose of the current study is to examine the impact of personality traits, cognitive styles, professional experience and officer social networks on officers' use of force decisions during stressful situations. As a secondary focus, the current study seeks to examine the impact of firearm training exercises on citizens' attitudes toward the police. The study has four main goals, each with a series of objectives. They are:

> ***Goal 1:*** To examine factors associated with decision making in stressful officer-citizen encounters.
>
> > *Objective 1*: Assess personality and cognitive processing among police officers and citizens.
> >
> > *Objective 2*: Assess social networks among police officers.
> >
> > *Objective 3*: Collect background information including demographics, prior training experiences, years of service, prior misconduct, and military experience.

***Goal 2:*** To assess outcomes of simulated stressful officer-citizen encounters.

*Objective 1*: Expose police officers and citizens to stressful officer-citizen encounters through the use of a firearms training simulator.

*Objective 2*: Compare the differences in decisions reached during the simulated encounters within officers, and also between police officers and citizens.

*Objective 3*: Isolate the role of personality in the decisions reached during the simulated encounters.

***Goal 3:*** To provide information that can be used by police agencies to enhance positive police-citizen interactions.

*Objective 1*: To enhance citizens' understanding of the difficulty of making decisions in stressful encounters which involve use of force.

*Objective 2*: Develop recommendations for officer training through the use of the simulated use of force training scenarios.

*Objective 3:* Disseminate findings to police agencies to augment current training efforts.

***Goal 4:*** To examine the impact of a brief educational experience on citizens' attitudes toward the police.

*Objective 1:* Expose citizens to stressful officer-citizen encounters through the use of a firearms training simulator.

Objective 2: Collect and compare pre- and post-test measures of citizens' attitudes toward policing and police use of force.

The specific research questions to be addressed in the current study are:

***Question 1:*** How do personality traits, cognitive styles, professional experience and officer social networks influence the decision to use force during an encounter with a non-compliant citizen?

***Question 2:*** How do personality traits, cognitive styles, professional experience and officer social networks influence the length of time required to make a force/no force decision during the encounter?

***Question 3:*** How do personality traits, cognitive styles, professional experience and officer social networks influence the type of tactic employed—either verbal de-escalation, less-lethal force or lethal force?

***Question 4:*** Does first-hand experience in a virtual firearms training environment impact civilian's attitudes toward (and perceptions of) police officers and police use of force?

## RESEARCH DESIGN AND METHODS

### Original Design

In the original design of this study, a total of 125 sworn law enforcement officers were to be recruited across three police departments (referred to here as Agency A, B and C) within a single county in the southern piedmont region of North Carolina. These officers would be asked to complete two online surveys: the first assessing personality traits, cognitive styles, professional training/experience, and demographics, and a second survey assessing officer social networks. Officer participants would also be asked to complete a series of use of force exercises while being video recorded inside a VirTra® firearms training simulator. Officers would be prompted to complete the two online surveys prior to the training exercises, but they were not required to complete the study components in that order. For their participation, officers would receive a $20 gift card.

The study also sought to recruit a total of 100 civilians *with no prior law enforcement or military experience* to complete an online survey assessing personality traits, cognitive styles and demographics. No social network survey was to be administered to civilians. The civilians would also be asked to complete the same set of use of force exercises while being video recorded inside the VirTra® simulator. Civilians would be prompted to complete the online survey prior to the training exercises, but they were not required to complete the study components in that

order. For their participation, civilians would receive $20 in gift cards.

**Deviations from the Original Design**

There were three deviations from the original study design and analyses. First, because of complications related to officer recruitment at one of the three participating departments, recruitment was expanded to include sworn officers at additional departments. Second, additional study incentives were offered to officers to encourage participation. Finally, due to a smaller sample of officers completing all of the study elements, some of the analyses (especially some officer-only analyses) could not be performed. Each of the deviations is summarized below.

*Recruitment Deviations*. Recruitment at Agency A and B occurred without any deviations. However, as recruitment was underway at Agency C (the largest of the three departments), the study experienced a series of setbacks that negatively impacted officer participation. First, soon after recruitment had begun at Agency C and officers were beginning to complete the online surveys, the research team was contacted by NIJ advisors who expressed concerns about the use of force training exercises chosen for the study. The advisors were concerned that the exercises might not allow the research team to fully achieve the goals of the grant. All recruitment efforts and data collection were therefore suspended while this matter was being resolved.

Second, as the research team was in conversation with the NIJ advisors about the scenarios, the police department that owned the firearms simulator used in this study received external funding to upgrade the simulator from a single-screen VirTra-100® projector to a five-screen VirTra-300® projector. The research team would therefore need to suspend data

collection further so that the simulator upgrade could be completed. During this time, the team selected new use of force simulations that addressed the concerns of the NIJ advisors.

Once the simulator upgrade was completed, the project was re-launched. All use of force data previously collected with the VirTra-100® simulator were now deemed unusable for the current report, and officers from Agency A and B (who previously completed the study) had to be re-enrolled to complete the new exercises on the VirTra-300® simulator. However, not all officers could be re-enrolled. Some declined to participate during the re-launch phase, while others had left the department in the interim due to retirement or employment elsewhere. Any officers who had been newly hired were invited to participate and recruited into the study where possible. After all officers at Agency A and B who could be re-enrolled/recruited had completed the study, the research team turned its attention to re-launching recruitment efforts at Agency C.

The re-launch at Agency C was scheduled to take place in the Spring of 2020; however, the COVID-19 pandemic led to another suspension in recruitment and data collection. During the initial months of the pandemic, police departments in the targeted county closed their doors to all non-essential traffic. By the time COVID-19 restrictions were lifted and Agency C was willing to re-engage in our research activities, approximately 18 months had passed since recruitment first began at that department. During this passage of time, the research team's point-of-contact at the agency retired, and the team had to find a new point-of-contact. Throughout this process, the research team's initial rapport with Agency C—as well as the recruitment momentum that was building during the initial phase of recruitment—had noticeably waned. Although attempts were made to re-engage and re-connect with the officers in Agency C (e.g., team members attended roll call sessions to discuss the project and answer questions), recruitment from this

department stalled significantly.

Only a few officers from Agency C agreed to participate during this second wave of recruitment, and most officers who had previously completed the online surveys were now no longer interested in completing the VirTra-300® exercises. Anecdotal evidence based on conversations with a few officers suggests that the public's scrutiny of police officers in the wake of George Floyd's death in May of 2020 left many officers leery of having their firearms training sessions be video recorded and included in a study of use of force decision making.

In the face of stalled recruitment at Agency C, the research team began to explore partnerships with other police/sheriff's departments in the general area. The recruitment of sworn officers from these additional agencies was not part of the study's original design.

*Incentive Deviations.* Recruitment from the additional law enforcement agencies was generally sparse. Therefore—and with permission from NIJ—the research team returned to Agency C and offered a new incentive for participation (paid for with the research team's discretionary funds and not NIJ grant funds). In addition to the original $20 gift card incentive, those who completed the study would now also be entered into one of several random drawings for an additional gift card valued at $100. Multiple drawings were offered so that the chance of being chosen was always 1-in-20 or better. (For purposes of equity and fairness, participants from prior and future participating agencies were also entered into these random drawings). These $100 drawings were not part of the study's original design.

Unfortunately, this additional incentive did little to change the recruitment results in Agency C, so the research team continued to pursue partnerships with other agencies, with limited success. In the final months of data collection, the research team contacted officers who

had completed one component of the study (e.g., the online surveys) but not all components (e.g., not the simulator exercises). This group included approximately two dozen officers from Agency C, as well as several additional officers from other partnering agencies. The research team invited these officers to complete their remaining study components, and for doing so they would receive an additional $30 gift card (paid for with the research team's discretionary funds and not NIJ grant funds). This additional incentive was not part of the study's original design, and would be given in addition to the original $20 gift card and in addition to the random drawing for a $100 gift card. This new incentive structure resulted in just one additional participant completing the study.

The above interruptions/delays in recruitment at Agency C dramatically hampered the research team's rapport with the officers there. Furthermore, there is reason to believe that the aftermath of George Floyd's death and the subsequent trial of Officer Derek Chauvin hindered the research team's ability to build trust during the re-enrollment period at Agency C, and at additional agencies. As a result, the team was able to recruit approximately 50% of its targeted number of officer participants. However, there was no noticeable impact on civilian recruitment. Specific information on the recruitment strategies used with law enforcement agencies and civilian populations are described in Appendix A.

*Analytic Deviations*. The smaller sample size of officers restricted the research team's ability to conduct certain analyses of interest. For example, the data would not permit an analysis of use of force decisions *within* the officer sample (only) for each scenario. Certain multinomial regression models predicting the response tactic participants chose (i.e., either verbal de-escalation, non-lethal force or lethal force) failed to converge on a single solution. This required

us to deviate from some of the study's original analyses. Also mindful of sample size, we report findings that are statistically significant at $p<.05$, but also note findings that are marginally significant ($p<.10$).

**Participants**

*Law Enforcement Officers*. One hundred twenty-seven officers across seven agencies were recruited for this study. The seven agencies are referred to as Agency A, B, C,…G (see Appendix A for a description of each agency). Five officers were excluded from the current analyses because the only study component they completed was the firearms training exercises on the original (single screen) VirTra-100® simulator. An additional five officers were excluded because they began the first online survey but never completed it or any other study components.

Table 1 summarizes the remaining 117 officers who completed *at least one* of the study's three major components—i.e., the first online survey examining personality traits, cognitive styles, professional experience, and demographics, the second online survey examining social networks, and/or the VirTra-300® training exercises. The table summarizes the distribution of officers by the study components they completed, and across agencies. Check-marks are used to denote components that are completed, with cross-marks used to denote components that are incomplete or not attempted. Officers are categorized into one of five groups based on the components they completed.

As seen in Table 1, 50 officers completed all three study components (Group 1) and are therefore viable cases for use in addressing the study's research questions. An additional 14 officers (Group 2) completed the first online survey and the training exercises. These Group 2 officers can be combined with Group 1 when examining research questions pertaining to the

relationships between use of force decisions and personality traits, cognitive styles and/or professional experience. Thus, the final sample of officers included in the analyses is 64 sworn officers.

Table 1. Study Component Completion Groups for Officers, by Law Enforcement Agency

| | **Study Component** | | | **Law Enforcement Agency** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Group | Survey 1 | Survey 2 | VirTra 300® | A | B | C | D | E | F | G | **Total** |
| 1 | ☑ | ☑ | ☑ | 13 | 15 | 4 | 3 | 9 | 4 | 2 | **50** |
| 2 | ☑ | ☒ | ☑ | 3 | 1 | 0 | 1 | 2 | 3 | 4 | **14** |
| 3 | ☑ | ☑ | ☒ | 1 | 4 | 16 | 0 | 0 | 2 | 3 | **26** |
| 4 | ☑ | ☒ | ☒ | 7 | 2 | 8 | 0 | 0 | 0 | 2 | **19** |
| 5 | ☒ | ☒ | ☑ | 3 | 2 | 0 | 1 | 2 | 0 | 0 | **8** |
| **Total** | | | | **27** | **24** | **28** | **5** | **13** | **9** | **11** | **117** |

*Civilians.* One hundred seventy-one civilian participants were recruited into this study (see Appendix A for a description of the study's civilian recruitment strategies). Of this group, 18 completed the study when the original (single screen) VirTra-100® was in use and are therefore not included in the current analyses. An additional 18 individuals who responded to social media posts about the study were also excluded from the analyses, as they were determined to be individuals who submitted bogus online survey responses in order to receive the gift card incentive.[2] Two of the remaining participants were removed from the analyses because they disclosed that they had prior law enforcement or military training, which are exclusion criteria. Finally, six individuals who began the online survey never completed it or the VirTra-300® exercises, and are therefore excluded from all analyses.

[2] Whereas most civilian participants completed the online survey in approximately 25 minutes, these 18 individuals were submitting survey responses in less than 5 minutes, and from IP addresses that were far outside North Carolina—and in some cases, outside the US.

Table 2 summarizes the remaining 127 individuals who completed *at least one* of the two study components for civilians—i.e., the online survey examining personality traits, cognitive styles, and demographics, and/or the VirTra-300® training exercises. The table summarizes the distribution of civilians by the study components they completed. Check-marks are used to denote components that are completed, with cross-marks used to denote components that are incomplete or not attempted. Civilians are categorized into one of three groups based on the components they completed.

Table 2. Study Component Completion Groups for Civilians

| | **Study Component** | | |
|---|---|---|---|
| Group | Survey | VirTra 300 ® | **Total** |
| 1 | ☑ | ☑ | **103** |
| 2 | ☑ | ☒ | **22** |
| 3 | ☒ | ☑ | **2** |
| **Total** | | | **127** |

As seen in Table 2, 103 civilians completed both study components (Group 1); however, two participants could not be retained in certain analyses because of specific data issues. Therefore, the final sample of civilians consists of 101 individuals.

**Materials and Measures**

*Training Simulator & Accessories.* All participants in the final sample completed use of force exercises inside a VirTra-300® firearms training simulator. The simulator is housed in a private room at Agency A. Five digital light processing projectors are mounted on the ceiling and are directed at a set of five screens, each measuring 10 feet long by 7.5 feet high. The five screens are configured to form a 300-degree semicircle (VirTra, n.d.). Participants begin each

training exercise by standing in the middle of the semicircle directly beneath the projectors. Thick foam padding covered the floor of the semicircle to protect participants from injury in the event of falling or dropping to the ground during the exercises.

Participants wore a duty belt while inside the simulator. The belt contained a modified Glock-22 service firearm that would "shoot" infrared light at the video screen when fired. The gun had the look, feel and weight of an actual service firearm. A carbon dioxide canister inside the gun created recoil each time the trigger was pulled. In addition to the firearm, the duty belt housed a pepper spray canister that fired infrared light, and a standard issue police taser with the probe cartridges removed and replaced with cartridges that fired infrared light. Participants were also given an infrared tactical flashlight for use during a nighttime scenario. Finally, worn along the back of the belt was a V-Threat-Fire® device, which would deliver a 0.25-second electric impulse through the clothing and to the waist of the participant. This impulse was delivered only if the participant was shot/attacked by a suspect on the screen. While painful, the shock is not debilitating. It is used to simulate a physical threat, making the training scenarios more stressful and therefore more realistic.

A firearms instructor operated the simulator during use in this study. The instructor sat at a computer desk immediately outside the semicircle of video screens, but easily in sight of participants inside the simulator. Using the simulator's computer interface, the instructor would start each of the three scenarios used in this study. If the scenario did not begin with a pre-recorded call for service from police dispatch, the instructor would brief the participant about the upcoming scenario and why police are being called to the scene. While the scenarios have multiple branching points that can change the outcome of each scenario, the instructor allowed

each scenario to unfold according to a single, predetermined outcome. During the course of each scenario, if the suspect on the screen attacked the participant in some way (e.g., shot the participant), then the instructor would activate the V-Threat-Fire® device to deliver an electric shock to the participant.

The research team positioned digital video cameras on tripods at both ends of the semicircle of video screens. The two cameras were focused on participants inside the simulator (filming them from behind), and provided different points of view in case participants moved about inside the simulator. A miniature video camera on a low-profile tripod was positioned at the base of one of the video screens inside the simulator and was focused on participants (filming from in front). This additional camera typically provided a better audio recording of participants' vocal commands inside the simulator. Additionally, given that the room lights were dimmed while the simulator screens were in use, this front-facing camera tended to provide a clearer view of what weapon participants pulled during the simulations. The digital video files from each camera were then processed and combined into a single file through the synchronization of the individual audio files. The perspective of each camera was fit into a single screen in the processed videos so that coders could observe the participant's behavior from multiple angles simultaneously.

*Training Scenarios.* All participants completed the same three training scenarios (in random order) inside the simulator. Each scenario is described below.

*Scenario 1 (Homeless Man)* was completed as a nighttime scenario, meaning the display on the video screens was darkened to make the scene appear to take place in the evening under limited lighting. Participants could use their infrared flashlight to illuminate portions of the video

screens further. The firearms instructor prompted participants prior to the start of the scenario by describing the service call they were about to complete. In his description, the instructor stated that the participant was responding to the town park about trespassers after dark.

The video begins with a first-person point-of-view of the participant facing a middle-aged white male sitting at an outdoor picnic table. His hair and clothing are unkempt as if he has been living on the streets for an extended period. The man is audibly talking to himself in a non-sensible way, giving the impression that he may have mental health issues. After a few moments of talking to himself, the man looks up in the direction of the participant. Agitated and swearing, he says he is "sick and tired" of being bothered by others. He states "this is my house" and "there's only one of you and three of us" despite the fact that he is the only person that is present. The man complains and swears incessantly, offering participants little time to speak. The man eventually stands up from the table and challenges the participant by saying "what are you going to do about it?" He then picks up a piece of scrap metal and begins to wave it and slam it to the ground as he takes a few steps toward the participant, saying "Come on! Come on!" After several more seconds of this behavior, the scenario ends. However, if participants were to successfully use force against the man, then the scenario would end sooner with the male falling to the ground.

Scenario 1 is regarded here as a low-threat situation. While the homeless man does become verbally confrontational and is holding the scrap metal as a potential weapon, participants can minimize their risk of harm by maintaining a safe distance from the man, who is not making any quick moves toward the participant. However, officers who perceive the man's aggressive posturing as a threat may choose to use some type of force to eliminate the potential

threat and to gain control over him.

*Scenario 2 (Domestic Violence)* begins with a first-person point-of-view of the participant in the passenger seat of a moving police car. A female partner is driving. A recorded radio dispatch operator is heard, indicating there is a call for service in response to a domestic violence situation. The partner answers the dispatch operator and remarks to the participant that she has been to this location before for domestic violence calls. The video continues for a few seconds with the car driving down the road, but then transitions to an exterior shot of a house on the right side of the video screens, with a detached garage on the left. The partner is standing to the participant's left, and is on the driveway in front of the garage.

A woman exits the home with wounds on her face. She walks to the driveway holding a crowbar in her hand, and frantically explains to the officers that "It's Chet!" As she sobs, the woman tosses the crowbar to the ground but remains standing in place. A few seconds later, the sound of a car engine can be heard as the garage door opens. A car exits the garage and pulls into the driveway and stops short of the participant and female officer. The driver (a white male) exits the car with his hands raised, explaining he had nothing to do with the assault. He then lays face down on the ground beside the car with his hands and legs spread from his body. As he does so, the officer (partner) orders the passenger to "get out of the car!" A tall, muscular white male exits the vehicle, cursing and exclaiming "this is bogus!" The partner orders the man to turn around and put his hands on his head. As he does this, the officer tells the participant to "Cover me" as she approaches the male to put him in handcuffs. As she approaches, the man turns around and pushes the officer to the ground. He then steps toward her and lifts his foot in the air. As he begins to extend his leg downward as if to stomp on the officer with his work boot, the

video ends. However, if participants were to successfully use force against the man, then the scenario would end sooner with the male falling to the ground.

Scenario 2 is regarded here as a medium-threat situation. The man standing over the officer poses a real threat and can inflict harm by stomping on her. While use of force by the participant would be warranted in such a situation, the risk of harm from the man's boot can be seen as ambiguous. Some participants may feel there is an imminent threat of death or serious bodily harm (e.g., if the man stomps on the officer's head), which may prompt them to choose to respond with lethal force. However, other participants may feel the threat does not rise to that level and instead choose to use non-lethal options. The ambiguity of the situation may leave some participants unsure what to do, allowing the scenario to end before a decision is made.

*Scenario 3 (Collision Investigation)* begins with a first-person point-of-view of the participant driving alone in a marked police car. A recorded radio dispatch operator is heard, directing the participant to provide backup to a fellow officer who has responded to a traffic accident and is conducting an investigation on scene. The participant's car continues to drive down the road and eventually fades to a new scene where the participant is now driving toward the scene of the accident. An SUV can be seen on the shoulder on the opposite side of the road. The SUV appears to have struck a utility pole. Behind the SUV is a marked police car. Neither the officer on scene nor the driver of the SUV is in sight, and there are no other cars driving along the road. The participant's car drives past the accident site in order to make a U-turn to park on the shoulder near the SUV.

The scenario then cuts to a first-person point-of-view of the participant outside the car and walking toward the rear passenger's side of the SUV. From underneath the SUV, some

shadows/movement can be seen on the ground on the opposite side of the vehicle. Once the participant begins to walk toward the back of the SUV, some grunting and movement can be heard. As the participant rounds the back side of the vehicle to the opposite side, a police handheld radio can be seen on the ground a few feet from the SUV. Once the participant is fully standing alongside the SUV, the participant can see the back of a white man wearing a plaid shirt and jeans, who is straddled across the torso of another man lying on his back and wearing uniform pants and black police boots. The man in plaid is holding a gun in his left hand and is pointing the gun toward the head of the man underneath him. The participant hears one of the men say "He's got a gun" and the two men on screen continue to struggle but the plaid-shirted man is able to remain straddled atop the other. Six seconds after the statement "He's got a gun" is made, the plaid-shirted man shoots the man on the ground in the head and immediately turns around and opens fire on the participant. He fires several rounds, and then the video ends. However, if participants were to successfully use force against the man, then the scenario would end sooner with the man falling over to the ground.

Note that Scenario 3 is the only scenario in which a suspect on the screen may attack the participant. If participants do not neutralize the threat from the plaid-shirted man before he opens fire on them, or if participants do not immediately move to the side as if they were taking cover behind the SUV as the man opens fire, then the participant would receive an electric shock to their waist from the V-Threat-Fire® device.

Scenario 3 is regarded here as a high-threat situation. The suspect is pointing a firearm at another person (an officer). There is an imminent threat of death or serious bodily harm to the officer on the ground, and potentially to the participant. Use of lethal force would be justified in

such a situation, although not everyone may make this decision.

*Simulator Experience Feedback.* Immediately after completing the simulator exercises, participants were asked a short series of questions designed to capture their familiarity with and comfort level within this type of virtual environment. Participants were asked (1) if they had any previous experience completing firearms training exercises inside a virtual simulator, (2) to rate how realistic the video simulations seemed (0=Not at all; 10=Extremely), and (3) to rate their level of comfort interacting with the actors in the video simulations (0=Not at all; 10=Extremely). Finally, to further gauge participants' level of familiarity/experience with these simulated combat environments, participants were asked if and how frequently they play first-person shooter video games. See Appendix B for a copy of this questionnaire.

*Video Coding Process*. Three independent coders watched each of the participant videos and coded a variety of behaviors into a standardized coding sheet. The standardized coding sheet was first tested on a randomly selected subset of the videos. The research team then met to discuss any issues with the first iteration of the coding sheet, including any coding standards that required more clarification, any additional behaviors that needed to be included in the coding sheet, and any discrepancies across coders that needed to be resolved. The three coders then revised their coding sheets based upon the revised coding standards, and interrater reliability checks were estimated again to verify that the issues raised in the first preliminary round of coding were resolved. Once the research team verified that these issues were resolved, the three coders then began coding the remaining participant videos as they were being collected and processed. Upon completing this round of coding, the research team re-ran interrater reliability checks to detect any substantial discrepancies across coders after all videos had been processed.

Overall, agreement between coders is very strong for both weapon choice and verbal de-escalation tactics (all inter-class coefficients >=0.95). Agreement on weapon choice/use was slightly stronger because those behaviors are more straightforward. That is, pulling a firearm and using it are easily seen/heard in the videos, but not all statements made by participants fit clearly into the verbal de-escalation categories. Appendix C provides additional details about the video process and results from the interrater reliability checks.

*Video Coding Measures - Use of Force.* Before providing information about the measures created from the coding sheet, a description of the structure of the coding sheet itself is warranted. The coding sheet used to record participant behaviors in the simulated scenarios is organized around timestamps associated with these behaviors. Each row in the coding sheet corresponds to a particular timestamp associated with some variety of participant behavior - e.g., the type and number of verbal de-escalation statements, drawing one of the three use of force options, or using some type of force. The beginning and ending timestamps for each participant-scenario series of observations are also recorded so that we can easily identify what type of force (or de-escalation technique) is used by the participant, when it is used relative to the beginning of the scenario (i.e., how long does it take for force to be used?), and how often is this kind of force used at that timestamp (i.e., how many shots of a firearm does the participant fire?).

Recall that participants had three types of force available to them: pepper spray, a taser, and a firearm. Coding for each type of use of force was separated into three dimensions: a dummy variable representing if a type of force is drawn (pepper_spray_drawn, taser_drawn, and firearm_drawn), a dummy variable indicating if the participant used a type of force (pepper_spray_used, taser_used, and firearm_used), and if a firearm *is* drawn, then a numeric

variable representing the number of shots fired (n_shots_fired) was recorded. In earlier rounds of coding, we determined that only the firearm needed a separate recording of the number of times used because numerous shots could be fired within a single second whereas the pepper spray and taser options were generally used just once (in rare occasions twice or more if earlier attempts were unsuccessful).

Using these indicators, we created three measures that serve as the dependent variables for the analyses of our first three research questions. The first variable, "use of force," is a dummy variable equal to 1 if a participant uses any type of force during a scenario and 0 if they do not use any type of force. The second variable is a multicategory indicator representing the type of tactic a participant uses in the scenario: 0 if they use no force/tactic, 1 if they use only verbal de-escalation (see description of this tactic below), 2 if they use non-lethal force (pepper spray *or* taser), and 3 if they use a firearm. The third variable is a continuous indicator for the amount of time elapsed from the start of the interactive part of each scenario until the participant uses some type of force.[3] If a participant does not use any type of force in the scenario, this variable is missing.

*Video Coding Measures - Verbal De-escalation.* An additional tactic available to participants - as opposed to using the aforementioned types of physical force - was to use verbal de-escalation techniques. We approached the identification and categorization of verbal de-escalation statements using typologies created by Oliva, Morgan, and Compton (2010). At a fundamental level, de-escalation refers to "the act of moving from a state of high tension to a

[3] At the beginning of Scenario #2 and #3, the participant is depicted as riding/driving in a car to the location of the service call. This time spent riding/driving is not considered to be the interactive part of the scenario, since these scenes do not require the participant to make any decisions or respond to what is on the video screens.

state of reduced tension" (Richards, 2007, p.161). From this, Oliva, Morgan, and Compton (2010) organized verbal de-escalation techniques into two broad categories: active listening and asking questions.

*Active listening* involves an officer "listening for the total meaning of the words spoken by the individual in crisis" (Olivia et al., 2010; p. 20). There are additional types of de-escalation statements that fall under the *active listening* umbrella, but a simple example of this technique is an officer using utterances such as "Uh-huh" or "Okay" to express to the individual that they are listening. A second active listening technique is *introducing oneself,* which entails an officer providing their name, affiliation, and purpose for interacting with an individual in crisis and does not include simple greetings such as "Hello" or "Hey there." A third listening technique, *using "I" statements,* entails an officer communicating to the person in crisis that they are "aware of the individual's problem or crisis issues," in a sincere manner (p. 21). Examples of "I" statements can include, "I can see that you are upset [or angry]," "I want to help you," or "I'm listening," (p. 21). A fourth technique, *restating statements,* involves paraphrasing what the individual has said back to the person in order to acknowledge that the officer is "listening and understanding, and also encourages the individual in crisis to provide further details" (p. 21). The fifth technique, *mirroring/reflecting statements*, includes an officer "[expressing] to the individual an understanding of his or her main feelings" (p. 21). Examples of such statements can include a person in crisis stating "I'm tired of no one listening to me, and it makes me angry," with the officer responding: "It makes you angry," (p. 21). The final active listing technique, *summarizing/paraphrasing statements*, is similar in content to *restating statements* but differs in timing; while *restating statements* occur at the beginning of an encounter,

*summarizing/paraphrasing statements* typically occur later and serve to "recap or summarize the information conveyed [by the person in crisis]" (p. 21).

In addition to active listing techniques, de-escalation can also involve asking questions (open or closed-ended) that require individuals to respond at length or with simple "yes" or "no" responses. While *open-ended questions* (e.g., "How are you doing today?" or "What other things are going on?") allow the officer to gather potentially pertinent information from the individual in their own words, *closed-ended questions* (e.g., "Are you thinking of hurting yourself?" or "Will you let me take you to get some help?") allow the officer to obtain more specific information (p. 22).

*Video Coding Measures - "Other" De-escalation*. Participants could also attempt to de-escalate an encounter though non-verbal techniques, such as managing the distance between themselves and the individuals on the simulation screens. As an example, in the town park simulation the homeless man becomes increasingly agitated and stands up from the park bench in order to advance closer to the participant. In response, participants could back away from the screen to maintain the same (simulated) distance from the man and avoid having to physically confront the man or use a weapon. Such non-verbal techniques were captured with the variable *other_deescalate,* which was coded as 1 when the participant backs away from the screen and 0 otherwise. Although this type of behavior was relatively infrequent and mostly occurred during the homeless man scenario, it represents an additional non-verbal means of de-escalation that was deemed important to record after observing it during the first testing round of video coding.

*Personality Traits.* Personality traits were measured using the Multidimensional Personality Questionnaire-Brief Form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002). The MPQ-

BF is a 155-question self-report personality scale designed to assess 11 lower-level traits that can be combined into the three primary superfactors. The three superfactors and their constituent traits are: *Positive Emotionality* (consisting of wellbeing, social potency, achievement, and social closeness), *Negative Emotionality* (consisting of stress reaction, alienation, and aggression), and *Constraint* (consisting of control, harm avoidance and traditionalism). Higher scores for each superfactor correspond to higher levels of the trait. Raw scores are standardized such that normative scores on each superfactor have a mean of 50 and a standard deviation of 10. Scores from the MPQ-BF are highly correlated with those of the longer version of the scale (Patrick et al., 2002) and show strong convergent/discriminant validity with other personality assessments (Patrick et al., 2002; Patrick & Kramer, 2017)—especially the superfactor scores (Gomez, Griffiths & Stavropolous, 2020). Due to copyright restrictions, a copy of the MPQ-BF is not included in this report.

*Need for Cognition.* Need for Cognition (NFC) was measured with the 18-item self-report Need for Cognition - Short Form scale (Cacioppo, Petty, & Kao, 1984). The scale consists of items such as "I prefer complex to simple problems" and "I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something" (reverse-coded). Participants rate each item on a 5-point scale (1=extremely unlike me; 5=extremely like me). Total scores are calculated as the sum of the 18 ratings, with higher scores corresponding to higher need for cognition. Factor analysis demonstrates that the scale measures a unidimensional construct, and psychometric testing indicates it has strong internal reliability and test-retest reliability (Cacioppo, et al., 1996; Cacioppo et al., 1984; Sadowski, 1993; Sadowski & Gulgoz, 1992; Sargent, 2004). Furthermore, the scale has been shown to have good convergent and

discriminant validity (Cacioppo et al., 1996), with high levels of NFC associated with a greater tendency to be curious, to scrutinize information when making decisions, to focus more heavily on complex tasks, and to use empirical information to form judgments. Those with high NFC are also less likely to experience intense emotional states, and are less susceptible to anxiety (Cacioppo et al. 1996). See Appendix D for a copy of this scale.

*Cognitive Reflection.* Cognitive reflection was measured with the Cognitive Reflection Test (CRT: Frederick, 2005). The CRT consists of three logic problems (see Appendix E). Each problem is designed to suggest an intuitive, incorrect answer; however, with further reflection the correct response can become apparent. The number of problems answered correctly is the participant's CRT score (either 0, 1, 2 or 3). Higher scores correspond to how well the individual can suppress System 1's impulse to reply with an intuitive answer. The CRT is correlated with but conceptually distinct from academic achievement, cognitive ability, and NFC. Furthermore, the CRT has been shown to be predictive of different decision-making strategies as well as of one's ability to avoid certain cognitive biases (Frederick, 2005; Mata, Ferreira, & Sherman, 2013; Oechssler, Roider, & Schmitz, 2009; Toplak, West, & Stanovich, 2011, 2014), prompting Frederick (2005:37) to assert that the CRT's "predictive validity equals or exceeds other cognitive tests that involve up to 215 items and take up to 3½ hours to complete."

*Demographics.* All participants were asked to self-report demographic characteristics including age, sex, race, educational background, employment status and prior military service. Civilian participants were asked additional questions about their lifetime interactions with police, including being stopped by an officer and being arrested.

*Professional Experiences (Law Enforcement Participants Only).* Officers were asked how many years of experience as an officer they have completed at their current agency, and across all agencies at which they have worked. Officers were also asked about the number of times (a) suspects have used forced against them, (b) they have used force against suspects, (c) citizens have filed complaints against them, (d) they have been officially sanctioned for misconduct, and (e) they have been officially recognized/received commendations for superior service as an officer. Appendix F contains the set of demographic questions as well as the professional experiences questions for police officers.

*Social Networks (Law Enforcement Participants Only).* A name generator was used to capture social network data within each department (Campbell & Lee, 1991). The name generator required officers to identify other officers in their department whom they would consider friends. There was no minimum or maximum number of reported ties that officers could identify.[4] After identifying the fellow officers they consider to be friends, participants were then asked additional details about each relationship including: how long they knew the tie (1 "Less than one year" to 5 "More than 10 years"), the duration of their working relationship (1 "Less than a month" to 8 "More than 10 years"), how frequently they speak with that tie (1 "Very rarely (less than once PER MONTH" to 7 "EVERY DAY or nearly everyday"), how important that tie is to them (1 "Not important at all" to 5 "Extremely important"), whether they considered that officer a mentor (1 if "Yes", 0 otherwise), if they completed their initial training to be an officer with that tie (1 if "Yes", 0 otherwise), if the tie was a close or extended family member (1

[4] As a practical matter, we included 40 spaces in the online survey page for respondents to fill in full names for their ties. Only one respondent hit this maximum but they did not complete the survey. The remainder of the sample reported fewer than 30 ties to fellow officers they consider friends.

if “Yes”, 0 otherwise with a follow-up question with each of the listed categories as options), how much time they are around that officer on a daily basis (1 “Fifteen minutes or less” to 7 “More than 8 hours”), and the impact on that relationship if they were to be suspended for using excessive force during an arrest (1 “The relationship would become much weaker, or no longer exist” to 7 “The relationship would become much stronger”, reverse coded from the survey).

In the final section of the survey respondents were asked about the perceived ties between their ties - i.e., if the officer they nominated as a friend would consider the other officers they nominated as their own friends. Answers to this question allow us to know the directionality of ties; not simply the ties an individual respondent reports but also the ties they believe to exist between their ties. The complete survey instrument for the social network measures appears in Appendix G.

With this data, numerous network measures were created to inform our analysis of discretionary officer behaviors. For example, “network size” was computed for each officer and represents the size (i.e., number of officers reported as ties) of their respective social network within their department. Further, various descriptive measures of each officer’s social network were computed, including the average impact on relationships if the respondent were to be suspended for excessive use of force, which we use here as a measure of peer attitudes supporting high levels of force. We also computed network density values for each respondent, calculated as the percentage of reported directional ties between nominated officers divided by the potential number of ties that could exist between all nominated officers. For example, if an officer nominates three fellow officers as “friends” then there are three potential directed ties in the network: 1) Officer #1 is friends with Officer #2, 2) Officer #1 is friends with Officer #3, and

3) Officer #2 is friends with Officer #3. If the respondent only reports that Officers #1 and #2 are friends, this means that the percentage of actual ties in their network relative to the number of potential ties is 33.33%.

*Attitudes toward Police (Civilian Participants Only).* A set of 20 questions were developed to measure civilian attitudes toward the police and police use of force. These questions can be grouped into four basic themes: how well civilians understand the difficulty and dangerousness of police work (4 questions), civilians' views of police officer professionalism and decision making (6 questions), civilians' views on the appropriate level of force in various confrontational situations (8 questions), and civilians' global perception of the police (2 questions).

Civilians responded to all items using a series of Likert scales (see Appendix H for a copy of this questionnaire). For the questions related to how well civilians understand police work, Likert values range from 0 to 10 with higher scores corresponding to greater levels of perceived understanding. For the questions about professionalism and decision making, Likert values range from 1 to 5 with higher scores correspond to more favorable opinions except in the case of the final three items, which were reverse coded (i.e., "Police officers are too quick to use force," "When it comes to using force, police officers should spend more time thinking before they act," and "Police officers are 'trigger-happy' and too eager to shoot"). For the questions about appropriate levels of force, Likert values range from 1 to 3 with higher scores corresponding with greater levels of force being acceptable. Finally, for the two global perceptions of police, Likert values range from -5 to +5, with higher scores corresponding to more favorable views.

*Control Variables.* In addition to the focal independent variables described above, we also include several control variables in our analyses. In each of the scenarios, coders indicated a timestamp for what we called a "control event." Control events were different for each scenario: 1) in the Homeless Man scenario this is when the man leaves the bench he is sitting on; 2) in the Domestic Violence scenario this is when Chet slams his car door, and 3) in the Collision Investigation scenario this is when the officer on the ground finished yelling "He's got a gun!" We recorded timestamps for these events because the simulator's central processing unit would occasionally "lag" causing the video to freeze momentarily and artificially extend the length of the scenario. In the rare case where a scenario froze, it most often occurred in the Homeless Man scenario and involved a few additional moments of silence before the man got up from the bench. An additional control variable was used to flag whether the control event occurred or not, as some participants responded with force before an event occurred thereby ending the scenario.

A small number of participants (n=7) did not provide valid answers to several survey items in our models, including the Need for Cognition scale, Cognitive Reflection scale, their age, and their sex. A series of dichotomous variables were created to flag these observations, equal to 1 if the participant had a missing value and 0 otherwise. For those participants missing information on the aforementioned covariates, zeroes were imputed for these values in place of missing values. Replacing these missing values allowed us to include these participants in our analyses while also flagging these values as imputed with the dichotomous indicators so as not to affect the estimation of coefficients for the variables with imputed zero values. This process allowed us to gain back five of the original seven missing participants, with two remaining excluded because their missingness on the Cognitive Reflection Scale perfectly predicted an

outcome in the logistic regression models.

Our final set of control variables pertain strictly to officer participants. First, we created another dichotomous missingness indicator to flag officers that did not complete the social network survey. Of the 64 officers in our analysis sample, 50 completed the social network survey, while 14 did not. To keep this latter group of officers in our regression models, we imputed zeroes for the social network variables and flagged these imputed values with the dichotomous missingness indicator. As such, coefficients for the social network variables in our models are interpreted among the officers who provided answers to the social network survey, excluding the officers who either did not fill out the social network survey at all or provided invalid answers. The other control variable for officers is a multi-category indicator for the department an officer was recruited from. This variable is included in the models to account for similarities across officers coming from the same departments.

**Procedure**

*Law Enforcement Participants.* Law enforcement officers were recruited in the manners described in Appendix A. The research team emailed officers the informed consent form information and a link to the first online survey containing the MPQ-BF, the Need for Cognition scale, the demographics questions, and professional experience questions. After officers submitted their responses to the first survey, their browser was automatically routed to the second online survey containing the social network questions. All officers who completed the first online survey were contacted about scheduling their appointment in the simulator, and as needed, were sent reminder emails about completing the second online survey.

As officers arrived for their simulator appointment, the firearms instructor provided them with the infrared firearm, taser, pepper spray and flashlight for their duty belt. The V-Threat-Fire® device was then placed on the back of the officer's belt. Officers completed the three training scenarios in random order, as pre-determined by the research team. A research team member turned on the video cameras prior to each training session, and then stepped behind the video screens and out of sight of the officer. After the exercises, officers were given a paper copy of the Simulator Experience Feedback form and the Cognitive Reflection Test to complete.

Note that some officers arrived for simulator training without having previously completed the online surveys. In these instances, officers were given paper copies of Informed Consent Forms to sign prior to completing any study measures. The research team then followed up with these participants by email, sending them the link to the first online survey. As needed, reminder emails were sent to officers prompting them to complete the online surveys.

Initially, participants who completed both online surveys were emailed their $20 gift card incentive. Participants who completed only the first survey were sent reminder emails to also complete the second. If officers failed to respond to these reminders, they were eventually emailed their $20 gift card for completing the first online survey and still asked to complete the second, with the hopes that the norm of reciprocity would prompt them to complete the remaining questionnaire. When it became evident that officers were not responding to the reminder emails, the research team began to offer an additional incentive for completing the study in full. Officers were notified that those who completed all portions of the study would be entered into one of several random drawings for an additional $100 gift card (purchased with University funds and not NIJ grant funds).

When the research team saw that this random drawing was not yielding higher completion rates, the team offered yet another additional incentive–this time, a guaranteed additional $30 gift card to those who completed all components of the study (also paid for with University funds and not NIJ grant funds). Thus, all totaled, officers who completed the study in full would receive the original $20 incentive plus an additional $30 incentive and also be entered into a random drawing for an additional $100.

*Civilian Participants.* Civilian participants were recruited in the manners described in Appendix A. The research team emailed civilians the informed consent form information and a link to an online survey containing the MPQ-BF, the Need for Cognition scale, and the demographics questions. As needed, civilians were sent reminder emails about completing the online survey. All civilians who completed the online survey were emailed a $5 electronic gift card and then contacted about scheduling their appointment in the simulator.

As civilians arrived for their simulator appointment, they were given a paper copy of the Attitudes toward Police questionnaire (to measure pretest attitudes). The firearms instructor then helped civilians put on the duty belt with the firearm, taser, pepper spray and V-Threat-Fire® device (or alternatively, these items were attached to the participants own belt). The infrared flashlight was handed to civilians as needed. The instructor demonstrated how to use each item and instructed participants to respond to the scenarios as if they were an officer, including providing verbal commands to suspects as necessary. Civilians then completed the three training scenarios in random order. A research team member turned on the video cameras prior to each training session, and then stepped behind the video screens and out of sight of the participant. Immediately after the exercises, civilians were given a paper copy of the Simulator Experience

Feedback form and a second copy of the Attitudes toward Police questionnaire (to measure posttest attitudes). Participants also completed the Cognitive Reflection Test questions, and were given a $15 gift card for completing their simulator session.

Note that some participants recruited through a Citizen's Police Academy program (described in Appendix A) arrived for simulator training without having previously completed the online survey. In these instances, civilians were given paper copies of Informed Consent Forms to sign prior to completing any study measures. The research team then followed up with these participants by email, sending them the link to the online survey. As needed, reminder emails were sent to civilians prompting them to complete the survey.

**Analytic Plan**

The analysis employs a binary logistic regression to predict if force was used in the simulated scenario, a multinomial logistic regression model to predict the type of force used in simulated scenarios–be it no force, non-lethal force (pepper spray or taser), or lethal force–and an ordinary least squares (OLS) regression to predict the length of time until weapon use. Binary logistic regression is best able to model dichotomous categorical outcomes, such as whether or not force was used during the scenario. Multinomial logistic regression is designed to handle situations in which the outcome variable is polytomous - i.e., situations where an outcome may take on one of three or more nominal categories. In the case of the scenarios we will use in this analysis, a participant may resolve situations by using (1) no force, (2) only verbal de-escalation, (3) non-lethal force (pepper spray or taser), or (4) lethal force (firearm).

The multinomial regression model (and essentially, the binary logistic model) takes the following form:

$$\eta_{ik} = log\left(\frac{\pi_{ik}}{\pi_{iK}}\right) = \alpha_k + \beta_k * Pers_i + \gamma_k * Demo_i + \delta_k * Snet_i + \varepsilon_{i_k}$$

where $\eta_{ik}$ is the latent propensity that individual *i* belongs to outcome category *k*, $Pers_i$ is a series of personality features derived from the MPQ-BF, the NFC scale score, and the CRT score, $Demo_i$ is a series of individual demographic characteristics, and $Snet_i$ represents an officer's social network characteristics. All models correct standard errors for clustering of scenarios within individuals and include a multi-category indicator for an officer's department to account for department effects on scenario outcomes. Furthermore, this analysis will assess how much each series of independent variables contributes to the explained variance in our outcomes by estimating three models for each analysis: (1) a model including only personality and cognitive variables, (2) a model including personality, cognitive, demographic and professional experience variables, and (3) a model including all of the aforementioned measures plus the social network variables. Likelihood ratio tests are estimated to compare model fit after each iteration, assessing if the inclusion of demographic variables improves model fit compared to a model only including personality variables, then assessing if also including social network characteristics significantly improves model fit over including just personality and demographic variables.

Ordinary least squares (OLS) regression is employed to predict the amount of time elapsed before a participant uses some type of non-lethal or lethal force. Traditional OLS takes the following form:

$$Y_i = \alpha + \beta * Pers_i + \gamma * Demo_i + \delta * Snet_i + \varepsilon_i$$

All predictor variables (e.g., those on the right-hand side of the equation) are repeated from the multinomial logistic regression detailed above. The only substantial difference for this model is that we may actually observe the outcome $Y_i$ - the amount of time (in seconds) before the participant uses lethal or non-lethal force. Similar to the analyses described above, we also assess the degree to which each block of covariates contributes to explaining variation in the time to use of force. Specifically, we repeat the procedure outlined above for the binomial and multinomial regression models and enter variables in three blocks, then compare model fit statistics to the prior model including fewer variables. All models also correct standard errors by clustering them within participants and account for department effects by including a multi-category department indicator.

Lastly, paired sample t-tests are used to compare civilians' pretest and posttest measures of attitudes toward police recorded immediately before and after their simulator exercises.

## RESULTS

Table 3 summarizes the variables used in the primary analyses, including the personality, cognitive, and demographic characteristics of the final sample of participants (N=165) as well as various officer-only and civilian-only measures. On average, participants scored slightly higher than normative populations on positive emotionality, were slightly lower on negative emotionality, and were generally consistent with normative populations on constraint.[5] Additionally, participants answered approximately one of the three Cognitive Reflection Test questions correctly, and reported moderate Need for Cognition scores.

[5] Recall that normative MPQ-BF scores have a mean of 50 with a standard deviation of 10.

Table 3. Summary Statistics of Participant Characteristics (N=165)

| | Full Sample (N=165) | | Officer Sample (n=64) | | Civilian Sample (n=101) | |
|---|---|---|---|---|---|---|
| | Mean or % | SD | Mean or % | SD | Mean or % | SD |
| **Personality Traits** | | | | | | |
| Positive Emotionality | 56.80 | 8.11 | 57.21 | 8.92 | 56.55 | 7.58 |
| Negative Emotionality | 46.50 | 9.28 | 46.53 | 9.48 | 46.48 | 9.20 |
| Constraint | 49.43 | 7.95 | 51.12 | 6.90 | 48.36 | 8.41 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection Test score | 0.84 | 1.01 | 0.80 | 0.95 | 0.87 | 1.06 |
| Need for Cognition score | 65.21 | 10.42 | 64.16 | 11.21 | 65.87 | 9.90 |
| **Demographics** | | | | | | |
| Age in years | 41.74 | 12.68 | 35.80 | 9.16 | 45.55 | 13.19 |
| Sex (1=Male) | 71.95% | – | 89.06% | – | 61.00% | – |
| Race | | | | | | |
| White | 84.85% | – | 89.06% | – | 82.18% | – |
| Black | 4.85% | – | 3.13% | – | 5.94% | – |
| Hispanic | 4.85% | – | 3.13% | – | 5.94% | – |
| Other | 5.46% | – | 4.69% | – | 5.94% | – |
| Employment Status | | | | | | |
| Unemployed | 6.06% | – | 0.00% | – | 9.90% | – |
| Employed <40 hrs. | 10.91% | – | 0.00% | – | 17.82% | – |
| Employed >=40 hrs. | 75.76% | – | 100.00% | – | 60.40% | – |
| Retired | 7.27% | – | 0.00% | – | 11.88% | – |
| Education Level | | | | | | |
| Less than HS diploma | 0.61% | – | 0.00% | – | 0.99% | – |
| HS diploma or GED | 8.48% | – | 10.94% | – | 6.93% | – |
| Some college | 28.48% | – | 35.94% | – | 23.76% | – |
| Associates degree | 13.33% | – | 17.19% | – | 10.89% | – |
| Bachelor's degree | 32.73% | – | 28.13% | – | 35.64% | – |
| Graduate degree | 16.36% | – | 7.81% | – | 21.78% | – |
| Prior military (1=Yes) | 7.88% | – | 20.31% | – | 0.00% | – |
| **Citizens Only Measures** | | | | | | |
| Ever stopped by an officer? (1=Yes) | – | – | – | – | 66.34% | – |
| Ever arrested? (1=Yes) | – | – | – | – | 6.67% | – |
| **Officer Only Measures** | | | | | | |
| Years of experience | – | – | 10.14 | 8.64 | – | – |
| Ever used force against a suspect (1=Yes) | – | – | 21.88% | – | – | – |
| Suspect ever used force on you (1=Yes) | – | – | 39.06% | – | – | – |
| Number of citizen complaints | | | | | | |
| 0 times | – | – | 51.56% | – | – | – |
| 1 time | – | – | 15.63% | – | – | – |
| 2 times | – | – | 17.19% | – | – | – |
| 3-5 times | – | – | 9.38% | – | – | – |
| 6+ times | – | – | 6.26% | – | – | – |

Table 3. Continued.

| | Full Sample (N=165) | | Officer Sample (n=64) | | Civilian Sample (n=101) | |
|---|---|---|---|---|---|---|
| | Mean or % | SD | Mean or % | SD | Mean or % | SD |
| Number of Times Officially Sanctioned | | | | | | |
| 0 times | – | – | 73.44% | – | – | – |
| 1 time | – | – | 23.44% | – | – | – |
| 2 times | – | – | 1.56% | – | – | – |
| 3-5 times | – | – | 1.56% | – | – | – |
| **Social Network Characteristics** | | | | | | |
| Network density | – | – | 42.03 | 41.81 | – | – |
| Network size | – | – | 4.78 | 5.01 | – | – |
| Average impact of suspension on ties | – | – | 3.13 | 1.93 | – | – |

Most officers in the sample are male (89%) and White (89%). All of the officers were working full-time within their respective departments. On average, officers were 36 years old with roughly 10 years of experience as a law enforcement officer. Approximately one-in-five officers reported having used force on a suspect during their career, and approximately half of the officers have had complaints filed against them by citizens for misconduct (with roughly one-fourth of officers reported being officially sanctioned because of misconduct). Additionally, officers had approximately five work colleagues in their professional social network, and on average the officers reported that their relationships within their peer networks would become "slightly weaker" (mean=3.13) if the officer was suspended for using excessive force.

Most civilians in the sample were male (61%), White (82%), and employed on a full-time basis (60%). On average, the civilians were 46 years old. Most have been stopped by the police at some point in their life (63%), with approximately 7% having been previously arrested.

Table 4 provides summary statistics of the scenario-related measures for each of three scenarios viewed by the 165 participants (N=495 participant-scenarios). Across the three scenarios, force of any type was used least often (32.13%) and de-escalation was used most often

(69.06%) when dealing with the homeless man in the park (Scenario 1; low-threat). There was considerable variability in the use of de-escalation across officer and civilian participants, with nearly all officers employing this tactic at some point (93.75%) versus approximately half of the civilians (53.47%). When force *was* used in this scenario, it almost always involved non-lethal force (i.e., pepper spray or taser) regardless of participant type.

Force was much more common (65.45%) in the domestic violence call (Scenario 2; medium-threat), with participants most often using lethal force to stop the suspect as he is about to stomp the officer on the ground. Officers were again more likely than civilians to use de-escalation tactics at some point during this scenario (50.00% versus 12.87%, respectively). Force was used by 40.60% of participants in the collision investigation scenario (Scenario 3; high-threat); however, there was large variability in this measure across officers and civilians. Whereas approximately 80% of officers were likely to respond with force (and typically lethal force), approximately 80% of civilians stood without taking any action at all (not even attempting verbal de-escalation). De-escalation tactics, while rarely used in this situation, were again more commonly adopted by officers. Anecdotal conversations with civilians after the scenario exercises were completed revealed that they were often unsure which person in the collision investigation scenario was the aggressor, and that they did not immediately notice the gun in the suspect's hand. Findings from the Simulator Feedback Experience questions bear out some of the civilians' uncertainty of how to respond, compared to officers. Whereas both civilians and officers rated the video exercises to be highly realistic (collective mean=8.68 out of 10), civilians rated their level of comfort interacting with the suspects on the screen to be somewhat lower than officers (respective means=6.03 vs. 8.05 out of 10; see Table 4).

Table 4. Summary Statistics of Scenario-Related Variables (N=495 participant scenarios)

| | Full Sample (N=165) | | Officer Sample (n=64) | | Civilian Sample (n=101) | |
|---|---|---|---|---|---|---|
| | Mean or % | SD | Mean or % | SD | Mean or % | SD |
| **Scenario 1 (Homeless Man)** | | | | | | |
| Response tactic used (most serious) | | | | | | |
| None/No tactic used | 21.21% | – | 6.25% | – | 30.69% | – |
| Verbal de-escalation (no force) | 46.67% | – | 62.50% | – | 36.63% | – |
| Pepper Spray | 12.73% | – | 7.81% | – | 15.84% | – |
| Taser | 18.79% | – | 23.44% | – | 15.84% | – |
| Firearm | 0.61% | – | 0.00% | – | 0.99% | – |
| Used any force (1=Yes) | 32.13% | – | 31.25% | – | 32.67% | – |
| Time elapsed until force was used[1] | 66.47 | 8.17 | 70.75 | 5.83 | 63.88 | 8.35 |
| Verbal de-escalation techniques | | | | | | |
| Used any verbal de-escalation? | 69.09% | | 93.75% | | 53.47% | |
| Variety of types used[2] | 2.32 | 1.12 | 2.73 | 1.21 | 1.87 | 0.83 |
| Number times used (across all types)[2] | 5.03 | 3.73 | 6.72 | 3.95 | 3.15 | 2.33 |
| **Scenario 2 (Domestic Violence)** | | | | | | |
| Response tactic used (most serious) | | | | | | |
| None/No tactic used | 23.03% | – | 17.19% | – | 26.73% | – |
| Verbal de-escalation (no force) | 11.52% | – | 21.88% | – | 4.95% | – |
| Pepper Spray | 1.82% | – | 1.56% | – | 1.98% | – |
| Taser | 21.21% | – | 23.44% | – | 19.80% | – |
| Firearm | 42.42% | – | 35.94% | – | 46.53% | – |
| Used any force (1=Yes) | 65.45% | – | 60.94% | – | 68.31 | – |
| Time elapsed until force was used[1] | 75.53 | 10.06 | 74.05 | 13.42 | 76.36 | 7.54 |
| Verbal de-escalation techniques | | | | | | |
| Used any verbal de-escalation? | 27.27% | | 50.00% | | 12.87% | |
| Variety of types used[2] | 1.16 | 0.37 | 1.16 | 0.37 | 1.15 | 0.38 |
| Number times used (across all types)[2] | 1.93 | 1.07 | 2.03 | 1.18 | 1.69 | 0.75 |
| **Scenario 3 (Collision Investigation)** | | | | | | |
| Response tactic used (most serious) | | | | | | |
| None/No tactic used | 56.36% | – | 18.75% | – | 80.20% | – |
| Verbal de-escalation (no force) | 3.03% | – | 1.56% | – | 3.96% | – |
| Pepper Spray | 0.00% | – | 0.00% | – | 0.00% | – |
| Taser | 4.24% | – | 3.13% | – | 4.95% | – |
| Firearm | 36.36% | – | 76.56% | – | 10.89% | – |
| Used any force (1=Yes) | 40.60% | – | 79.69% | – | 15.84% | – |
| Time elapsed until force was used[1] | 15.91 | 4.25 | 15.76 | 4.69 | 16.38 | 2.36 |
| Verbal de-escalation techniques | | | | | | |
| Used any verbal de-escalation? | 6.06% | | 9.38% | | 3.96% | |
| Variety of types used[2] | 1.10 | 0.32 | 1.17 | 0.41 | 1.00 | 0.00 |
| Number times used (across all types)[2] | 1.50 | 0.71 | 1.50 | 0.84 | 1.50 | 0.58 |
| **Simulator Experience Feedback** | | | | | | |
| Ever been in a simulator before (1=Yes) | 37.0% | – | 70.3% | – | 15.8% | – |
| How comfortable interacting with video | 6.81 | 2.46 | 8.05 | 1.52 | 6.03 | 2.63 |
| How realistic was the scenario | 8.67 | 1.39 | 8.17 | 1.48 | 8.98 | 1.24 |
| Play first person shooter games (1=Yes) | 24.2% | – | 32.8% | – | 18.8% | – |

[1]Values are conditional on the participant using some type of force.
[2]Values are conditional on the participant making at least one verbal de-escalation statement.

***Research Question 1:*** *How do personality traits, cognitive styles, professional experience and officer social networks influence the decision to use force during an encounter with a non-compliant citizen?*

Table 5 presents an abridged set of results from a logistic regression predicting use of any physical force–be it lethal or non-lethal force. (The unabridged results from this model can be found in Table 5a in Appendix I.) Note that the regression model includes both officers and civilians, and includes data from all three scenarios, so the unit of analysis is the person-scenario (N=495). Covariates are entered in three blocks: (1) personality/cognition variables, (2) demographics/professional experience variables, and (3) social network variables. All models include controls for the type of participant (with civilian participant as the reference category), the type of scenario (with the domestic violence scenario as the reference category), the department an officer belongs to (with Agency A as the reference category), the timing of the control event (i.e., frozen video) in the scenario and if it occurs, and whether the participant was missing information for one of six variables (see Table 5a in Appendix I for the results of these additional control variables shown).

The results from Model 1 in Table 5 indicate that Positive Emotionally is inversely and marginally significantly associated with the use of force ($b$=-0.024, $p$<.10), suggesting that individuals scoring higher in Positive Emotionality are less likely to use any type of force, controlling for participant type and scenario type. All other personality and cognitive variables are insignificant, though the directions of the coefficients are sometimes consistent with expectations. For example, individuals higher on Constraint ($b$=-0.022) appear to have a slightly lower log odds of using force to resolve the scenarios, though the coefficient is not significantly different from zero.

Table 5. Logistic Regression Predicting Use of Any Force (N=495 participant scenarios) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.024+ | 0.014 | -0.024 | 0.016 | -0.027 | 0.016 |
| Negative Emotionality | 0.003 | 0.012 | 0.001 | 0.012 | 0.001 | 0.012 |
| Constraint | -0.022 | 0.015 | -0.022 | 0.015 | -0.014 | 0.016 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.051 | 0.115 | -0.113 | 0.113 | -0.121 | 0.113 |
| Need for Cognition | 0.013 | 0.011 | 0.008 | 0.013 | 0.013 | 0.013 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 0.835* | 0.401 | 0.383 | 0.859 | -1.931+ | 1.048 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -1.320*** | 0.333 | -1.380*** | 0.377 | -1.433*** | 0.376 |
| Collision investigation | -3.462** | 1.240 | -3.649* | 1.480 | 3.600* | 1.460 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.008 | 0.014 | 0.004 | 0.014 |
| Sex (1=Male) | | | 0.106 | 0.328 | 0.119 | 0.322 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.335 | 0.614 | 0.323 | 0.633 |
| Hispanic | | | 0.787 | 0.425 | 0.697 | 0.429 |
| Other | | | 0.558 | 0.424 | 0.450 | 0.425 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.045 | 0.029 | -0.033 | 0.031 |
| Number of citizen complaints | | | 0.296* | 0.150 | 0.330* | 0.167 |
| Number of official sanctions | | | 0.637 | 0.534 | 0.575 | 0.571 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.002 | 0.007 |
| Network size | | | | | 0.152* | 0.066 |
| Impact of suspension on ties | | | | | 0.294+ | 0.174 |
| **Additional Variables** | | | | | | |
| See Table 5a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | 4.576* | 1.993 | 4.758* | 2.563 | 4.373+ | 2.562 |
| Log Pseudolikelihood | -275.424 | | -261.991+ | | -257.757+ | |
| Pseudo R-squared | 0.194 | | 0.233 | | 0.245 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

With respect to the control variables in the model, participants who are officers are more likely to use force in the simulator exercises than civilians ($b$=0.835, $p$<.05), with no apparent differences between officers across departments relative to those from Agency A (see Table 5a).

There are also significant differences in the likelihood of using force across the scenarios. Relative to the domestic violence scenario, participants were less likely to use force in both the homeless man scenario ($b$=-1.320, $p$<.001) and the collision investigation scenario ($b$=-3.462, $p$<.01). The latter finding comes as a surprise, as the collision investigation scenario was a high-threat situation where the use of force was clearly justified.

Model 2 in Table 5 adds the block of demographic characteristics about participants, including basic demographic factors (e.g., age, sex, race), indicators for each participant's educational and employment backgrounds, and professional experiences as a police officer (for officers only). Accounting for these additional regressors renders the coefficient for Positive Emotionality non-significant, and no other personality or cognitive variables emerge as sharing a significant relationship with the probability of using force. Similarly, the coefficient for participant type ($b$=0.383) is no longer significant, indicating that officers no longer differ from civilians in their odds of using force in the simulator. Basic demographic characteristics are also unrelated to the probability of using force with one exception: their number of prior citizen complaints against an officer ($b$=0.296, $p$<.05). Officers with more prior complaints have a greater likelihood to use force in the simulator. Similar to Model 1, the coefficients for scenario type still indicate that using force is less likely in the homeless man scenario ($b$=-1.380, $p$<.001) and in the collision investigation scenario ($b$=-3.649, $p$<.05), holding all else constant. Although significant coefficients are rare in Model 2, this block of covariates does significantly contribute to model fit and increases explained variation in use of force to 0.233 compared to the pseudo r-squared from Model 1 of 0.194.

Model 3 in Table 5 adds three social network characteristics to the analyses: network

density, network size, and the average impact on an officer's ties should they be suspended for inappropriate use of force. As seen in the table, the number of citizen complaints against an officer retains a positive and significant relationship with the probability of using force ($b$=0.330, $p$<.05). Both network size ($b$=0.152, $p$<.05) and the average impact of suspension on social ties ($b$=0.294, $p$<.10) are also positive and at least marginally significant. Collectively, these findings suggest that larger networks are related to a higher likelihood of using force, and that an officer who reports that their social ties would become *stronger* if they are suspended (i.e., greater peer support for higher levels of violence) are more likely to use force, holding all else constant. We also find that including social network characteristics in the model changes the relationship between participant type and the likelihood of using force. Whereas in Model 1 it appeared that officers were significantly more likely to use force as compared to civilians, the coefficient in Model 3 ($b$=-1.931, $p$<.10) suggests the opposite; controlling for the variety of personality, cognitive, demographic, and social network characteristics, officers are *less* likely to use force in the simulator as compared to civilians.

As with both Models 1 and 2, scenario type is significantly associated with the likelihood of using force but the results are slightly different. Although participants remain less likely to use force in the homeless man scenario ($b$=-1.433, $p$<.001), controlling for social network characteristics changes the sign of the collision investigation scenario coefficient ($b$=3.600, $p$<.05), indicating the scenario is now associated with a greater likelihood to use force. Finally, the inclusion of social network characteristics in Model 3 significantly improves model fit relative to Model 2 and the explained variation in use of force increases slightly to 0.245.

Given the different levels of threat each scenario poses (low, medium, and high) and the

significant differences in the likelihood of using force across the scenarios, separate regressions were conducted for each individual scenario. Rather than presenting the covariates as separate blocks, we present these scenario-specific regressions with all personality/cognitive variables, demographic/professional experience variables and social network variables included in a single model. Table 6 summarizes an abridged list of results from these logistic regressions predicting using force of any type for each scenario. The unabridged set of results can be found in Table 6a in Appendix I.

As seen in Table 6, in Scenario 1 (Homeless Man; low-threat) use of force is not predicted by any of the personality and cognitive measures except for Need for Cognition (at $p<.10$). The coefficient for NFC is positive, meaning the participants who are more active "thinkers" are more likely to use force ($b=0.081$). Compared to their White participants, Black participants are more likely to use force ($b=2.384$, $p<.05$), and compared to civilians, police officers are less likely to use force ($b=-7.622$, $p<.05$). Furthermore, officers with more years of experience are less likely to use force in this situation ($b=-0.218$, $p<.05$), but those with more official sanctions for misconduct are more likely to use force ($b=3.495$, $p<.01$). Finally, those officers who report that their social ties would become stronger if they are suspended are more likely to use force, holding all else constant ($b=1.990$, $p<.01$). The model accounted for 32% of the variance in use of force in Scenario 1.

This same set of predictors performs less well in explaining the variance of the domestic violence scenario (pseudo r-squared = 0.169). None of the personality or cognitive factors are predictive of using force, and while the coefficient for being an officer is still associated with a lower likelihood of using force compared to civilians ($b=-4.958$), the effect is now significant at

*p*<.10. Similarly, the number of citizen complaints against an officer and the size of the officer's social network are both positively related to use of force at *p*<.10.

Table 6. Logistic Regression Predicting Use of Force (Any Force) - Scenario Specific Findings, *Abridged*

| | Scenario 1: Homeless Man (n=126) | | Scenario 2: Domestic Violence (n=162) | | Scenario 3: Collision Invest. (n=146) | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.024 | 0.046 | -0.023 | 0.027 | -0.051 | 0.052 |
| Negative Emotionality | 0.025 | 0.031 | -0.020 | 0.023 | 0.025 | 0.029 |
| Constraint | -0.0483 | 0.036 | -0.026 | 0.028 | 0.025 | 0.040 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.308 | 0.298 | -0.171 | 0.204 | -0.082 | 0.322 |
| Need for Cognition | 0.081+ | 0.044 | 0.0130 | 0.022 | 0.012 | 0.041 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -7.622* | 3.066 | -4.958+ | 2.536 | 0.810 | 1.866 |
| **Demographics** | | | | | | |
| Age (in years) | 0.039 | 0.030 | 0.003 | 0.025 | -0.041 | 0.032 |
| Sex (1=Male) | -1.111 | 0.790 | -0.165 | 0.527 | 2.766+ | 1.632 |
| Race | | | | | | |
| White (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Black | 2.384* | 1.153 | -0.716 | 0.943 | 1.729 | 1.625 |
| Hispanic | 0.507 | 1.522 | 1.548 | 1.060 | 0.369 | 1.184 |
| Other | 0 | —- | 1.455 | 1.662 | 2.330+ | 1.191 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | -0.218* | 0.096 | -0.009 | 0.054 | 0.070 | 0.060 |
| Number of citizen complaints | 0.538 | 0.377 | 0.548+ | 0.290 | -0.133 | 0.340 |
| Number of official sanctions | 3.495** | 1.330 | 0.763 | 1.168 | -0.146 | 0.996 |
| **Social Network** | | | | | | |
| Network density | -0.018 | 0.015 | 0.018+ | 0.010 | -0.015 | 0.013 |
| Network size | 0.025 | 0.190 | 0.136 | 0.086 | 0.450* | 0.199 |
| Impact of suspension on ties | 1.990** | 0.673 | 0.255 | 0.378 | 0.458 | 0.421 |
| **Additional Variables** | | | | | | |
| See Table 6a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | -1.831 | 5.144 | 13.788 | 8.393 | -3.460 | 5.887 |
| Log Pseudolikelihood | -54.158 | | -87.356 | | -50.266 | |
| Pseudo R-squared | 0.319 | | 0.169 | | 0.493 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

The set of predictor variables is best able to predict use of force in the high-threat, collision investigation scenario (pseudo r-squared = 0.493). However, only a few variables in the

model are statistically significant (see Table 6a for the full results). While participant type is no longer significant in the model, being male and of some "other" race are both positively related to use of force at $p<.10$, and network size is positively related at $p<.05$.

In sum, the findings from these regression analyses indicate that the model of predictors is best able to explain variance at the extreme levels of threat (homeless man and collision investigation) rather than in the middle (domestic violence scenario). Contrary to expectations, none of the personality or cognitive factors were significantly associated with using force in the expected direction, and the impact of demographic, professional experience, and social network variables were rather inconsistent across models. However, it is notable that officers were *less likely* than civilians to use force in general (and especially in the low- and medium-threat scenarios), but officers with more citizen complaints for misconduct and those with greater peer support for high levels of force were *more likely* to use force relative to other officers.

***Research Question 2:*** *How do personality traits, cognitive styles, professional experience, and officer social networks influence the length of time required to make a force/no force decision during the encounter?*

Table 7 summarizes the abridged results from a series of OLS regressions predicting the amount of time that elapses in a scenario until a participant uses non-lethal or lethal force. (The unabridged results from this model can be found in Table 7a in Appendix I). We report the results from these models in the same manner as we did in the prior section; that is, each model adds an additional set of participant characteristics, beginning with personality and cognitive factors, then demographic and professional factors, and finally, social network information. It is important to note that these models only include the participant-scenario observations in which non-lethal or lethal force was used (n=228 participant-scenarios). As such, the coefficients from

these models should be interpreted with caution as we condition being in this sample on the participant's behavior within the scenario, which can be caused by a variety of factors we can and cannot observe.

Table 7. OLS Regression Predicting Time Until Force is Used (N=228) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.044 | 0.084 | 0.065 | 0.059 | 0.069 | 0.061 |
| Negative Emotionality | -0.054 | 0.066 | -0.028 | 0.068 | -0.034 | 0.070 |
| Constraint | 0.040 | 0.070 | 0.034 | 0.070 | 0.050 | 0.075 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | 0.862 | 0.531 | 1.030+ | 0.585 | 0.743 | 0.514 |
| Need for Cognition | -0.035 | 0.058 | -0.050 | 0.057 | -0.049 | 0.061 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 1.524 | 1.122 | 1.149 | 2.759 | 2.248 | 5.601 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -8.453*** | 1.372 | -8.050*** | 1.450 | -7.656*** | 1.537 |
| Collision investigation | -53.050*** | 3.211 | -53.022*** | 3.543 | -52.775*** | 3.441 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.129* | 0.051 | 0.115* | 0.053 |
| Sex (1=Male) | | | 0.674 | 1.229 | 0.710 | 1.351 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | -5.772 | 3.607 | -6.399+ | 3.345 |
| Hispanic | | | -3.601* | 1.534 | -5.157** | 1.773 |
| Other | | | -2.770 | 3.340 | -2.462 | 3.590 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | 0.053 | 0.143 | 0.105 | 0.164 |
| Number of citizen complaints | | | -1.205+ | 0.648 | -0.680 | 0.627 |
| Number of official sanctions | | | 0.966 | 1.317 | 0.991 | 1.467 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.068+ | 0.040 |
| Network size | | | | | 0.274 | 0.218 |
| Impact of suspension on ties | | | | | -2.019* | 0.982 |
| **Additional Variables** | | | | | | |
| See Table 7a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | 67.031*** | 6.999 | 63.552*** | 6.944 | 62.760*** | 7.235 |
| Log-likelihood | -791.660 | | -781.315 | | -776.779+ | |
| R-squared | 0.919 | | 0.926 | | 0.929 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

As seen in Model 1 in Table 7, personality and cognitive characteristics do not share a relationship with the time until force is used but the scenario type clearly does. The time until force is used in the collision investigation scenario is much lower ($b$=-53.050, $p$<.001) compared to the domestic violence scenario, and we see a similar pattern for the homeless man scenario ($b$=-8.453, $p$<.001). However, both results are undoubtedly caused by the timing of the threatening behaviors that appear within these scenarios, and merely represent a largely mechanistic relationship with the time until a participant uses force. Collectively, the variables in this model account for 91.9% of the variation in the timing of force. This is largely due to both the nature of the scenarios and several of the control variables in this analysis. The timing to use force in these scenarios is somewhat compressed relative to the total amount of interaction time that exists in each. Generally, there are singular events in each scenario that provoke intervention and the participants then have anywhere from five to eight seconds to decide how to react. Controlling only for scenario type, control event timing, and whether a control event occurs accounts for 91.4% of the variation in timing of force (models not shown), so much of this explained variance is purely accounting for the timing of events in the scenarios.

The inclusion of demographic and professional experience variables in Model 2 yields several findings. First, for every one unit increase in the cognitive reflection scale, a participant takes approximately one additional second to use force, holding all else constant ($b$=1.030, $p$<.10). Age is also related to taking a longer time to use force ($b$=0.129, $p$<.05), while identifying as Hispanic is associated with taking less time to use force relative to identifying as White ($b$=-3.601, $p$<.05). With regard to officer participants, for every additional citizen complaint levied against the officer, our model suggests that the officer uses force 1.205 seconds

sooner ($p$<.10). Including demographic characteristics does not result in a significant improvement to model fit, but does increase explained variance to 92.6%.

The addition of officer social network characteristics in Model 3 causes a few changes in the pattern of results. To begin, the cognitive reflection scale is no longer related to time until force is used. The coefficient for Black participants is also now significant, suggesting that participants who identify as Black tend to use force about six seconds sooner than White participants ($b$=-6.399, $p$<.10). Both an officer's network density and their average anticipated impact of suspension to their ties to other officers in their department are significantly related to the time until force is used, but in opposite directions. For every percentage point increase in the percent of ties that are also friends with one another, an officer takes an additional 0.068 seconds ($p$<.10) to use force. By contrast, an officer who anticipates that their social ties will become stronger on average if they are suspended is expected to use force roughly two seconds sooner ($b$=-2.019, $p$<.05) for every one point increase in this scale. With respect to the remaining significant relationships in Model 3, these are largely identical to their equivalent results in Model 2 with some minor changes to the magnitude of the effects. The explained variance of the model increases slightly to 92.9% after including the social network variables.

In sum, the amount of time that passes until a participant uses force varies across scenarios, but this is likely due to the point-in-time during the scenario when the underlying threat appears and nothing more. Police officers and civilians do not differ in the timing in which they use force; however, differences across race did emerge with White participants taking the longest amount of time to decide to respond with force. Similarly, older participants took longer to use force. Contrary to expectation, personality and cognitive variables were found to be

unrelated to the time to use force, though some social networks variables were related (especially the average impact of suspension on friendship ties). Unfortunately, attempts to explore these relationships further in additional analyses using scenario-specific models and/or across participant types were unsuccessful due to issues associated with the reduced sample size (recall that not everyone in the sample used force).

***Research Question 3:*** *How do personality traits, cognitive styles, professional experience and officer social networks influence the type of tactic employed—either verbal de-escalation, less lethal force, or lethal force?*

Tables 8, 9, 10 and 11 report the abridged results from a multinomial logistic regression predicting the type of tactic a participant employs, including: (1) no tactic, (2) verbal de-escalation, (3) non-lethal force–i.e., pepper spray or taser, and 4) lethal force. The full set of results from these models can be found in Tables 8a, 9a, 10a and 11a, respectively, in Appendix I. Each outcome variable in these models reflects the most serious tactic a participant used during a given scenario, such that participants who initially used verbal de-escalation but later used lethal force are coded as a 4 (lethal force) on this variable. The use of multiple response tactics was fairly common among participants, especially among officers, as they tended to (but did not always) escalate their responses in accordance with the behavior of actors in the simulation.

The results reported in Tables 8, 9 and 10 use verbal de-escalation as the reference category, so coefficients should be interpreted as increases or decreases in the log odds of using the corresponding comparison tactic (i.e., no tactic, non-lethal force, or lethal force) relative to using verbal de-escalation as a result of a one-unit change in independent variable. Given the general public's concerns about police using force as opposed to non-force options, we selected verbal de-escalation as the reference category in order to provide what we felt were the most

meaningful contrasts–specifically, the contrast between a non-forceful tactic and the physically forceful tactics. For good measure, we also include the comparison of using no tactic at all relative to de-escalation. Table 11 summarizes the findings of our final contrast: the likelihood of using lethal force relative to non-lethal force. We include this comparison given the public's concern over the police using lethal force even when non-lethal options are also available to officers.

Table 8 provides the results for the first contrast: no tactic used as compared to verbal de-escalation. In Model 1, none of the personality variables exhibit a significant association with using no tactic relative to verbal de-escalation. As compared to citizens, officers are less likely to use no tactic at all relative to using verbal de-escalation ($b$=-2.256, $p$<.001). Additionally, participants are less likely to use no tactic relative to verbal de-escalation in the homeless man scenario. Although significant findings are sparse in Model 1, the included variables collectively account for 0.324 of the variation in tactic type used.

Model 2 in Table 8 adds in demographic and professional experience variables. As compared to female participants, male participants are less likely to use no tactic relative to using verbal de-escalation ($b$=-1.031, $p$<.05). While officers in general are less likely to use no tactic relative to verbal de-escalation ($b$=-2.092, $p$<.10), those officers with more official sanctions ($b$=1.821, $p$<.05) are more likely to use no tactic relative to verbal de-escalation. Finally, as compared to Model 1, Model 2 has an improved model fit and explains slightly more of the variation in tactic choice (pseudo r-squared = 0.380, compared to Model 1's pseudo r-squared of 0.324).

Table 8. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 1: No Tactic Used Relative to Verbal De-escalation (N=495) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.006 | 0.020 | 0.002 | 0.025 | -0.000 | 0.025 |
| Negative Emotionality | -0.003 | 0.019 | -0.008 | 0.020 | -0.008 | 0.020 |
| Constraint | -0.004 | 0.024 | -0.019 | 0.026 | -0.015 | 0.027 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.188 | 0.187 | -0.126 | 0.195 | -0.103 | 0.199 |
| Need for Cognition | -0.012 | 0.019 | 0.004 | 0.018 | 0.001 | 0.018 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -2.256*** | 0.498 | -2.092+ | 1.147 | -2.226 | 1.678 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -1.027* | 0.504 | -1.223* | 0.532 | -1.257* | 0.557 |
| Collision investigation | -0.002 | 1.806 | 0.028 | 1.857 | 0.280 | 1.945 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.019 | 0.021 | 0.020 | 0.021 |
| Sex (1=Male) | | | -1.031* | 0.447 | -0.955* | 0.451 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.906 | 0.711 | 1.106 | 0.763 |
| Hispanic | | | 1.340 | 1.170 | 1.252 | 1.214 |
| Other | | | -0.801 | 0.746 | -0.987 | 0.803 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.075 | 0.046 | -0.068 | 0.044 |
| Number of citizen complaints | | | -0.365 | 0.300 | -0.420 | 0.314 |
| Number of official sanctions | | | 1.821* | 0.760 | 1.998* | 0.779 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.012 | 0.012 |
| Network size | | | | | -0.070 | 0.101 |
| Impact of suspension on ties | | | | | 0.171 | 0.357 |
| **Additional Variables** | | | | | | |
| See Table 8a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | 5.815+ | 3.338 | 5.576 | 3.408 | 5.563 | 3.402 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Model 3 in Table 8 incorporates the officer social network characteristics. The inclusion of these measures typically results in very little change from the findings in Model 2 other than the magnitude of existing effects adjusting slightly. Congruent with this, a likelihood ratio test comparing Model 3 to Model 2 is insignificant, suggesting that adding the social network characteristics into this series of models results in no significant improvement in the model's fit. This is also evident in the change to the pseudo r-squared value as it increases from Model 2 by just .011 points to 0.391.

Table 9 presents the results for the second contrast: non-lethal force as compared to verbal de-escalation. Of the personality variables, only Constraint is related to type of force used, indicating that participants who scored higher on the constraint scale were less likely ($b$=-0.036, $p$<.10) to use non-lethal force relative to using verbal de-escalation. The only other notable finding in Model 1 is that, relative to the collision investigation scenario, participants in the domestic violence scenario were less likely to use non-lethal force ($b$=-4.794, $p$<.05) relative to verbal de-escalation. Model fit statistics remain the same as they are reported for the multinomial logistic regression as a whole, and not the individual contrasts presented in each table.

Model 2 adds the demographic and professional experience measures into the analysis. As seen in the table, higher levels of Constraint remain negatively related ($b$=-0.040, $p$<.10) to using non-lethal force relative to verbal de-escalation. Additionally, officers with more sanctions are more likely ($b$=2.049, $p$<.05) to use non-lethal force relative to verbal de-escalation. Finally, participants remain less likely ($b$=-4.944, $p$<.05) to use non-lethal force relative to verbal de-escalation in the traffic accident scenario as compared to the domestic violence scenario.

Table 9. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 2: Non-Lethal Force Relative to Verbal De-escalation (N=495) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.026 | 0.024 | -0.025 | 0.027 | -0.029 | 0.028 |
| Negative Emotionality | -0.009 | 0.018 | -0.023 | 0.022 | -0.023 | 0.022 |
| Constraint | -0.036+ | 0.020 | -0.040+ | 0.023 | -0.038 | 0.023 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.072 | 0.178 | -0.165 | 0.184 | -0.192 | 0.182 |
| Need for Cognition | 0.004 | 0.019 | 0.004 | 0.023 | 0.010 | 0.024 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -0.497 | 0.499 | -1.838 | 1.506 | -6.210** | 1.878 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -0.458 | 0.525 | -0.599 | 0.572 | -0.696 | 0.609 |
| Collision investigation | -4.794* | 1.874 | -4.944* | 1.966 | -4.646* | 2.054 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.016 | 0.023 | 0.016 | 0.023 |
| Sex (1=Male) | | | -0.573 | 0.471 | -0.574 | 0.465 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.770 | 0.821 | 1.004 | 0.816 |
| Hispanic | | | 1.409 | 1.318 | 1.323 | 1.338 |
| Other | | | -0.616 | 0.884 | -0.728 | 0.928 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.129 | 0.080 | -0.110 | 0.076 |
| Number of citizen complaints | | | 0.386 | 0.265 | 0.312 | 0.299 |
| Number of official sanctions | | | 2.049* | 0.824 | 2.247** | 0.827 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.004 | 0.012 |
| Network size | | | | | 0.097 | 0.138 |
| Impact of suspension on ties | | | | | 0.881* | 0.416 |
| **Additional Variables** | | | | | | |
| See Table 9a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | 4.874 | 3.810 | 3.483 | 4.545 | 3.189 | 4.443 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001
Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Model 3 incorporates the social network characteristics into this contrast. While the results for prior sanctions for misconduct ($b$=2.247, $p$<.01) and the collision investigation

scenario (*b*=-4.646, *p*<.05) remain similar in magnitude, direction, and significance, the finding for Constraint does not. The coefficient remains negative, but it is no longer statistically significant. However, the inclusion of social network characteristics reveals a significant finding for participant type suggesting that, relative to civilians, officers are generally less likely to use non-lethal force relative to verbal de-escalation (*b*=-6.210, *p*<.01). Further, the coefficient for the average impact of suspension on social ties suggests that officers who anticipate that their ties will become stronger are more likely to use non-lethal force relative to verbal de-escalation (*b*=0.881, *p*<.05).

Table 10 reports the results for our third contrast: lethal force relative to verbal de-escalation. The results from Model 1 suggest that participants higher in Cognitive Reflection (*b*=-0.292, *p*<.10) tend to be less likely to use lethal force relative to verbal de-escalation. Other than this, the only other significant finding from Model 1 is that participants are much less likely to use lethal force relative to verbal de-escalation in the homeless man scenario (*b*=-5.414, *p*<.001) in comparison to the domestic violence scenario.

Model 2 incorporates demographic and professional experience variables. As seen in the table, Cognitive Reflection (*b*=-0.331, *p*<.10) and the homeless man scenario (*b*=-5.829, *p*<.001) coefficients retain their significance and increase slightly in magnitude. Additionally, Hispanic (*b*=2.343, *p*<.05) participants are found to be more likely to use lethal force relative to verbal de-escalation, as are officers who report a higher number of official sanctions (*b*=1.162, *p*<.10). At the same time, officers with additional years of experience are less likely to use lethal force (*b*=-0.068, *p*<.10).

Table 10. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 3: Lethal Force Relative to Verbal De-escalation (N=495) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.014 | 0.021 | -0.024 | 0.029 | -0.026 | 0.030 |
| Negative Emotionality | 0.015 | 0.017 | 0.015 | 0.019 | 0.014 | 0.020 |
| Constraint | -0.015 | 0.022 | -0.022 | 0.025 | -0.013 | 0.026 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.292+ | 0.174 | -0.331+ | 0.189 | -0.361+ | 0.196 |
| Need for Cognition | 0.005 | 0.021 | 0.012 | 0.022 | 0.018 | 0.022 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -0.336 | 0.563 | 0.547 | 1.002 | -1.893 | 1.437 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -5.414*** | 1.220 | -5.829*** | 1.371 | -5.904*** | 1.350 |
| Collision investigation | -1.036 | 2.371 | -0.381 | 2.670 | -0.468 | 2.598 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.031 | 0.022 | 0.027 | 0.023 |
| Sex (1=Male) | | | -0.664 | 0.475 | -0.600 | 0.478 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 1.218 | 0.960 | 1.371 | 0.979 |
| Hispanic | | | 2.343* | 1.022 | 2.137+ | 1.093 |
| Other | | | 0.452 | 0.610 | 0.258 | 0.608 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.068+ | 0.037 | -0.046 | 0.036 |
| Number of citizen complaints | | | -0.097 | 0.218 | -0.042 | 0.222 |
| Number of official sanctions | | | 1.162* | 0.519 | 1.136+ | 0.581 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.001 | 0.008 |
| Network size | | | | | 0.156+ | 0.088 |
| Impact of suspension on ties | | | | | 0.273 | 0.258 |
| **Additional Variables** | | | | | | |
| See Table 10a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | 4.874 | 3.810 | 3.483 | 4.545 | 3.189 | 4.443 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001
Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Model 3 incorporates the social network variables. Cognitive reflection ($b$=-0.361, $p$<.10) and the homeless man scenario ($b$=-5.904, $p$<.001) yet again retain their significance while also increasing slightly in magnitude. Participants who are Hispanic remain more likely to use lethal

force compared to verbal de-escalation ($b$=2.137, $p$<.10), as do officers who report a higher number of prior sanctions ($b$=1.136, $p$<.10) or have a larger social network within their department ($b$=0.156, $p$<.10).

Table 11 reports the results for our final contrast: lethal force as compared to non-lethal force. Coefficients for this contrast may be interpreted as the change in the log odds of using lethal force as compared to non-lethal force if an independent variable were to increase by one unit (or, a group contrasted to the reference category where applicable). The results from Model 1 suggest that participants higher in Negative Emotionality are slightly more likely ($b$=0.024, $p$<.10) to use lethal force relative to non-lethal force, but no other personality variable shares a significant association with type of force used.

The demographic characteristics included in Model 2 are largely unrelated to type of force with one exception: officers with more complaints from citizens are more likely to use lethal over non-lethal force ($b$=-0.482, $p$<.10). Negative Emotionality remains positively and significantly associated with a higher likelihood of using lethal force rather than non-lethal force ($b$=0.037, $p$<.05), and accounting for demographic characteristics reveals a positive association for participant type suggesting that officers are more likely than civilians to use lethal over non-lethal force ($b$=2.385, $p$<.10). Including the social network characteristics of officers in Model 3 results in only very slight changes to the results from Model 2. The coefficient for Negative Emotionality is unchanged ($b$=0.037, $p$<.05). The coefficient for participant type increases in magnitude and significance ($b$=4.317, $p$<.05), suggesting officers are more likely than civilians to use lethal over non-lethal force–but the coefficient for the number of citizen complaints is no longer significantly related to type of force used. Instead, the number of official sanctions an

officer has received is significantly and negatively correlated (*b*=-1.111, p<.10) with using lethal versus non-lethal force.

Table 11. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 3: Lethal Force Relative to Non-Lethal Force (N=495) - *Abridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.012 | 0.020 | 0.001 | 0.019 | 0.003 | 0.019 |
| Negative Emotionality | 0.024+ | 0.014 | 0.037* | 0.018 | 0.037* | 0.018 |
| Constraint | 0.021 | 0.022 | 0.018 | 0.024 | 0.025 | 0.025 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.220 | 0.165 | -0.166 | 0.183 | -0.230 | 0.189 |
| Need for Cognition | 0.001 | 0.016 | 0.008 | 0.023 | 0.007 | 0.024 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 0.0161 | 0.484 | 2.385+ | 1.362 | 4.317* | 1.908 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -4.956*** | 1.282 | -5.230*** | 1.49 | -5.209** | 1.500 |
| Collision investigation | 3.757+ | 1.927 | 4.563+ | 2.535 | 4.177 | 2.604 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.016 | 0.019 | 0.011 | 0.019 |
| Sex (1=Male) | | | -0.091 | 0.473 | -0.026 | 0.458 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.448 | 0.735 | 0.367 | 0.783 |
| Hispanic | | | 0.934 | 0.791 | 0.815 | 0.794 |
| Other | | | 1.068 | 0.896 | 0.986 | 0.924 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | 0.061 | 0.084 | 0.064 | 0.076 |
| Number of citizen complaints | | | -0.482+ | 0.267 | -0.354 | 0.275 |
| Number of official sanctions | | | -0.887 | 0.670 | -1.111+ | 0.614 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.002 | 0.012 |
| Network size | | | | | 0.059 | 0.086 |
| Impact of suspension on ties | | | | | -0.608 | 0.405 |
| **Additional Variables** | | | | | | |
| See Table 11a | | | | | | |
| **Model Characteristics** | | | | | | |
| Constant | -5.333+ | 3.004 | -7.466+ | 4.221 | -7.198+ | 4.369 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

In sum, the tactic participants employed in the simulator varied by several factors including personality and cognitive variables, participant type (officer versus civilian), professional experiences of the officer, and social network measures. For example, individuals with higher levels of Negative Emotionality were *more likely* to use lethal force than non-lethal force, and individuals with possessing greater Cognitive Reflection were *less likely* to use lethal force relative to de-escalation techniques. Overall, officers are more likely than civilians to use lethal force than non-lethal force, and officers who have a more official sanctions for misconduct are more likely to use pepper spray, taser or firearm than using de-escalation techniques (but they are less likely to use lethal force than non-lethal force). Finally, officers with larger social networks were more likely to use lethal force relative to de-escalation techniques, while officers who felt that the strength of their network ties would grow *stronger* if they were suspended for excessive force were more likely to use non-lethal force than de-escalation techniques.

***Research Question 4:*** *Does first-hand experience in a virtual simulation environment impact civilian's attitudes toward (and perceptions of) police officers and/or the ways in which officers use force?*

Table 12 summarizes the findings from the pre-post comparisons of the questions relating to how well civilians understand the difficulty and dangerousness of police work, civilians' views of police officer professionalism and decision making, civilians' views on the appropriate level of force in various confrontational situations, and the two questions measuring civilians' global perception of the police. As seen in the table, this sample of civilians held highly favorable views of the police at baseline. For example, for two global assessment items (impression of the police and satisfaction with police) the mean pretest values are 4.56 and 4.59 (out of 5.00) respectively. The civilians also rated the difficulty, stressfulness, and dangerousness of policing to be quite

high (means of approximately 9.40 out of 10.00), and viewed police officers as highly professional, deserving of more pay, and being treated harshly by the media (means of approximately 4.30 to 4.40 out of 5.00).

Despite these strong baseline impressions, the civilians' brief experience inside the simulator increased these impressions further. In the posttest assessment, civilians rated police work to be significantly more difficult, more stressful and more dangerous (all *p*s<.05). They rated police as significantly more professional, deserving of more pay, and are treated unfairly by the media (all *p*s<.05). Additionally, after the simulator exercises the civilians were significantly less likely to endorse the idea that the police are too quick to use force, and less likely to endorse the idea that they should slow down and think more before using force (*p*s<.05). Although the ratings for the two global measures also increased, these changes were not significant.

The brief experience inside the simulator also impacted civilians' views of the level of force that is acceptable in various situations. Civilians endorsed using significantly higher levels of force in the posttest administration in six of the eight conditions described in Table 12 (all *p*s<.05). The only two conditions that did not experience a significant change are the one that presents the least threat to officers (i.e., suspect who refuses to lay on the ground) and the one that presents the greatest threat (i.e., suspect points a gun toward an officer).

In sum, although civilians had favorable pre-existing views of policing, their brief experience in a firearms training simulator enhanced these views even further. Their exposure to the simulator exercises also led to participants feeling that higher levels of force are warranted in certain situations–especially those where the threat of harm is not extremely low or extremely high.

Table 12. Pre- and Post-Test Attitudes towards Police, Civilian Sample (N=101)

| | Pre-Test Mean (SD) | Post-Test Mean (SD) | t-value |
|---|---|---|---|
| **Understanding the Difficulties/Dangers (Scale of 0 to 10)** | | | |
| Understand risks and challenges | 7.37 (1.88) | 7.47 (2.54) | 0.50 |
| How difficult an officer's job is | 9.43 (0.89) | 9.70 (0.58) | 4.39*** |
| How stressful an officer's job is | 9.35 (0.79) | 9.72 (0.55) | 5.48*** |
| How dangerous an officer's job is | 9.37 (0.95) | 9.72 (0.60) | 5.22*** |
| **Views of Professionalism and Decision Making (Scale of 1 to 5)** | | | |
| Police behave in professional manner | 4.32 (0.56) | 4.42 (0.55) | 2.57** |
| Police are treated too harshly by media | 4.30 (0.83) | 4.48 (0.72) | 3.34*** |
| Police should be paid more | 4.46 (0.67) | 4.60 (0.60) | 3.45*** |
| Police are too quick to use force | 2.44 (0.86) | 1.91 (0.86) | -7.52*** |
| Police should think more before acting | 2.54 (0.93) | 2.17 (1.06) | -4.35*** |
| Police are trigger-happy | 1.62 (0.73) | 1.52 (0.69) | -1.73* |
| **View on Using Force on a Suspect who… (Scale of 1 to 3)** | | | |
| Refuses to lay on the ground | 2.00 (0.00) | 2.00 (0.25) | 0.00 |
| Suddenly charges toward an officer | 2.47 (0.50) | 2.60 (0.49) | 3.11** |
| Tries to hit an officer with his fists | 2.22 (0.42) | 2.42 (0.50) | 4.45*** |
| Refuses to take his hand from his pockets | 2.19 (0.49) | 2.36 (0.50) | 3.31*** |
| Quickly pulls unknown object from pocket | 2.67 (0.49) | 2.77 (0.42) | 2.41** |
| Is holding a knife | 2.60 (0.53) | 2.72 (0.45) | 2.77** |
| Is holding a gun toward the ground | 2.70 (0.48) | 2.88 (0.33) | 4.66*** |
| Is holding a gun toward the officer | 2.98 (0.14) | 3.00 (0.00) | 1.42+ |
| **Global Views (Scale of -5 to +5)** | | | |
| General impression of police | 4.56 (0.96) | 4.60 (0.88) | 1.16 |
| Satisfaction with police | 4.59 (0.91) | 4.63 (0.86) | 1.07 |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

# DISCUSSION

Interest in police use of force is not new, with concerns about abuses of such power dating back as far as the 13th Century (Alpert & Dunham, 2004). However, in recent years policing has faced a "legitimacy crisis" of unprecedented levels (Nix, Campbell, Byers & Alpert, 2017: p. 310)—not just in the US, but in many countries around the world (Oberwittler & Roche, 2019). In a cultural climate where public outcries to defund "warrior style policing" are common (Cobbina-Dungy & Jones-Brown, 2021) and in which police agencies are employing new practices to hold officers more accountable (Wright & Houston, 2021), research on use of force decision making is needed to better understand how individual-level characteristics shape such quick and critical decisions. The current study was designed to help address this need.

This study sought to explore the impact of law enforcement officers' personality characteristics, dual process cognitive factors (i.e., System 1 and System 2 thinking styles), professional experiences and social networks on the decision to use force inside a training simulator. For purposes of comparison, civilian participants completed the same personality assessment, cognitive questionnaires and use of force measures. The inclusion of civilian participants also allowed for an examination of the impact of a brief educational experience (i.e., completing training exercises inside the simulator) on civilians' attitudes toward police and use of force decisions. Although the final sample of police officers in the study was smaller than anticipated, the study is able to provide some tentative conclusions about the role of individual level factors on use of force decision making (with $ps<.10$ or $ps<.05$).

**Summary of Findings**

Prior research has shown that individuals scoring high on the personality trait of Negative Emotionality, and those who score low on the trait of Constraint are more susceptible to rule breaking behaviors, including violence and delinquency (Burt & Donnellan, 2008; Caspi et al., 1994; Kreuger et al., 1994; 1996). Accordingly, the current study sought to determine if these same personality traits might predict higher levels of force during the training simulations–even in those simulations where the threat may be low-to-moderate. Contrary to expectations, neither Negative Emotionality nor Constraint were predictive of the decision to use force of any type (Table 5) regardless of the level of threat in the scenario (Table 6), and neither were predictive of the timing of force being used (Table 7). There is some evidence to suggest that participants who have lower levels of Constraint are more likely to use pepper spray or a taser rather than verbal de-escalation techniques (Table 9, Model 2), but this effect disappears when controlling for social network variables. Higher levels of Negative Emotionality were associated with higher likelihoods to use lethal force relative to non-lethal force (Table 11), but otherwise, these personality traits (along with Positive Emotionality) fail to distinguish between those who use force from those who use only de-escalation techniques.

Prior research also reveals that individuals who have a strong Need for Cognition (Cacioppo & Petty, 1984; Cacioppo et al., 1996) are more attentive to detail and make more deliberative decisions (System 2 processing), as opposed to more instinctive decisions (System 1 processing). The current study therefore sought to determine whether an officer's Need for Cognition slowed their use of force decision making in order to allow time for a more contemplative assessment of risk and its corresponding use of force response. Similarly, prior

research suggests that one's Cognitive Reflection level shapes the way the individual thinks about risk and reward, presumably by relying more heavily on System 1's quick cognitive processing rather than System 2's slow processing (Frederick, 2005; Toplak et al, 2011). Although no study to our knowledge has specifically examined the role of Cognitive Reflection in police use of force decisions, such quick-thinking cognitive styles have been theorized to account for racial disparities in police use of force (Mears et al., 2017). Thus, the current study sought to more formally explore the role of Cognitive Reflection in an officer's decision to use force on a non-compliant citizen.

In the current study, Need for Cognition and Cognitive Reflection were generally unrelated to the prediction of any force being used (Table 5). Note that greater Cognitive Reflection was associated with longer response times for using force (Table 7, Model 2), but this effect disappears when controlling for social network variables. An effect for Cognitive Reflection also appeared in the homeless man scenario (Table 6), such that those with greater reflective abilities were *more likely* to use any type of force in this low-threat encounter. However, in the aggregate across all scenarios, individuals possessing greater cognitive reflection were *less likely to use lethal force* relative to de-escalation techniques (Table 10).

Professional experience is theoretically related to use of force decision making, with veteran officers better able to rely on years of training–including de-escalation training–in order to resolve conflicts without using force (McElvain & Kposowa, 2004; Paoline & Terrill, 2007). We therefore examined the role of being a police officer versus civilian and the number of years of experience as an officer, as well as an officer's history of complaints of police misconduct, on the decision to use force. Results from the current study reveal that police officers are generally

*less likely* to use force of any type than untrained civilians (Table 5), especially in the low-to-medium threat situations (Table 6, Scenario 1 and 2). Officers are also more likely than civilians to use de-escalation tactics than non-lethal tactics (Table 9), but more likely to use lethal force than non-lethal force (Table 11). However, there were no differences between officers and civilians in the timing of force (Table 7), or in terms of using de-escalation versus lethal force (Table 10). Furthermore, officers with more years of professional experience were less likely to use force in the homeless man scenario (Table 6), and less likely to use lethal force more generally compared to using de-escalation tactics (Table 10)—although this latter effect disappears when controlling for social network variables.

Officers who have a prior history of citizen complaints and/or official sanctions for misconduct are more likely to use force of any type (Table 5), more likely to use force in the homeless man and domestic violence scenarios (Table 6), are quicker to use force (Table 7, Model 2; although this effect disappears controlling for social network variables), and are more likely to use pepper spray or taser (Table 9) and a firearm (Table 10) than de-escalation techniques. However, those with prior histories of complaints/sanctions for misconduct are more likely to use de-escalation techniques rather than to do nothing at all (Table 8), and are less likely to use lethal force than pepper spray/taser (Table 11).

Given that officers' perceived justifications for using force as well as their actual behaviors are thought to be shaped by organizational cultures/social networks (Ouellet, Hashimi, Gravel & Papachristos, 2019; Weisburd et al., 2001), the current study sought to assess how the size and strength of one's professional social network influences that individual's decision to use force. The study's original design was to explore whether officers within the same social

networks make similar decisions inside the training simulator. However, due to low study participation among officers and the resulting need to recruit officers from across a larger number of departments, the study's ability to map out network clusters was compromised. Nevertheless, the study continued to examine how decision making was influenced by the size of an officer's social network and the network's perceived attitudes toward force (i.e., would the relationships within the networks become stronger if the participant were to be suspended for using excessive force).

In the current study, officers with larger social networks and/or greater network densities (i.e., having friends who are friends with each other) were more likely to use force of any type (Table 5), more likely to use force in the domestic violence and collision investigation scenarios (Table 6), took slightly longer to decide to use force (Table 7) and were more likely to use lethal force relative to de-escalation techniques (Table 10). Officers who felt that the strength of their network ties would grow *stronger* if they were suspended for excessive force (a measure of peer support surrounding use of force) were more likely to use force of any type (Table 5), more likely to use force in the homeless man scenario (Table 6), used force more quickly (Table 7), and were more likely to use pepper spray/taser relative to de-escalation techniques (Table 9). Overall, these findings suggest that officers who have a larger friendship network of officers and whose network tends to support colleagues who may use excessive force are generally more likely to use force themselves and use it more quickly, including in low-threat situations.

Finally, prior research suggests that multi-week civilian educational programs, such as Citizens Police Academies, generate a greater understanding of the nature of police work and more positive attitudes toward the police (Lee, 2016; Perez et al., 2021; 2022), but the impact of

an acute intervention on citizen's attitudes toward police is not as well understood. Results from the current study reveal that the time civilian participants spent inside the firearms training simulator–despite being brief–had an immediate impact on their attitudes toward police officers and use of force decision making (Table 12). Even though the civilians in the current study had highly favorable opinions of the police at baseline, their appreciation of the difficulties, stressfulness and dangerousness of police work grew following the simulator training. At the posttest phase, civilians also were more likely to endorse the notion that police behave professionally, are treated too harshly by the media, and should be paid more. After spending time in the simulator, civilians are also less likely to endorse the notion that police are too quick to use force and are "trigger happy."

The simulator experience appeared to increase the level of force civilians felt was acceptable across a variety of situations (Table 12). The only instances where acceptable force levels did not increase were those where there was either little threat to the officer (suspect refuses to lay on the ground as ordered), or extremely high levels of threat (suspect is pointing a gun toward the officer). In these two situations, civilians' perceptions of acceptable force are largely immutable; however, in other situations where the threat level is more moderate and/or situations are more ambiguous, perceptions can change. Given that high profile cases of police use of force often involve threats that fall between the extremes, providing civilians with opportunities to experience these encounters inside a simulator may help to create more understanding and foster greater trust of the police.

## Implications

There are several themes that emerge from this body of results. First, while personality assessments may be useful for screening those individuals who are applying to be officers (Detrick & Chibnall, 2002; 2013), this study did not find that personality is useful for understanding use of force decisions among those who meet the initial screening standards to become officers. There may be more promise, however, by examining cognitive factors. The fact that individuals scoring higher in Need for Cognition were more likely to use de-escalation techniques than lethal force suggests that these individuals are more cognitively flexible and are able to consider additional means for resolving conflict besides lethal force. As departments come to understand how Need for Cognition and other cognitive constructs may impact decision making, use of force training may be modified to recognize an officer's cognitive need to consider multiple response options before deciding which to pursue (and when it is safe to do so).

A second theme that emerges is that police training equips officers with important de-escalation skills. In the low threat scenario (Homeless Man), which provides the greatest opportunity to use de-escalation, we find that officers use de-escalation tactics more often than untrained civilians. Such a finding suggests that *officer training matters*. Given the national outcry against use of excessive force, this finding also suggests that a nationwide movement toward, and preference for, prioritizing de-escalation tactics is worth pursuing. Additional investments in de-escalation facilities and training curriculums, such as those recently adopted in Charlotte, North Carolina (Melton, 2021) are needed, and some states and agencies have started to prioritize de-escalation within training academies. The current study suggests that those

investments may prove worthwhile, although emerging evidence also suggests that officers must be open and receptive to de-escalation adoption, and that field supervisors (many of whom are more experienced officers) may play an important role in facilitating receptivity (Engel, Isaza, Motz, McManus & Corsaro, 2022).

While trained officers were more adept than civilians at using de-escalation in the situations that best permit it, they were also more likely than civilians to use *lethal* force when necessary. Ultimately, this is what should be expected of trained law enforcement officers - to use de-escalation techniques when it is appropriate to do so, but to use lethal force when it is legally acceptable and necessary to protect officer and civilian safety. As the nation sees growing support for arming citizens so they can theoretically provide the same protection afforded by officers (e.g., arming school teachers; see Politico, 2022), findings from the current study question whether these citizens will be able to make the same decisions as trained officers.

While not a focus of the study, the low threat scenario offered us the opportunity to explore how officers and civilians responded to a call involving a person in a mental health crisis. In this study, officers were more likely to use verbal de-escalation techniques to manage the situation as compared to citizens. How officers respond to calls for service involving people with mental illnesses has been the subject of increased scrutiny after several high profile incidents that ended with lethal force. While many urban police departments have crisis intervention teams as part of their units, smaller more rural departments may not have the resources for these teams. Training officers how to respond to these individuals should continue to be a priority.

A third theme that emerges from the study's findings is that police officers with a documented history of citizen complaints and/or confirmed misconduct were sometimes more likely to use force in the simulated scenarios. However, the results were inconsistent across models and could also be interpreted in various ways. Citizen complaints, for example, might be related to duty assignments (e.g., working in more challenged neighborhoods or during peak crime times; serving arrest warrants on violent fugitives; participating on task force/high intensity crime response teams - see, for example, Terrill, Ingram, Somers & Paoline, 2018). Alternatively, citizen complaints often do reflect accusations of misuse of force (Hickman, 2006) or other officer behaviors/attitudes that need to be proactively addressed. And documented findings of sanctioned activities and misconduct are perhaps more serious than citizen complaints from an organizational and community perspective.

Regardless, both of these measures appear to inform officer decision-making with respect to use of force, engagement in de-escalation, and willingness to use more or less force at certain times. Sophisticated early intervention/warning systems (Alpert & Walker, 2000; Walker, 2003) often capture historical data and patterns on these potential predictors of force decisions. These systems, while potentially expensive and sometimes time-consuming to implement, should nevertheless be broadly expanded across law enforcement agencies and used proactively by first line supervisors.

Fourth, the social network analyses offer a richer understanding of how an officer's peers might exert influence on decisions and behavior with respect to use of force. In this study, we found that law enforcement peers definitively matter in predicting use of force decisions and outcomes, and in reinforcing the (internalized) legitimacy of those decisions. These are important

findings given that agency culture can impact organizational support for legitimate use of force and procedural justice (Silver, Roche, Bilach & Bontrager, 2018), that agencies are moving toward a "duty to intervene" posture when it comes to use of excessive force response, and that formal and informal leaders play important roles in establishing cultural norms and maintaining adherence to departmental policy and the law, including use of force practices in the field (Police Executive Research Forum, 2016; Huberts, Kaptein, & Lasthuizen, 2007; Weisburd, Greenspan, Hamilton, Williams & Bryant, 2001).

We are not suggesting that officers in this study made firearms simulation decisions that would be considered excessive force in the field. In fact, a primary purpose of the simulation *training* is to provide immediate feedback and coaching in response to the officer's decisions. However, law enforcement leaders should remain mindful of, and attentive to, officers (and supervisors) who maintain close friendships with colleagues who accumulate numerous and documented excessive force complaints. Leaders should also understand that those attitudes can be coached and be contagious, and can also migrate across social networks. On the other hand, those same attitudes can be proactively identified (sometimes through psychological testing and/or training processes (Scrivner, 1994), measured to some degree (via early warning/intervention systems), and mitigated through closer supervision and de-escalation role modeling (Engel et al., 2022).

Finally, citizen perceptions of the legitimacy of law enforcement processes, and trust in and support for use of force by officers, are often shaped by personal experiences and contacts with police (Harrell & Davis, 2020; Peyton, Sierra-Arevalo & Rand, 2019). The current study perhaps extends citizens' understanding of law enforcement challenges by providing them with

an opportunity to assume the role of an officer/deputy, and experience, first-hand, several use of force decisions inside a firearms simulator environment. Citizen academies often offer similar opportunities, with perhaps a single simulator experience at the end of the training, and these academies do help shape citizens' perception of the police (Cohn, 1996). However, citizen academies are not specifically designed to impact citizen perceptions of police use of force, which can vary considerably across demographic subgroups (Johnson & Kuhns, 2009) and cultures (Johnson, Maguire & Kuhns, 2014). And persistent, negative perceptions of the legitimacy of use of force can quickly erode trust and confidence in the law enforcement process (U.S. Commission on Civil Rights, 2018).

Unlike traditional citizen academies, this study specifically focused attention on perceptions of use of force by exposing a sample of (pro-police) citizens to multiple simulator scenarios at varying threat levels, and measured the impact of those experiences on changes in perceptions regarding policing more generally, and use of force specifically. The results indicated that helping citizens understand the timing, complexities, and challenges of use of force decisions positively informed and impacted their perceptions, again within a sample of citizens who were clearly supportive of police. Communities and law enforcement agencies that are continually challenged by misuse/excessive force complaints, or by recent officer-involved shooting events, might consider broader adoption of citizen simulator experiences as one method of improving police-community relationships. While training simulators such as that used in the current study are too expensive for many law enforcement agencies, advances in virtual reality headsets and their use in police training (Potts, Hawken, Hillhouse & Farabee, 2022) may make these simulation exercises more economical.

## Limitations & Future Research

The generalizability of our study findings, to some extent, were limited by the officer sample size. Recall that the original study design was necessarily modified as a result of some unforeseen events which impacted officer recruitment/retention (e.g., the George Floyd killing and the subsequent impact on officer and departmental engagement and willingness to participate; the nationwide shutdown associated with the early stages of the COVID-19 pandemic; the unanticipated transition from a single-screen VirTra-100® projector to a five-screen VirTra-300® projector during the study). Our attempts to generate broader interest from officers/deputies from several nearby agencies, and to further incentivize participating officers, had a limited impact. Subsequently, the relatively small number of officers included in the study, while not unique to studies using firearms simulators (cf: Hine, Porter, Westera, Alpert & Allen, 2019; Hulse & Memom, 2006; Mitchell & Flin, 2007), constrained our ability to run certain officer-specific and scenario-specific analyses.

To some degree, the officer sample size limitation was offset by our inclusion of a civilian sample, which provided opportunities for comparative analyses and allowed us to explore the impact of simulated training on civilian attitudes toward police and police use of force. Nevertheless, future studies could easily replicate this study design within a larger law enforcement setting, or again across multiple agencies, and perhaps consider other methods for successfully recruiting officers. Ideally, this study could operate and coincide with standard in-service annual firearms simulator training requirements, which could generate maximum enrollment. In addition, study results may differ across different types of law enforcement

agencies (municipal/city, sheriff's offices, state agencies; urban, suburban or rural; small, medium, large, etc.), and these are important contextual variations that should be explored.

A second study limitation was perhaps both a strength and a potential weakness. Every officer and civilian who participated was trained by the same instructor (from Agency A) in the firearms simulator. In many respects, that decision/outcome is positive in the sense that there was some consistency in the pre-simulator setup, feedback language, and overall training process used. On the other hand, we recognized that officers who worked within the instructor's agency (of approximately 30 officers) likely had a pre-established relationship with the instructor, while officers from other agencies and the civilians generally did not. The extent and implications of those relationships, which are unknown, may have had some impact on the study results.

To clarify, instructor feedback to familiar officers during simulations was potentially different (sometimes more relaxed; perhaps, at times, more critical, etc.) than feedback to unfamiliar officers and civilians. The pre-established relationship and feedback language, if provided following the first simulation, could also potentially impact decision-making in the second or third simulations. Further, for officers working in Agency A, it is possible that the simulator instructor was (anonymously) identified within an officer's social network and/or was a supervisor for the officer at one time or another; as such, the feedback may have been delivered differently yet again.

While personality assessments may be useful for screening those applying to be officers, this study did not find that personality is useful for understanding use of force decisions. It is perhaps the case that by using personality tests or other forms of "readiness assessments" at the screening phase, police departments create a more homogenous group of officers than would be

found in the general population. If that is the case, then it may prove to be more difficult to distinguish differences in personality and their effects on use of force decisions in a more granular fashion. This, combined with a limited sample size, perhaps helps explain our findings that personality failed to predict outcomes in the majority of cases. Future research should continue to examine personality factors and use of force decisions utilizing a larger sample of officers and with a variety of personality measures.

Our study failed to capture whether social network contacts were supervisors, past or present, although we did ask about whether social ties served as mentors. Out of the 49 officers that provided valid information on the social network survey, and reported at least one tie within the department, 42 (85.71%) reported that at least one of their named ties was a mentor. Whether the mentors were also formal supervisors, or was the simulator trainer (officers in Agency A) is unknown. Future studies may want to consider whether having a completely independent trainer is worth considering, or, alternatively, measure pre-existing relationships between trainers and trainees and between supervisors and subordinates, particularly in smaller agency settings.

Finally, future research should continue to study peers using social network analysis techniques. In spite of the rich history of police subculture research (see Crank, 2004; Paoline & Terrill, 2014), social network methods have yet to be widely employed to examine discretionary officer behavior. As noted above, our sample included several small police departments in suburban and rural areas. Exploring the relevance of social networks in a larger police department may help us further understand these relationships.

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# APPENDIX A:

# RECRUITMENT STRATEGIES

## Law Enforcement Agency Recruitment Strategies

For purposes of anonymity, all law enforcement agencies invited to participate in the current study are referred to here as Agency A, Agency B, Agency C, etc.

*Agency A.* Agency A is a municipal police department within the originally targeted county. At the start of the study, the agency had approximately 30 sworn officers serving a town of approximately 14,000 residents. Agency A owned the VirTra® firearms training simulator used in this study. Throughout the study, the simulator was operated by one of Agency A's firearms training instructors.

In the Fall of 2018, members of the research team met with officers during roll call meetings to announce the study and answer questions the officers may have had. Officers were informed that the study involved the completion of two online surveys and a series of firearms training exercises inside the simulator. Officers were also informed that they would receive a $20 Amazon gift card for completing the online surveys. Given that officers would be completing the simulator exercises while on duty, and mindful of departmental restrictions prohibiting officers receiving external compensation while on duty, the $20 incentive was paired with only the online surveys, which officers could complete during off duty hours. After the roll call meetings, officers were emailed the consent form information and a link to the first online survey. The second survey was designed to launch automatically at the completion of the first.

Agency A routinely uses the simulator as part of its officers' annually required firearms training. The Chief of Police at Agency A agreed to allow the study's VirTra® exercises to be

used as part of the department's 2018 annual training. Members of the research team were present during these training sessions to video record those officers who provided their consent to participate in the study. Note that some officers provided consent by previously completing the online survey(s), while others who had not yet completed the survey but wanted to participate in the study signed consent forms prior to completing their training exercises.

In the Summer of 2019, Agency A upgraded its training simulator from a single screen model (the VirTra-100®) to a five-screen model (VirTra-300®). All use of force data collected on the single screen model was now deemed unusable for the current report, and a new set of simulations for use with the upgraded simulator were selected for use. In the Fall of 2019, Agency A trained its officers using the new simulations, and members of the research team were present to re-consent officers in order to video record their training sessions for use in this study. Because annual firearms training was mandatory for all sworn officers—and because most officers consented to participate in the study—the research team was able to recruit most officers from Agency A. However, some officers declined to participate in the study, and others were excluded from participating because they had previously seen the simulations at a different training site. Other officers who originally completed the VirTra-100® simulations were unavailable to complete the VirTra-300® simulations because they retired/left the department before the new simulations were adopted. Any officers who were recently hired by Agency A were invited by the research team to participate in the study.

*Agency B.* Agency B is a municipal police department within the originally targeted county. At the start of the study, the agency had approximately 25 sworn officers serving a town of approximately 15,000 residents. Recruitment at Agency B mirrored that of Agency A. In the

Spring of 2019, the research team met with officers during roll call meetings. Officers were emailed the consent form information and link to the first online survey. Agency B was invited to use the VirTra simulator at Agency A for their officers' annual firearms training, and the Chief of Police at Agency B agreed to allow the study's VirTra® simulations to be used during this training. Research team members video recorded the training sessions of those officers who agreed to participate in the study. After the simulator was upgraded to the five-screen model later that same year, Agency B's 2019 use of force data were deemed unusable. However, in the early portion of 2020, Agency B returned to complete the newly selected VirTra-300® exercises as part of its annual training. The research team was able to recruit most officers from Agency B into the study, although some declined to take part or retired/left the department before the 2020 data collection period. Any officers who were recently hired by Agency B were invited by the research team to participate in the study.

*Agency C.* Agency C is a municipal police department within the originally targeted county. At the start of the study, the agency had approximately 90 sworn officers serving a town of approximately 35,000 residents. Recruitment in Agency C unfolded differently. In the Spring of 2019, members of the research team met with officers during roll call meetings to announce the study and answer questions officers may have had. Officers were then emailed consent form information and a link to the first online survey. While Agency C was also invited to use the firearms simulator for its annual training, the department declined. As a result, officers who wanted to participate in the study would now need to obtain permission from a supervisor in order to complete the VirTra® exercises while on duty, or they would need to schedule an appointment during off-duty hours to complete the exercises.

Several officers from Agency C completed the online surveys immediate after the research team's initial recruitment visit; however, before appointments could be scheduled to complete these officers' simulator exercises (and before recruitment of additional officers could take place), the research team had to suspend data collection for several months due to concerns raised by NIJ advisors about the training exercises, and due to the upgrading of the VirTra-100® to the VirTra-300®. After the simulator upgrade was complete and new training exercises were selected for use in the study (and after the research team re-enrolled officers from Agency A and B), the team turned its attention again to Agency C. However, the COVID-19 pandemic led to another suspension in recruitment at Agency C, this time lasting approximately one year. During this time, public criticism of police use of force erupted in response to the killing of George Floyd by a Minneapolis police officer.

In the Summer of 2021, the research team attempted to re-connect and re-engage with the officers in Agency C, but only a few officers were recruited during this second wave and those who had previously been recruited were generally no longer interested in completing the firearms simulation exercises. Anecdotal evidence suggests the public's scrutiny of the police following the death of George Floyd dissuaded some officers from participating. Over the course of the next year, the research team attempted to re-ignite interest in the project at Agency C, and even offered additional incentives for taking part in the project. Ultimately, few officers from Agency C completed enough of the data collection exercises to be included in the current study. Recognizing that recruitment at Agency C was not going to be as fruitful as originally expected, the research team sought to enroll law enforcement officers in other agencies.

*Agency D.* Agency D is a municipal police department outside the originally targeted

county, but still within the same general region of the state. At the start of the study, the agency had approximately 18 sworn officers serving a town of approximately 5,000 residents. Agency D's geographic distance from Agency A (where the simulator is located) did not make it a viable target for mass recruitment. However, in the Spring of 2021, the commander of a squad of five officers from Agency D contacted the firearms instructor at Agency A and asked if the squad could complete training exercises in the simulator. Given that these five officers would already be commuting to Agency A for training, the research team approached this squad as they arrived and invited them to participate in the study. Most agreed to take part.

*Agency E*. Agency E is a municipal police department outside the originally targeted county, but still within the same general region of the state. At the start of the study, the agency had approximately 15 sworn officers serving a town of approximately 3,000 residents. In the Spring of 2021, the commanders of 13 officers from that agency contacted the firearms instructor at Agency A and asked if the officers could complete training exercises in the simulator. Given that these 13 officers would already be commuting to Agency A for training, the research team approached this squad upon their arrival and invited them to participate in the study. Most agreed to take part.

*Agency F*. Agency F is the sheriff's office serving the originally targeted county. At the start of the study, the office had approximately 240 sworn deputies serving a county of approximately 227,000 residents. In the Fall of 2021, members of the research team contacted the Deputy Sheriff at Agency F in order to invite the department to be a partner in the study. The Deputy Sheriff was supportive of our work, but for logistical reasons the research team was not granted permission to meet with deputies face-to-face to discuss the study or address questions.

Instead, study information had to be shared by way of an online recruitment video that the research team created. The team emailed a video link and a supplemental flyer about the study to each deputy. The team followed up with a separate email containing the informed consent form information and a link to the first online survey. Because the agency did not wish to have its deputies complete the simulator exercises as part of its annual training, any deputy interested in taking part in the study had to schedule an appointment to come to Agency A during off-duty hours. Few deputies expressed interest in participating in the project.

*Agency G.* Agency G is a sheriff's office within a neighboring state. At the start of the study, the department had approximately 130 sworn agents serving a county of approximately 90,000 residents. In the Spring of 2022, members of the research team contacted the leadership staff at the agency in order to invite the department to be a partner in the study. The leadership at Agency G was supportive of our work, but for logistical reasons would not grant the research team permission to conduct face-to-face recruitment meetings with the deputies. Study information would again be shared by way of an online recruitment video and supplemental flyer. However, rather than providing the research team with a roster of all deputies' email addresses so that the recruitment video and flyer could be distributed by the team, the leadership at Agency G wanted a staff member at the agency to be the one to distribute the information to deputies. Without a roster of email addresses, the research team could not send out informed consent form information or the first online survey link proactively to each deputy. Instead, the team would have to wait for deputies to contact them and request this information. Any deputies interested in participating would also have to schedule appointments in the firearms simulator during off-duty hours. Arguably, the limited access to deputies for purposes of recruitment,

coupled with the off-duty restriction for completing the training exercises, impacted the participation rate at Agency G. Only a few deputies participated in the project.

*Agency H.* Agency H is a municipal police department outside the originally targeted county, but still within the same region of the state. At the start of the study, the agency had approximately 55 sworn officers serving a town of approximately 31,000 residents. In the Winter of 2021, the research team reached out to the Chief of Police in order to invite the department to be a partner in the study. The Chief was supportive of the research and was willing to have all of his officers receive training inside the simulator while on duty (just as Agency A and B had done). However, before granting full permission, the Chief wanted his department's attorney to assess any liability to which the department might be exposed by participating.

The attorney contacted the research team and raised questions about whether an officer's survey responses or training video could be obtained through discovery in a civil rights case. With the assistance of a NIJ Human Subjects Protection Officer, the research team was able to satisfy the attorney's concerns and he ultimately approved of the department's involvement. However, by the time this approval was received, three months had passed since the original meeting with the Chief. A new COVID outbreak was now present within Agency H, and the Chief found himself short-staffed. He could no longer commit to sending large groups of on-duty officers to Agency A for simulator training. Instead, any officer who wanted to participate in the study would have to schedule a simulator appointment while off-duty.

The Chief was also no longer interested in having the research team come speak to officers face-to-face for recruitment purposes, and so the research team had to again rely on an online recruitment video, which was supplemented with an electronic recruitment flyer.

Furthermore, the research team was not given a roster of the individual email addresses of the officers. The recruitment video and flyer would instead be distributed by a member of the department's leadership team, and any officer interested in taking part would need to reach out to the research team for the consent form and link to the online survey. Ultimately, no officers from this department ever expressed interest in participating, and as such, Agency H is not mentioned as a participating department throughout the remainder of this report.

**Civilian Participants and Recruitment Strategies**

Adult civilians with no prior law enforcement or military training were recruited to participate in the study. Mindful of the need to travel to Agency A to complete the simulator exercises, the study sought to recruit civilians who resided in the same county as Agency A. In the hopes of recruiting a diverse set of civilians, a variety of recruitment strategies were adopted.

*Citizen Police Academy Participants.* Agency A offers a multi-week "Citizen Police Academy" (CPA) to area residents. The program is designed to give citizens an opportunity to learn about local police operations, crime safety measures, self-defense strategies, and police training techniques. CPA participants also complete a series of training exercises inside the VirTra®. Agency A agreed to use the training exercises selected for this study in its CPA classes. Given that CPA participants would already be coming to Agency A to complete these exercises, the research team sought to recruit civilian participants from this pool of individuals.

*Police Department Social Media Post*. The research team developed a social media post describing the current study and containing the research team's contact information. Given that Agency A, B and C are all within the targeted catchment area for civilian recruitment, the research team asked each of the three departments to publish the post on their social media

platforms. Agency A and B agreed to do so.

*Neighborhood and Business Flyers.* A paper flyer modeled after the social media post described above was printed and left in mailboxes of residents in several apartment complexes and single-family home neighborhoods throughout the county. Approximately 1,000 flyers were distributed in this manner.

Paper copies of the flyer were also distributed to various businesses in the community for their employees and/or patrons. They were posted at local fitness centers, car washes, grocery stores, fire stations, video game stores, public laundromats, and at barber shops that cater to Black patrons. Approximately 200 flyers were distributed in this manner.

Electronic copies of the flyer were emailed to public school teachers in the targeted county, to area churches with predominantly Black or multicultural denominations, and to more than 50 organizations in the county's Chamber of Business membership directory.

*Email Announcement.* With the assistance of the Chief of Police in Agency A, an email was sent to all town employees (in Agency A's town) describing the study and including the research team's contact information.

## APPENDIX B:

## SIMULATOR EXPERIENCE FEEDBACK QUESTIONNAIRE

1. Prior to today, have you ever completed any firearms training scenarios in a VirTra or VirTra-like video training simulator? (Check Box)

   [ ] No
   [ ] Yes

2. On a scale of 0 to 10, how comfortable were you *interacting with the actors* on the video screen? (Circle Number)

   0 1 2 3 4 5 6 7 8 9 10

   Not At All Comfortable — Extremely Comfortable

3. On a scale of 0 to 10, *how realistic* did those video scenarios feel/seem to you? (Circle Number)

   0 1 2 3 4 5 6 7 8 9 10

   Not At All Realistic — Extremely Realistic

4. Do you play "first person shooter" video games such as *Call of Duty, Rainbow Six Siege,* or *Doom*? (Check Box)

   [ ] No
   [ ] Yes

   Yes – If 'Yes,' then in a *typical week,* how many hours per week do you spend playing first person shooter video games?

   _____ hours/week

## APPENDIX C:

## VIDEO CODING PROCESS & INTER-RATER RELIABILITY CHECKS

Videos for each participant were coded independently by three separate coders and multiple rounds of reliability checks were estimated to ensure proper training of coders and agreement between their coding results. The first round of coding occurred on a testing set of 10 participants. The primary coder (Co-PI DeWitt), then evaluated coding results across the three coders and reviewed notes made by each coder. The primary coder then revised the coding guide accordingly and all coders were tasked with coding new participant videos as they were recorded and processed. The primary coder periodically re-estimated comparisons across coders as time elapsed, with a final round of coding review completed in July 2022.

To evaluate inter-rater reliability, we used intraclass correlation coefficients (ICCs). ICCs were generated using the "icc" function in Stata version 17.0 specifying fixed effects for each coder and random effects for each participant. ICC values represent the correlation between individual coder values and the average values for each participant across coders. Outcomes for each calculation were calculated for participant-level indicators summed across the three scenarios coded for each participant, including 1) the total number of times pepper spray was drawn or used, 2) the total number of times a taser was drawn or used, 3) the total number of times a firearm was drawn or used (including the number of shots fired), 4) the total number of verbal de-escalation statements made and, 5) the variety of different verbal de-escalation techniques used. Table C1 provides summary statistics for each of these variables as well as ICC values and their respective 95% confidence intervals.

Table C1: Summary Statistics for Video Coding by Coder and with ICCs

| | All Coders | | Coder 1 | | Coder 2 | | Coder 3 | | ICC | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Value | 95% CI |
| Pepper Spray | | | | | | | | | | |
| Drawn | 0.34 | 0.54 | 0.34 | 0.55 | 0.34 | 0.55 | 0.32 | 0.52 | 0.985 | (0.981, 0.989) |
| Used | 0.17 | 0.47 | 0.19 | 0.49 | 0.18 | 0.50 | 0.16 | 0.41 | 0.958 | (0.946, 0.967) |
| Taser | | | | | | | | | | |
| Drawn | 1.05 | 0.93 | 1.05 | 0.93 | 1.04 | 0.94 | 1.05 | 0.93 | 0.997 | (0.996, 0.998) |
| Used | 0.48 | 0.80 | 0.50 | 0.82 | 0.48 | 0.82 | 0.46 | 0.78 | 0.989 | (0.985, 0.991) |
| Firearm | | | | | | | | | | |
| Drawn | 1.97 | 0.75 | 1.98 | 0.74 | 1.96 | 0.74 | 1.98 | 0.77 | 0.982 | (0.977, 0.986) |
| Used | 0.84 | 0.71 | 0.84 | 0.71 | 0.81 | 0.69 | 0.86 | 0.84 | 0.983 | (0.978, 0.987) |
| N Shots Fired | 1.89 | 2.23 | 1.91 | 2.29 | 1.84 | 2.14 | 1.92 | 2.26 | 0.982 | (0.977, 0.986) |
| Verbal De-escalation | | | | | | | | | | |
| Number of Statements | 4.14 | 4.35 | 4.10 | 4.39 | 4.16 | 4.34 | 4.15 | 4.36 | 0.971 | (0.963, 0.978) |
| Variety Score | 1.36 | 1.15 | 1.36 | 1.19 | 1.34 | 1.11 | 1.38 | 1.16 | 0.956 | (0.944, 0.966) |

The means and standard deviations are all very similar across coders, generally differing in just the first or second decimal place. This agreement is reflected in the high values for the ICCs. Similar to other varieties of interrater reliability statistics (e.g., Cronbach's alpha), the ICC ranges from 0 to 1, with values closer to 1 indicating more agreement. All ICC values for the characteristics displayed in Table A1 are within .05 points of perfect agreement. The associated confidence intervals also suggest very high levels of agreement, the minimum value being 0.944 for the verbal de-escalation variety score. Without exception, ICC values and their confidence intervals indicate very high levels of agreement, suggesting a more than satisfactory level of interrater reliability.

## APPENDIX D:

## NEED FOR COGNITION - SHORT FORM

Instructions: For each of the statements below, please indicate to what extent the statement is characteristic of you, using the scale below.

1 = extremely uncharacteristic
2 = somewhat uncharacteristic
3 = uncertain
4 = somewhat characteristic
5 = extremely characteristic

| | | Circle Your Answer | | | | |
|---|---|---|---|---|---|---|
| 1. | I would prefer complex to simple problems. | 1 | 2 | 3 | 4 | 5 |
| 2. | I like to have the responsibility of handling a situation that requires a lot of thinking. | 1 | 2 | 3 | 4 | 5 |
| 3.[R] | Thinking is not my idea of fun. | 1 | 2 | 3 | 4 | 5 |
| 4. [R] | I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. | 1 | 2 | 3 | 4 | 5 |
| 5. [R] | I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something. | 1 | 2 | 3 | 4 | 5 |
| 6. | I find satisfaction in deliberating hard and for long hours. | 1 | 2 | 3 | 4 | 5 |
| 7. [R] | I only think as hard as I have to. | 1 | 2 | 3 | 4 | 5 |
| 8. [R] | I prefer to think about small, daily projects to long-term ones. | 1 | 2 | 3 | 4 | 5 |
| 9. [R] | I like tasks that require little thought once I've learned them. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10. | The idea of relying on thought to make my way to the top appeals to me. | 1 | 2 | 3 | 4 | 5 |
| 11. | I really enjoy a task that involves coming up with new solutions to problems. | 1 | 2 | 3 | 4 | 5 |
| 12. R | Learning new ways to think doesn't excite me very much. | 1 | 2 | 3 | 4 | 5 |
| 13. | I prefer my life to be filled with puzzles that I must solve. | 1 | 2 | 3 | 4 | 5 |
| 14. | The notion of thinking abstractly is appealing to me. | 1 | 2 | 3 | 4 | 5 |
| 15. | I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought. | 1 | 2 | 3 | 4 | 5 |
| 16. R | I feel relief rather than satisfaction after completing a task that required a lot of mental effort. | 1 | 2 | 3 | 4 | 5 |
| 17. R | It's enough for me that something gets the job done; I don't care how or why it works. | 1 | 2 | 3 | 4 | 5 |
| 18. | I usually end up deliberating about issues even when they do not affect me personally. | 1 | 2 | 3 | 4 | 5 |

R=Reverse scored

## APPENDIX E:

## COGNITIVE REFLECTION TEST

Without using any outside help (no calculators, internet, asking others, etc.,), answer the questions below. Write your answers in the spaces provided. If you are not sure of the answer, then give us your best guess.

1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? (Assume no sales tax.)

   **Answer:** _____

2. If it takes 5 machines 5 minutes to make 5 pencils, how long would it take 100 machines to make 100 pencils.

   **Answer:** _____ minutes

3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

   **Answer:** _____ days

   Answers: (1) 5-cents (2) 5 minutes (3) 47 days

## APPENDIX F:

## DEMOGRAPHIC & PROFESSIONAL EXPERIENCES QUESTIONS

Instructions: Please answer the questions below. Your answers will help us describe the two groups of people (officers and citizens) who participate in the study.

1. How old are you? _____ years old

2. What is your biological sex?
   [ ] Male
   [ ] Female

3. Which of the following best describes your race/ethnic background?
   [ ] White (Non-Hispanic)
   [ ] Black or African American
   [ ] Hispanic, Latino/Latina, or Spanish origin
   [ ] American Indian or Alaska Native
   [ ] Asian
   [ ] Native Hawaiian or Other Pacific Islander
   [ ] Other _____

4. What is the highest level of school you have completed or the highest degree you have received?
   [ ] No high school experience
   [ ] Some high school experience; No diploma
   [ ] High school degree or high school degree equivalent (GED)
   [ ] Some college; No degree
   [ ] Associate's degree (2 year college)
   [ ] Bachelor's degree (4 year college)
   [ ] Graduate degree

5. Which of the following categories best describes your employment status?
   [ ] Employed, working 40 or more hours per week
   [ ] Employed, working less than 40 hours per week
   [ ] Not employed but currently looking for work
   [ ] Not employed and NOT currently looking for work
   [ ] Retired
   [ ] Disabled; Not able to work

6. Have you ever served in a branch of the military?
   [ ] No
   [ ] Yes; If yes, how many years of military experience do you have? _____ years

***Questions 7 - 12 were administered to civilian participants only.***

7. During your lifetime, how many times—if any—have you received police assistance for a problem/issue that you were having?
   [ ] 0 times
   [ ] 1 time
   [ ] 2-4 times
   [ ] 5-7 times
   [ ] 8-9 times
   [ ] 10 or more times

8. During your lifetime, how many times—if any—have you received *superior* police assistance for a problem/issue that you were having?
   [ ] 0 times
   [ ] 1 time
   [ ] 2-4 times
   [ ] 5-7 times
   [ ] 8-9 times
   [ ] 10 or more times

9. During your lifetime, how many times—if any—have you been stopped/questioned by the police because they believed you had committed a violation or crime?
   [ ] 0 times
   [ ] 1 time
   [ ] 2-4 times
   [ ] 5-7 times
   [ ] 8-9 times
   [ ] 10 or more times

10. During your lifetime, how many times—if any—have you been arrested?
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

11. During your lifetime, how many times—if any—have you personally *experienced* police misconduct (i.e., behaviors by the police that you believe are inappropriate or unjustified)?
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

12. During your lifetime, how many times—if any—have you personally *witnessed* police misconduct committed against another person (i.e., behaviors by the police that you believe are inappropriate or unjustified)?
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

***Questions 13 - 19 were administered to police officer participants only.***

13. For how many years have you worked as a police officer at your CURRENT department?

    _____ years

14. For how many years have you worked as a police officer in total ACROSS ALL departments where you have worked?

    _____ years

15. Over the course of your career as a law enforcement officer (across all departments), how many times -if any- has someone used lethal force against you in the line of duty? By lethal force we mean any force that is likely to cause serious bodily harm or death.
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

16. Over the course of your career as a law enforcement officer (across all departments), how many times -if any- have you used lethal force against another person in the line of duty? By lethal force we mean any force that is likely to cause serious bodily harm or death.
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

17. Over the course of your career as a law enforcement officer (across all departments), how many times -if any- has a citizen filed a formal complaint of misconduct against you? Please include all complaints filed, even if they were deemed unfounded or did not result in any official sanction.
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

18. Over the course of your career as a law enforcement officer (across all departments), how many times -if any- have you been officially sanctioned because of misconduct? Official sanctions include: a formal written reprimand, a demotion, suspension, etc.
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

19. Over the course of your career as a police officer (across all departments), how many times—if any—have you been officially recognized/honored because of superior service while on duty? Official recognitions/honors include: a formal written letter of acknowledgement, verbal recognition at a ceremony, receiving a certificate/plaque, etc.
    [ ] 0 times
    [ ] 1 time
    [ ] 2-4 times
    [ ] 5-7 times
    [ ] 8-9 times
    [ ] 10 or more times

## APPENDIX G:

## SOCIAL NETWORK MEASURES

**Instructions**
Research suggests that our friends' attitudes and behaviors can shape the way we make decisions. In this survey we will ask you about the officers in your department with whom you share a personal friendship. You will be asked to identify these officers by name, and indicate how well you know them.

Please provide a full first and last name for each officer in your department whom you would consider to be a friend (and not just a coworker). This survey will allow you to list up to 40 friends, but you should use only the spaces you need and leave the others blank. If you need to list more than 40 friends from your department, then please contact us and we will provide you with a pencil and paper copy of the survey to complete.

All of this information will be kept confidential and your responses will only be known to the research staff, not your fellow officers. Your name and all of the names provided by you will be replaced with random identification numbers after data collection has ended.

Click on the button below (bottom right) when you are ready to begin.

**Personal Information & Tie Names**

Question 1: What is your full name? (This information is needed to help us identify all friendships by name. Without your name, we cannot specify which two people are friends.)

Question 2: What is your work email address?

Question 3: In the spaces below, please provide the real names of officers (full first and last name) whom you would consider to be a friend (not just a coworker). Use a different space for each officer. Use as many spaces as you need to identify those officers in your department who make up your friendship network.

When you have entered your final name, scroll to the bottom and click on the arrow to continue to the next page.

***40 blank spaces provided in Qualtrics***

**Information about Relationships with Ties**

*Note: ${lm://Field/1} automatically populates tie names provided in Question 3. These questions repeat for each tie name provided by the respondent*

Question 4: How long have you known ${lm://Field/1}?
1. Less than one year
2. 1 to 3 years
3. 3+ to 5 years
4. 5+ to 10 years
5. More than 10 years

Question 5. On average, how often do you speak with ${lm://Field/1}?
1. EVERY DAY or nearly everyday
2. Four or five times PER WEEK
3. Two or three times PER WEEK
4. Once PER WEEK
5. Two or three times PER MONTH
6. Once PER MONTH
7. Very rarely (less often than once PER MONTH)

Question 6. How important would you say the relationship with ${lm://Field/1} is to you?
1. Extremely important
2. Very important
3. Moderately important
4. Slightly important
5. Not important at all

Question 7. ${lm://Field/1} is someone I can turn to for support during difficult times in my life.
1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

Question 8. About how much time are you around ${lm://Field/1} on a typical day of work?
1. Fifteen minutes or less
2. ½ hour to 1 hour
3. 1+ to 2 hours
4. 2+ to 4 hours
5. 4+ to 6 hours
6. 6+ to 8 hours
7. More than 8 hours

Question 9. For how long have you worked with ${lm://Field/1}?
1. Less than a month
2. 1 to 3 months
3. 3+ to 6 months
4. 6+ months to 1 year
5. 1+ to 3 years
6. 3+ to 5 years
7. 5+ to 10 years
8. More than 10 years

Question 10. Did you complete your initial training to be an officer with ${lm://Field/1}?
1. Yes
2. No

Question 11: Would you consider ${lm://Field/1} to be a mentor?
1. Yes
2. No

Question 12: Is ${lm://Field/1} a member of your close (spouse, child, parent/grandparent) or extended (cousin, aunt/uncle, niece/nephew, in-law) family?
1. Yes
2. No

Question 12A (if Yes to Question 12): How is ${lm://Field/1} related to you?
1. Partner/Spouse
2. Mother or Father
3. Sister or Brother
4. Child
5. Grandfather or Grandmother
6. Cousin
7. Aunt or Uncle
8. Nephew or Niece
9. Other Family

Question 13: Consider the following hypothetical situation. Suppose you were suspended without pay for using excessive force during the course of an arrest. The details of the incident and your suspension are well known across the department. How would your relationship with ${lm://Field/1} be strengthened or weakened because of this incident?

1. The relationship would become much stronger
2. The relationship would become somewhat stronger
3. The relationship would become slightly stronger
4. It would have no effect at all on the relationship
5. The relationship would become slightly weaker
6. The relationship would become somewhat weaker
7. The relationship would become much weaker, or no longer exist

**Relationships between Ties**

Instructions: We want to know how many of your friends are friends with each other. Below on the left-hand side you will see a listing of all the friends you identified. To the right is the name of one of those friends. If a person on the left-side is friends with the person on the right, then drag that name over from the left to the right.

When you are done, click on the arrow at the bottom to continue to the next page. There you will be asked to repeat this process, but this time with a different friend's name on the right.

Question 14: Which of the following officers that you have named would ${lm://Field/1} consider to be a friend? Please use the same standards for calling someone a "friend" that you did in naming these officers as your friend.
**List of all ties named in Question 3 presented**

## APPENDIX H:

## ATTITUDES TOWARD POLICE QUESTIONNAIRE

The questions below ask about your opinions of the police, and what it is like to be a police officer.

***Part I. Answer the question in this section by circling a number from 0 to 10.***

1. How well do you understand the risks and challenges that police officers face?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Not At All | | | | | | | | | | Extremely Well |

2. How difficult do you think a police officer's job is?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Not At All | | | | | | | | | | Extremely Difficult |

3. How stressful do you think a police officer's job is?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Not At All | | | | | | | | | | Extremely Stressful |

4. How dangerous do you think a police officer's job is?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Not At All | | | | | | | | | | Extremely Dangerous |

**Part II. Indicate how much you agree or disagree with the statements below as they apply to the *typical* police officer. Use the scale:**

SD = Strongly Disagree
D = Disagree
N = Neutral/Neither Disagree or Agree
A = Agree
SA = Strongly Agree

Remember to think about *typical* police officers as you complete the items.

| | | **Circle Your Answer** | | | | |
|---|---|---|---|---|---|---|
| 1. | Police officers behave in a professional manner. | 1 | 2 | 3 | 4 | 5 |
| 2. | Police officers are treated unfairly (too harshly) by the media. | 1 | 2 | 3 | 4 | 5 |
| 3. | Police officers should be paid more for the work they do. | 1 | 2 | 3 | 4 | 5 |
| 4. | Police officers are too quick to use force. | 1 | 2 | 3 | 4 | 5 |
| 5. | When it comes to using force, police officers should spend more time thinking before they act. | 1 | 2 | 3 | 4 | 5 |
| 6. | Police officers are "trigger-happy" and too eager to shoot. | 1 | 2 | 3 | 4 | 5 |

**Part III. The questions in this section describe different situations between a police officer and a suspect. Please indicate if you think it is acceptable (appropriate) for the police officer to use force in the situation.**

**If you think force is acceptable, please indicate if you think *non-deadly* or *deadly force* is acceptable.**

***Non-deadly force* includes grabbing/pushing/tackling the suspect, using pepper spray, or using a taser.**

***Deadly force* involves shooting the suspect.**

1. Do you think it is acceptable for the police officer to use force on a suspect who is refusing to follow orders to lay down on the ground?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

2. Do you think it is acceptable for the police officer to use force on a suspect who suddenly begins to charge toward the officer?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

3. Do you think it is acceptable for the police officer to use force on a suspect who tries to hit the officer with his fists?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

4. Do you think it is acceptable for the police officer to use force on a suspect who is refusing to take his hands out of his pocket?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

5. Do you think it is acceptable for the police officer to use force on a suspect who quickly reaches in his pocket and pulls out an unknown object?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

6. Do you think it is acceptable for the police officer to use force on a suspect who is holding a knife?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

7. Do you think it is acceptable for the police officer to use force on a suspect who is holding a gun toward the ground?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

8. Do you think it is acceptable for the police officer to use force on a suspect who is holding a gun toward the officer?
   [ ] No, force is not acceptable
   [ ] Yes, but only non-deadly force is acceptable
   [ ] Yes, deadly force is acceptable

**Part IV. Finally, please answer the questions below about the police in your community.**

1. What is your general impression/opinion of the police in your community?

| -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Extremely Unfavorable | | | | | Neutral | | | | | Extremely Favorable |

2. Overall, how satisfied are you with the police in your community?

| -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Extremely Unfavorable | | | | | Neutral | | | | | Extremely Favorable |

## APPENDIX I:

## UNABRIDGED TABLES OF REGRESSION RESULTS

Table 5a. Logistic Regression Predicting Use of Any Force (N=495 participant scenarios) - *Unbridged Findings*

Table 6a. Logistic Regression Predicting Use of Force (Any Force) - Scenario Specific Findings, *Unabridged*

Table 7a. OLS Regression Predicting Time Until Force is Used (N=228) - *Unabridged Findings*

Table 8a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 1: No Tactic Used Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

Table 9a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 2: Non-Lethal Force Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

Table 10a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 3: Lethal Force Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

Table 11a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 4: Lethal Force Relative to Non-Lethal Force (N=495) - *Unabridged Findings*

Table 5a. Logistic Regression Predicting Use of Any Force (N=495 participant scenarios) - *Unbridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.024+ | 0.014 | -0.024 | 0.016 | -0.027 | 0.016 |
| Negative Emotionality | 0.003 | 0.012 | 0.001 | 0.012 | 0.001 | 0.012 |
| Constraint | -0.022 | 0.015 | -0.022 | 0.015 | -0.014 | 0.016 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.051 | 0.115 | -0.113 | 0.113 | -0.121 | 0.113 |
| Need for Cognition | 0.013 | 0.011 | 0.008 | 0.013 | 0.013 | 0.013 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 0.835* | 0.401 | 0.383 | 0.859 | -1.931+ | 1.048 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -1.320*** | 0.333 | -1.380*** | 0.377 | -1.433*** | 0.376 |
| Collision investigation | -3.462** | 1.240 | -3.649* | 1.480 | 3.600* | 1.460 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.008 | 0.014 | 0.004 | 0.014 |
| Sex (1=Male) | | | 0.106 | 0.328 | 0.119 | 0.322 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.335 | 0.614 | 0.323 | 0.633 |
| Hispanic | | | 0.787 | 0.425 | 0.697 | 0.429 |
| Other | | | 0.558 | 0.424 | 0.450 | 0.425 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.045 | 0.029 | -0.033 | 0.031 |
| Number of citizen complaints | | | 0.296* | 0.150 | 0.330* | 0.167 |
| Number of official sanctions | | | 0.637 | 0.534 | 0.575 | 0.571 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.002 | 0.007 |
| Network size | | | | | 0.152* | 0.066 |
| Impact of suspension on ties | | | | | 0.294+ | 0.174 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | -0.242 | 0.488 | -0.204 | 0.548 | -0.182 | 0.526 |
| Agency C | 0.557 | 0.724 | 0.044 | 0.839 | -0.376 | 0.651 |
| Agency D | 0.047 | 0.810 | -0.631 | 0.877 | -0.416 | 0.818 |
| Agency E | 0.163 | 0.575 | -0.230 | 0.597 | -0.089 | 0.564 |
| Agency F | 0.797 | 0.726 | 0.717 | 0.667 | 0.836 | 0.707 |
| Agency G | -0.515 | 0.634 | -1.000 | 0.648 | -0.807 | 0.674 |
| Time to control event | -0.047 | 0.029 | -0.049 | 0.034 | -0.048 | 0.034 |
| No control event (1=Yes) | 2.452* | 1.017 | 2.582* | 1.105 | 2.803* | 1.180 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | 2.362** | 0.805 |
| Missing NFC score (1=Yes) | 0.724 | 0.906 | 0.289 | 1.006 | 0.488 | 1.033 |
| Missing age (1=Yes) | ----- | ----- | 0.235 | 0.754 | -0.032 | 0.745 |

Table 5a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.039 | 0.112 | -0.043 | 0.111 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | -0.222 | 0.427 | -0.186 | 0.426 |
| Unemployed | | | -0.875 | 0.587 | 0.900 | 0.593 |
| Retired | | | -0.921 | 0.572 | -0.856 | 0.593 |
| Prior Military (1=Yes) | | | -0.374 | 0.380 | -0.154 | 0.465 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | -0.194 | 0.481 | -0.340 | 0.479 |
| Force ever used on you (1=Yes) | | | -0.003 | 0.361 | -0.269 | 0.409 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | 0.431 | 0.334 | 0.412 | 0.333 |
| Ever arrested (1=Yes) | | | 0.780 | 0.505 | 0.782 | 0.514 |
| **Model Characteristics** | | | | | | |
| Constant | 4.576* | 1.993 | 4.758* | 2.563 | 4.373+ | 2.562 |
| Log Pseudolikelihood | -275.424 | | -261.991+ | | -257.757+ | |
| Pseudo R-squared | 0.194 | | 0.233 | | 0.245 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Table 6a. Logistic Regression Predicting Use of Force (Any Force) - Scenario Specific Findings, *Unabridged*

| | Scenario 1: Homeless Man (n=126) | | Scenario 2: Domestic Violence (n=162) | | Scenario 3: Collision Invest. (n=146) | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.024 | 0.046 | -0.023 | 0.027 | -0.051 | 0.052 |
| Negative Emotionality | 0.025 | 0.031 | -0.020 | 0.023 | 0.025 | 0.029 |
| Constraint | -0.0483 | 0.036 | -0.026 | 0.028 | 0.025 | 0.040 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.308 | 0.298 | -0.171 | 0.204 | -0.082 | 0.322 |
| Need for Cognition | 0.081+ | 0.044 | 0.0130 | 0.022 | 0.012 | 0.041 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -7.622* | 3.066 | -4.958+ | 2.536 | 0.810 | 1.866 |
| **Demographics** | | | | | | |
| Age (in years) | 0.039 | 0.030 | 0.003 | 0.025 | -0.041 | 0.032 |
| Sex (1=Male) | -1.111 | 0.790 | -0.165 | 0.527 | 2.766+ | 1.632 |
| Race | | | | | | |
| White (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Black | 2.384* | 1.153 | -0.716 | 0.943 | 1.729 | 1.625 |
| Hispanic | 0.507 | 1.522 | 1.548 | 1.060 | 0.369 | 1.184 |
| Other | 0 | —- | 1.455 | 1.662 | 2.330+ | 1.191 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | -0.218* | 0.096 | -0.009 | 0.054 | 0.070 | 0.060 |
| Number of citizen complaints | 0.538 | 0.377 | 0.548+ | 0.290 | -0.133 | 0.340 |
| Number of official sanctions | 3.495** | 1.330 | 0.763 | 1.168 | -0.146 | 0.996 |
| **Social Network** | | | | | | |
| Network density | -0.018 | 0.015 | 0.018+ | 0.010 | -0.015 | 0.013 |
| Network size | 0.025 | 0.190 | 0.136 | 0.086 | 0.450* | 0.199 |
| Impact of suspension on ties | 1.990** | 0.673 | 0.255 | 0.378 | 0.458 | 0.421 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | -2.798+ | 1.560 | 0.437 | 0.901 | 0.020 | 1.270 |
| Agency C | -4.801* | 2.148 | -0.244 | 1.307 | -1.870 | 1.791 |
| Agency D | 0 | —- | -0.563 | 1.473 | 2.064 | 1.890 |
| Agency E | -2.919 | 2.263 | 0.501 | 1.201 | -0.667 | 1.293 |
| Agency F | 1.034 | 1.467 | -1.130 | 1.203 | 2.554+ | 1.509 |
| Agency G | -8.060* | 3.366 | -1.918 | 1.427 | 0 | —- |
| Time to control event | -0.036 | 0,045 | -0.189 | 0.145 | -0.017 | 0.058 |
| No control event (1=Yes) | 0 | —- | 0 | —- | 3.793* | 1.488 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | 7.180** | 2.685 | 4.077* | 1.956 | 1.752 | 1.582 |
| Missing NFC score (1=Yes) | 0 | —- | 1.172 | 2.065 | -2.162 | 2.579 |
| Missing age (1=Yes) | 0 | —- | 0 | —- | 0 | —- |

Table 6a. Continued.

| | Scenario 1: Homeless Man (n=126) | | Scenario 2: Domestic Violence (n=162) | | Scenario 3: Collision Invest. (n=146) | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | -0.285 | 0.245 | 0.109 | 0.175 | 0.006 | 0.337 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Work <40 hrs. | -0.503 | 0.808 | -0.922 | 0.748 | 1.473 | 1.012 |
| Unemployed | -1.216 | 0.943 | -0.973 | 0.799 | -1.497 | 1.042 |
| Retired | 0 | —- | -0.315 | 1.021 | 0 | —- |
| Prior Military (1=Yes) | -0.229 | 1.184 | -0.389 | 0.935 | 0.238 | 1.023 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | -1.131 | 1.144 | 0.160 | 0.976 | 0.680 | 1.233 |
| Force ever used on you (1=Yes) | 2.224+ | 1.326 | -0.127 | 0.827 | -1.936 | 1.199 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | 1.433* | 0.612 | 0.167 | 0.557 | 0.563 | 1.145 |
| Ever arrested (1=Yes) | 0.758 | 1.094 | 1.436 | 1.140 | 1.833+ | 1.071 |
| **Model Characteristics** | | | | | | |
| Constant | -1.831 | 5.144 | 13.788 | 8.393 | -3.460 | 5.887 |
| Log Pseudolikelihood | -54.158 | | -87.356 | | -50.266 | |
| Pseudo R-squared | 0.319 | | 0.169 | | 0.493 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Table 7a. OLS Regression Predicting Time Until Force is Used (N=228) - *Unabridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.044 | 0.084 | 0.065 | 0.059 | 0.069 | 0.061 |
| Negative Emotionality | -0.054 | 0.066 | -0.028 | 0.068 | -0.034 | 0.070 |
| Constraint | 0.040 | 0.070 | 0.034 | 0.070 | 0.050 | 0.075 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | 0.862 | 0.531 | 1.030+ | 0.585 | 0.743 | 0.514 |
| Need for Cognition | -0.035 | 0.058 | -0.050 | 0.057 | -0.049 | 0.061 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 1.524 | 1.122 | 1.149 | 2.759 | 2.248 | 5.601 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -8.453*** | 1.372 | -8.050*** | 1.450 | -7.656*** | 1.537 |
| Collision investigation | -53.050*** | 3.211 | -53.022*** | 3.543 | -52.775*** | 3.441 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.129* | 0.051 | 0.115* | 0.053 |
| Sex (1=Male) | | | 0.674 | 1.229 | 0.710 | 1.351 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | -5.772 | 3.607 | -6.399+ | 3.345 |
| Hispanic | | | -3.601* | 1.534 | -5.157** | 1.773 |
| Other | | | -2.770 | 3.340 | -2.462 | 3.590 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | 0.056 | 0.143 | 0.105 | 0.164 |
| Number of citizen complaints | | | -1.205+ | 0.648 | -0.680 | 0.627 |
| Number of official sanctions | | | 0.966 | 1.317 | 0.991 | 1.467 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.068+ | 0.040 |
| Network size | | | | | 0.274 | 0.218 |
| Impact of suspension on ties | | | | | -2.019* | 0.982 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | -5.601+ | 3.318 | -4.965 | 3.217 | -3.070 | 2.636 |
| Agency C | -0.748 | 0.960 | 1.141 | 1.701 | 2.519 | 2.455 |
| Agency D | -0.830 | 1.644 | 5.513+ | 2.907 | 8.864* | 3.514 |
| Agency E | 0.735 | 1.329 | 2.554 | 2.215 | 1.603 | 2.912 |
| Agency F | -2.674 | 2.361 | -0.416 | 2.602 | -0.109 | 2.720 |
| Agency G | -1.520 | 1.373 | 0.123 | 2.254 | -1.450 | 2.412 |
| Time to control event | 0.145* | 0.063 | 0.149* | 0.073 | 0.154* | 0.072 |
| No control event (1=Yes) | 1.211 | 1.879 | 1.912 | 2.697 | 2.496 | 2.895 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | -0.895 | 4.567 |
| Missing NFC score (1=Yes) | -3.460 | 4.256 | -5.531 | 4.754 | -8.168+ | 4.827 |
| Missing age (1=Yes) | ----- | ----- | 8.005* | 3.047 | 7.404* | 3.234 |

Table 7a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.463 | 0.397 | -0.383 | 0.377 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | 3.687+ | 1.935 | 4.139+ | 2.185 |
| Unemployed | | | 1.364 | 1.910 | 1.325 | 1.872 |
| Retired | | | -0.813 | 1.628 | -0.557 | 1.640 |
| Prior Military (1=Yes) | | | -0.067 | 2.890 | -1.113 | 2.487 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | -1.947 | 4.185 | -2.390 | 4.420 |
| Force ever used on you (1=Yes) | | | -0.916 | 2.764 | -2.343 | 2.409 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | -1.903+ | 1.060 | -1.905+ | 1.123 |
| Ever arrested (1=Yes) | | | -1.972 | 1.862 | -1.429 | 1.802 |
| **Model Characteristics** | | | | | | |
| Constant | 67.031*** | 6.999 | 63.552*** | 6.944 | 62.760*** | 7.235 |
| R-squared | 0.919 | | 0.926 | | 0.929 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Table 8a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 1: No Tactic Used Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.006 | 0.020 | 0.002 | 0.025 | -0.000 | 0.025 |
| Negative Emotionality | -0.003 | 0.019 | -0.008 | 0.020 | -0.008 | 0.020 |
| Constraint | -0.004 | 0.024 | -0.019 | 0.026 | -0.015 | 0.027 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.188 | 0.187 | -0.126 | 0.195 | -0.103 | 0.199 |
| Need for Cognition | -0.012 | 0.019 | 0.004 | 0.018 | 0.001 | 0.018 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -2.256*** | 0.498 | -2.092+ | 1.147 | -2.226 | 1.678 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -1.027* | 0.504 | -1.223* | 0.532 | -1.257* | 0.557 |
| Collision investigation | -0.002 | 1.806 | 0.028 | 1.857 | 0.280 | 1.945 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.019 | 0.021 | 0.020 | 0.021 |
| Sex (1=Male) | | | -1.031* | 0.447 | -0.955* | 0.451 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.906 | 0.711 | 1.106 | 0.763 |
| Hispanic | | | 1.340 | 1.170 | 1.252 | 1.214 |
| Other | | | -0.801 | 0.746 | -0.987 | 0.803 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.075 | 0.046 | -0.068 | 0.044 |
| Number of citizen complaints | | | -0.365 | 0.300 | -0.420 | 0.314 |
| Number of official sanctions | | | 1.821* | 0.760 | 1.998* | 0.779 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.012 | 0.012 |
| Network size | | | | | -0.070 | 0.101 |
| Impact of suspension on ties | | | | | 0.171 | 0.357 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | 1.059 | 0.702 | 0.663 | 0.852 | 0.420 | 1.048 |
| Agency C | -0.590 | 1.735 | -1.698 | 1.857 | -2.019 | 2.100 |
| Agency D | -1.906+ | 1.003 | -3.331* | 1.413 | -3.491* | 1.648 |
| Agency E | 0.734 | 1.134 | 0.205 | 1.397 | 0.322 | 1.388 |
| Agency F | -1.316 | 1.232 | -2.039* | 0.967 | -2.608* | 1.061 |
| Agency G | -0.190 | 1.634 | -1.693 | 1.163 | -2.241+ | 1.247 |
| Time to control event | -0.060 | 0.040 | -0.065 | 0.042 | -0.060 | 0.043 |
| No control event (1=Yes) | 11.032*** | 1.408 | -.241*** | 1.651 | 10.383*** | 1.609 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | 0.616 | 1.577 |
| Missing NFC score (1=Yes) | -2.382 | 1.983 | -1.089 | 1.818 | -0.965 | 1.814 |
| Missing age (1=Yes) | ----- | ----- | -1.225 | 1.148 | -1.032 | 1.132 |

Table 8a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.025 | 0.149 | -0.055 | 0.152 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | 0.050 | 0.610 | 0.093 | 0.613 |
| Unemployed | | | 1.447 | 0.916 | 1.459 | 0.929 |
| Retired | | | -0.120 | 0.695 | -0.157 | 0.695 |
| Prior Military (1=Yes) | | | -0.033 | 0.916 | 0.602 | 1.056 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | 1.589* | 0.743 | 1.288 | 0.844 |
| Force ever used on you (1=Yes) | | | 0.465 | 0.684 | 0.658 | 0.811 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | 0.577 | 0.477 | 0.535 | 0.477 |
| Ever arrested (1=Yes) | | | -0.053 | 0.839 | -0.092 | 0.846 |
| **Model Characteristics** | | | | | | |
| Constant | 5.815+ | 3.338 | 5.576 | 3.408 | 5.563 | 3.402 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Table 9a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 2: Non-Lethal Force Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.026 | 0.024 | -0.025 | 0.027 | -0.029 | 0.028 |
| Negative Emotionality | -0.009 | 0.018 | -0.023 | 0.022 | -0.023 | 0.022 |
| Constraint | -0.036+ | 0.020 | -0.040+ | 0.023 | -0.038 | 0.023 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.072 | 0.178 | -0.165 | 0.184 | -0.192 | 0.182 |
| Need for Cognition | 0.004 | 0.019 | 0.004 | 0.023 | 0.010 | 0.024 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -0.497 | 0.499 | -1.838 | 1.506 | -6.210** | 1.878 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -0.458 | 0.525 | -0.599 | 0.572 | -0.696 | 0.609 |
| Collision investigation | -4.794* | 1.874 | -4.944* | 1.966 | -4.646* | 2.054 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.016 | 0.023 | 0.016 | 0.023 |
| Sex (1=Male) | | | -0.573 | 0.471 | -0.574 | 0.465 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.770 | 0.821 | 1.004 | 0.816 |
| Hispanic | | | 1.409 | 1.318 | 1.323 | 1.338 |
| Other | | | -0.616 | 0.884 | -0.728 | 0.928 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.129 | 0.080 | -0.110 | 0.076 |
| Number of citizen complaints | | | 0.386 | 0.265 | 0.312 | 0.299 |
| Number of official sanctions | | | 2.049* | 0.824 | 2.247** | 0.827 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.004 | 0.012 |
| Network size | | | | | 0.097 | 0.138 |
| Impact of suspension on ties | | | | | 0.881* | 0.416 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | -0.584 | 0.986 | -0.700 | 1.283 | -0.991 | 1.362 |
| Agency C | 0.713 | 1.142 | -0.747 | 1.870 | -1.704 | 1.235 |
| Agency D | -0.980 | 1.194 | -2.573+ | 1.419 | -2.382+ | 1.295 |
| Agency E | 0.587 | 0.829 | -0.226 | 0.925 | -0.042 | 0.971 |
| Agency F | 1.123 | 0.918 | 0.681 | 0.988 | 0.568 | 1.099 |
| Agency G | -0.494 | 0.952 | -3.003* | 1.262 | -2.831* | 1.390 |
| Time to control event | -0.101* | 0.043 | -0.107* | 0.045 | -0.100* | 0.047 |
| No control event (1=Yes) | 11.818*** | 1.305 | 9.814*** | 1.555 | 11.425*** | 1.536 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | 4.235* | 2.029 |
| Missing NFC score (1=Yes) | | | -13.710*** | 1.628 | -14.106*** | 1.774 |
| Missing age (1=Yes) | ----- | ----- | -14.564*** | 1.576 | -15.706*** | 1.576 |

Table 9a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.019 | 0.154 | -0.051 | 0.158 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | -0.791 | 0.734 | -0.769 | 0.726 |
| Unemployed | | | 0.118 | 1.048 | 0.154 | 1.074 |
| Retired | | | -1.513+ | 0.782 | -1.504+ | 0.789 |
| Prior Military (1=Yes) | | | -0.133 | 0.662 | 0.267 | 0.893 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | 0.811 | 0.621 | 0.474 | 0.625 |
| Force ever used on you (1=Yes) | | | -0.069 | 0.501 | -0.262 | 0.566 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | 0.817 | 0.529 | 0.758 | 0.537 |
| Ever arrested (1=Yes) | | | 0.711 | 0.759 | 0.672 | 0.774 |
| **Model Characteristics** | | | | | | |
| Constant | 4.874 | 3.810 | 3.483 | 4.545 | 3.189 | 4.443 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Table 10a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 3: Lethal Force Relative to Verbal De-escalation (N=495) - *Unabridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | -0.014 | 0.021 | -0.024 | 0.029 | -0.026 | 0.030 |
| Negative Emotionality | 0.015 | 0.017 | 0.015 | 0.019 | 0.014 | 0.020 |
| Constraint | -0.015 | 0.022 | -0.022 | 0.025 | -0.013 | 0.026 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.292+ | 0.174 | -0.331+ | 0.189 | -0.361+ | 0.196 |
| Need for Cognition | 0.005 | 0.021 | 0.012 | 0.022 | 0.018 | 0.022 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | -0.336 | 0.563 | 0.547 | 1.002 | -1.893 | 1.437 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -5.414*** | 1.220 | -5.829*** | 1.371 | -5.904*** | 1.350 |
| Collision investigation | -1.036 | 2.371 | -0.381 | 2.670 | -0.468 | 2.598 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.031 | 0.022 | 0.027 | 0.023 |
| Sex (1=Male) | | | -0.664 | 0.475 | -0.600 | 0.478 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 1.218 | 0.960 | 1.371 | 0.979 |
| Hispanic | | | 2.343* | 1.022 | 2.137+ | 1.093 |
| Other | | | 0.452 | 0.610 | 0.258 | 0.608 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | -0.068+ | 0.037 | -0.046 | 0.036 |
| Number of citizen complaints | | | -0.097 | 0.218 | -0.042 | 0.222 |
| Number of official sanctions | | | 1.162* | 0.519 | 1.136+ | 0.581 |
| **Social Network** | | | | | | |
| Network density | | | | | -0.001 | 0.008 |
| Network size | | | | | 0.156+ | 0.088 |
| Impact of suspension on ties | | | | | 0.273 | 0.258 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | 0.648 | 0.654 | 0.681 | 0.722 | 0.800 | 0.793 |
| Agency C | -0.170 | 1.072 | -0.558 | 1.178 | -0.969 | 1.297 |
| Agency D | -0.855 | 1.013 | -2.195+ | 1.174 | -1.915+ | 1.144 |
| Agency E | 0.307 | 0.890 | 0.031 | 1.034 | 0.312 | 0.975 |
| Agency F | -0.714 | 0.725 | -0.651 | 0.728 | -0.701 | 0.841 |
| Agency G | -0.706 | 0.762 | -1.177 | 0.834 | -1.234 | 0.945 |
| Time to control event | -0.045 | 0.055 | -0.031 | 0.062 | -0.033 | 0.060 |
| No control event (1=Yes) | -1.036 | 2.371 | 13.419*** | 1.382 | 14.608*** | 1.309 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | 2.605* | 1.119 |
| Missing NFC score (1=Yes) | 0.186 | 1.722 | 0.485 | 1.607 | 0.747 | 1.633 |
| Missing age (1=Yes) | ----- | ----- | 0.924 | 1.289 | 0.673 | 1.295 |

Table 10a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.146 | 0.148 | -0.153 | 0.149 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | 0.304 | 0.651 | 0.371 | 0.645 |
| Unemployed | | | 0.544 | 1.097 | 0.523 | 1.111 |
| Retired | | | -0.626 | 0.787 | -0.570 | 0.797 |
| Prior Military (1=Yes) | | | -0.741 | 0.694 | -0.257 | 0.959 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | 0.811 | 0.621 | 0.474 | 0.625 |
| Force ever used on you (1=Yes) | | | -0.069 | 0.501 | -0.262 | 0.566 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | 1.039+ | 0.542 | 1.005+ | 0.540 |
| Ever arrested (1=Yes) | | | 0.869 | 0.750 | 0.901 | 0.749 |
| **Model Characteristics** | | | | | | |
| Constant | 4.874 | 3.810 | 3.483 | 4.545 | 3.189 | 4.443 |
| Log Pseudolikelihood | -455.693 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

Table 11a. Multinomial Logistic Regression Predicting Type of Force Used, Contrast 4: Lethal Force Relative to Non-Lethal Force (N=495) - *Unabridged Findings*

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Personality Factors** | | | | | | |
| Positive Emotionality | 0.012 | 0.020 | 0.001 | 0.019 | 0.003 | 0.019 |
| Negative Emotionality | 0.024+ | 0.014 | 0.037* | 0.018 | 0.037* | 0.018 |
| Constraint | 0.021 | 0.022 | 0.018 | 0.024 | 0.025 | 0.025 |
| **Cognitive Factors** | | | | | | |
| Cognitive Reflection | -0.220 | 0.165 | -0.166 | 0.183 | -0.230 | 0.189 |
| Need for Cognition | 0.001 | 0.016 | 0.008 | 0.023 | 0.007 | 0.024 |
| **Control Variables** | | | | | | |
| Participant Type (1=Officer) | 0.0161 | 0.484 | 2.385+ | 1.362 | 4.317* | 1.908 |
| Scenario Type | | | | | | |
| Domestic viol. (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Homeless man | -4.956*** | 1.282 | -5.230*** | 1.49 | -5.209** | 1.500 |
| Collision investigation | 3.757+ | 1.927 | 4.563+ | 2.535 | 4.177 | 2.604 |
| **Demographics** | | | | | | |
| Age (in years) | | | 0.016 | 0.019 | 0.011 | 0.019 |
| Sex (1=Male) | | | -0.091 | 0.473 | -0.026 | 0.458 |
| Race | | | | | | |
| White (reference) | | | ----- | ----- | ----- | ----- |
| Black | | | 0.448 | 0.735 | 0.367 | 0.783 |
| Hispanic | | | 0.934 | 0.791 | 0.815 | 0.794 |
| Other | | | 1.068 | 0.896 | 0.986 | 0.924 |
| **Professional Experiences (Officers Only)** | | | | | | |
| Years of experience | | | 0.061 | 0.084 | 0.064 | 0.076 |
| Number of citizen complaints | | | -0.482+ | 0.267 | -0.354 | 0.275 |
| Number of official sanctions | | | -0.887 | 0.670 | -1.111+ | 0.614 |
| **Social Network** | | | | | | |
| Network density | | | | | 0.002 | 0.012 |
| Network size | | | | | 0.059 | 0.086 |
| Impact of suspension on ties | | | | | -0.608 | 0.405 |
| **Additional Control Variables** | | | | | | |
| Police Agencies | | | | | | |
| Agency A (reference) | ----- | ----- | ----- | ----- | ----- | ----- |
| Agency B | 1.232 | 0.925 | 1.381 | 1.280 | 1.792 | 1.275 |
| Agency C | -0.883 | 1.253 | 0.189 | 1.758 | 0.735 | 1.219 |
| Agency D | 0.125 | 1.152 | 0.377 | 1.397 | 0.467 | 1.348 |
| Agency E | -0.280 | 0.738 | 0.257 | 0.819 | 0.355 | 0.959 |
| Agency F | -1.838* | 0.669 | -1.331 | 0.904 | -1.269 | 0.872 |
| Agency G | -0.211 | 0.881 | 1.826 | 1.304 | 1.597 | 1.411 |
| Time to control event | 0.056 | 0.048 | 0.076 | 0.061 | 0.066 | 0.063 |
| No control event (1=Yes) | 2.558* | 1.217 | 3.605* | 1.525 | 3.183* | 1.462 |
| Missing data | | | | | | |
| Missing Soc. Netwk (1=Yes) | ----- | ----- | ----- | ----- | -1.630 | 2.139 |
| Missing NFC score (1=Yes) | 15.299*** | 1.380 | 14.194*** | 1.608 | 14.853*** | 1.758 |
| Missing age (1=Yes) | ----- | ----- | 15.488*** | 1.439 | 16.379*** | 1.431 |

Table 11a. Continued.

| | Model 1: Personality & Cognitive Factors | | Model 2: Demographic & Experience Factors | | Model 3: Social Network Factors | |
|---|---|---|---|---|---|---|
| | b | SE | b | SE | b | SE |
| **Additional Demographics** | | | | | | |
| Education | | | -0.127 | 0.136 | -0.102 | 0.140 |
| Employment Status | | | | | | |
| Work >=40 hrs. (reference) | | | ----- | ----- | ----- | ----- |
| Work <40 hrs. | | | 1.095 | 0.682 | 1.140+ | 0.670 |
| Unemployed | | | 0.426 | 0.749 | 0.369 | 0.757 |
| Retired | | | 0.888 | 0.854 | 0.934 | 0.851 |
| Prior Military (1=Yes) | | | -0.608 | 0.607 | -0.524 | 0.794 |
| **Additional Professional Experiences (Officers Only)** | | | | | | |
| Ever used force (1=Yes) | | | 0.160 | 0.730 | -0.092 | 0.802 |
| Force ever used on you (1=Yes) | | | -0.520 | 0.764 | -0.724 | 0.827 |
| **Civilian Experiences** | | | | | | |
| Ever stopped by officer (1=Yes) | | | 0.221 | 0.537 | 0.247 | 0.534 |
| Ever arrested (1=Yes) | | | 0.158 | 0.583 | 0.228 | 0.571 |
| **Model Characteristics** | | | | | | |
| Constant | -5.333+ | 3.004 | -7.466+ | 4.221 | -7.198+ | 4.369 |
| Log Pseudolikelihood | -455.696 | | -417.695* | | -410.324 | |
| Pseudo R-squared | 0.324 | | 0.380 | | 0.391 | |

+=p<.10, *=p<.05, **=p<.01, ***=p<.001

Likelihood ratio tests are computed to compare Model 2 to Model 1 and Model 3 to Model 2. Significant results indicate improved model fit relative to the simpler comparison model.

## APPENDIX J:

## DISSEMINATION ARTIFACTS

This work will be disseminated to the academic community through traditional venues (e.g., academic journals, conference presentations, etc.), where scholars and practitioners alike can begin to incorporate the findings into use of force training practices for officers. Datafiles containing participants' anonymized responses to survey questions and video coding measures will be archived with NIJ for other researchers to review.

This work will also be disseminated with the study's participating law enforcement agencies. The research team believes that the findings regarding the citizen education programs and attitudes toward the police can be used by these agencies (and can be shared with other agencies) to help establish/grow educational opportunities for the citizens in the community to help spark dialogue and rebuild trust between police officers and the citizens they serve.

The above dissemination efforts are being developed for the future. To date, information about this project has been disseminated through local/national media outlets, as shown below.

| Media Citation | Source Link | Audience |
|---|---|---|
| *UNC Charlotte researchers, Waxhaw Police using 'use of force' simulator to study officer responses*. WJZY Fox 46 Charlotte. September 15, 2021 | https://www.youtube.com/watch?v=3-oHzg9cYCw | General public |
| *North Carolina police department to study how officers make use-of-force decisions*. FoxNews.com. October 28, 2021 | https://www.foxnews.com/us/psychology-behind-officers-decision-making-studies | General public |