Human error in police involved shootings

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HUMAN ERROR IN POLICE INVOLVED SHOOTINGS

by

Paul L. Taylor

A Dissertation
Submitted to the University at Albany, State University of New York
in Partial Fulfillment of
the Requirements for the Degree of
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ABSTRACT

Police use of deadly force has become one of the most contentious and controversial aspects of the U.S. criminal justice system. Yet, the vast majority of police shootings never rise to the level of public consciousness (Zimring, 2017). Instead, the public discourse and controversy tends to center on a handful of cases that appear excessive and/or are difficult to understand (Pickering & Klinger, 2016). As a result, these cases have a disproportionate impact on the public’s perception of police legitimacy and competence, particularly when it comes to their use of deadly force (Gua, 2014). The outcomes of many of these controversial cases meet the definition of and could be classified as human error (Reason, 1990). Where we find error in the professional environment, we find the opportunity to improve practice and future outcomes (Woods et al., 2010). Indeed, research on human error has been used as vehicle for reform and improved practice in a number of other high-risk occupations including aviation, medicine, the military, and transportation. This dissertation examines human error within the context of the police decision to discharge a firearm in the line of duty. The goal of the dissertation is to provide and test a theoretical framework designed to facilitate more meaningful research, understanding, prediction, and perhaps even the reduction of some of the most controversial police shootings.
DEDICATION

This dissertation is dedicated to my wife, partner, and best friend Jessica Taylor. Without her patience, unconditional love, and steadfast support none of this would have been possible.
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Chapter 1: Introduction

"What has occurred in this case must ever recur in similar cases. Human nature will not change. In any future great national trial, compared with the men of this, we shall have as weak and as strong, as silly and as wise, as bad and as good. Let us therefore study the incidents of this, as philosophy to learn from, and none as wrongs to be revenged."

- Shelby Foote

Introduction

Police shootings have become one of the most “visible and controversial” aspects of the U.S. criminal justice system (Klinger, et al., 2015, p. 194). While a substantial body of literature on police use of deadly force has accumulated (Worden, 1995), policing scholars have continued to call for additional research on police decision making within the context of deadly force encounters (e.g., Alpert & Smith, 1994; Klinger & Brunson, 2009; Reiss, 1980; Shane & Swenson, 2019; Zimring, 2017). Yet, with a few exceptions (e.g., Correll, et al., 2014; Fridell & Binder, 1992; James et al., 2016; Klinger, 2004; Pickering, 2016), very little organized work has gone into unpacking how and why officers, situated in the moment, decide whether or not to pull the trigger. This is somewhat surprising given the importance placed on this data by scholars (e.g., Skogan & Fridell, 2004; Shane & Swenson, 2019); the inherent public interest and controversy surrounding police shootings (e.g., Zimring, 2017); and the relatively advanced state of decision-making research in other high risk occupations (e.g., Klein, 2009). Perhaps more surprising is the lack of research on human error in the context of police use of deadly force.

The social and behavioral sciences are underpinned by the assumption that people with similar experiences and training respond to similar situations in similar ways (Simon, 1969) and that behavior tends to be systematically connected to the features of peoples’ tools, tasks, previous experiences, training, and environments (e.g., Dekker, 2014; Klein, 2011; Lipsky, 2010). The research on human error has consistently demonstrated that situations, behaviors, and
decision processes that result in error tend to result in repeated errors across time and people (Reason, 1990; Woods et al., 2010). This has allowed for the systematic study of error to be used as a vehicle for understanding workplace decision-making, professional reform, and improved outcomes in a number of other high risk occupational fields including medicine (Institute of Medicine, 2000), commercial aviation (Wiegmann et al., 2005), transportation (Green, 2017), and the military (Snook, 2002). James Doyle (2010) and a growing group of others (e.g. Hollway, 2014; Shane, 2013) have called for a similar lens to be applied to various aspects of the U.S. criminal justice system including police use of deadly force (e.g. Pickering & Klinger, 2016; Sherman, 2018).

Scharf and Binder (1983), identified four possible outcomes for a police shooting, two of which they classified as errors: False-positive errors – “A person presumed dangerous but, in fact, not actually armed or dangerous is killed by a police officer” – and false-negative errors – “A police officer or citizen is killed because a police officer fails to shoot” (p. 23). While this was an important first step in the classification of police shooting outcomes and errors, their typology is not collectively exhaustive and warrants additional work.

**Dissertation Structure**

To examine human error in the context of police shootings, this dissertation incorporates three independent research projects and the following structure: Chapter two will detail a new typology of police shooting errors and will provide the theoretical framework for my dissertation. It will also serve as the primary literature review of the relevant research on police use of deadly force and human error. Chapter three will report the results of a randomized controlled experiment testing the effects of dispatched information on the police decision to shoot and the subsequent likelihood for false-positive or, as I later define them, misdiagnosis
shooting errors. Chapter four will report the results of a randomized controlled experiment testing the effects of muzzle-position on the likelihood for misdiagnosis shooting errors. Chapter five will tie the dissertation together, discuss the research and policy implications, and serve as the conclusion for the dissertation.

**Three Studies**

1.) *Beyond False-Positives: A Typology of Police Shooting Errors*

The first study forms the theoretical foundation for the dissertation and serves as the primary review of the relevant literature on police use of deadly force and human error. I have developed a collectively exhaustive and mutually exclusive typology of police shooting errors that extends on Scharf and Binder’s (1983, p. 23) important but incomplete typology of potential deadly force outcomes. In other words, my typology creates a theoretical framework that encompasses all instances in which a police officer fires a bullet and the result is an error, as Reason (1990) would define it. This includes misdiagnosis shootings, misapplication shootings (e.g. firing a gun when the officer actually intended to use a Taser), misses, and unintentional discharges. These categories are defined by two variables: Whether or not the officer intended to discharge a firearm and whether or not the officer’s bullet hits the intended target. Empirical examples are used as ideal cases to exemplify each category of the typology.

2.) *Dispatch Priming and Misdiagnosis Shooting Errors*

The second study examines the effects of dispatched information on likelihood for police misdiagnosis shooting errors. In other words, it tests one category of the new typology. Using a randomized controlled experiment that incorporated simulated police dispatch
audio recordings, a police firearms simulator, and active law enforcement officers from several different agencies, this study examines the effects of dispatch priming on police shoot/no shoot decision-making. The findings suggest that officers rely heavily on dispatched information in making the decision to pull the trigger when confronted with an ambiguously armed subject in a simulated environment. When the dispatched information was correct, there was a significant reduction in the number of shooting errors. When the dispatched information was erroneous, there was a significant increase in shooting errors. The results contribute to a broader understanding of officer decision making and the systemic nature of human error within the context of police shootings.

3.) Muzzle Position and Misdiagnosis Shooting Errors

Woods et al. (2010) point out that it is not enough to search for and identify human error in the work place. Instead, the goal of accident or error related research should always be to learn from error, reduce complexity, and “engineer resilience” into the decision environment for front end operators (p. 83). Using a randomized controlled experiment that incorporates a police firearms simulator and active law enforcement officers from several different agencies, this study examined the effects of muzzle-position on the likelihood for misdiagnosis shooting errors. Three different muzzle positions were examined and shooting errors were operationalized in two ways: False-positive errors – shooting a person who was not armed and did not present an immediate threat to the officer – and false-negative errors – not shooting a person or not shooting a person fast enough, who was armed and did present an immediate threat to the officer. Using data from the dispatch priming study as a baseline, this study explores whether muzzle position can be used to significantly decrease the rate of false-positive (misdiagnosis)
errors while not significantly increasing the rate of false-negative errors in situations in which an officer is confronted with an ambiguously armed person.
Chapter 2: (Study 1) Beyond False-Positives: A Typology of Police Shooting Errors

“To study error is to study the function of the system in which practitioners are embedded” (Woods et al., 2010, p. 25).

Introduction

Daniel Kahneman (2011) wrote, “There are distinctive patterns in the errors people make. Systemic errors are known as biases, and they recur predictably in particular circumstances… The availability of diagnostic labels for [these] biases make [them] easier to anticipate, recognize, and understand” (p. 3-4). The social and behavioral sciences are underpinned by the assumption that people with similar experiences and training respond to similar situations in similar ways. We understand that behavior tends to be systematically connected to the features of peoples’ tools, tasks, previous experiences, training, and environments (Dekker, 2014; Klein, 2011; Lipsky, 2010). In a similar fashion, the research on human error has consistently demonstrated that situations, behaviors, and decision processes that result in error tend to result in repeated errors across time and people (Reason, 1990; Woods et al., 2010). This has allowed for the systematic study of error to be used as a vehicle for understanding work place decision-making, professional reform, and improved outcomes in a number of high risk endeavors and occupational fields including medicine (Institute of Medicine, 2000), aviation (Dekker, 2016; Reason, 2008), transportation (Green, 2017), and the military (Snook, 2002). James Doyle (2010) and a growing group of others (e.g. Hollway, 2014; Shane, 2013) have called for a similar lens to be applied to various aspects of the U.S. criminal justice system including police use of deadly force (e.g. Pickering & Klinger, 2016; Sherman, 2018).

The purpose of this chapter is to present a typology of police shooting errors. The goal is to provide both researchers and practitioners with a new framework – i.e. Kahneman’s
“diagnostic labels” – to help facilitate more meaningful research, understanding, better prediction, and perhaps even a reduction in some of the most controversial police shootings.

**Human Error**

James Reason (1990) defines human error as, “a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve their intended outcome, and when these failures cannot be attributed to the intervention of some chance agency” (p. 9). While there is certainly more than one way to define human error (e.g. Hanson, 2006), there are a number of important reasons to apply this particular definition to police shooting errors. First, James Reason’s conception of human error has been widely accepted, operationalized, and applied by those who study human error in other professional settings (e.g. Dekker, 2002; Snook, 2000; Woods et al., 2010). In addition, this definition has been adopted verbatim by the Institute of Medicine (2000, p. 54) and the Federal Aviation Administration (Wiegmann et al., 2005, p. 1). Keeping a consistent definition will allow for the current work to build on the extensive research that has been done on human error and to leverage some of the responses to and prevention of human error by other high-risk occupations.

According to the Institute of Medicine (2000), the key words in Reason’s definition are ‘intended’ and ‘outcome’ and they are important to keep in mind if we are to apply this definition of human error to officer-involved shootings. It would not be appropriate, for example, to apply the term ‘error’ to all police shootings involving unarmed people. If, for instance, an officer was struggling with a person, knew the person was unarmed and intentionally shot the person anyway, this would not meet the definition of an error. In this case, the officer intended to shoot an unarmed person and the outcome matched the intention. If, on the other hand, the officer believed the person was armed and the officer intentionally shot the person when he
reached into his pocket and it subsequently turned out he was unarmed, this would meet James Reason’s definition of human error. The officer in this case intended to shoot an armed person but, instead, shot an unarmed person. The result is an unintended outcome, an error. In a similar fashion, if an officer intentionally shot an unarmed person in an act of criminal malice, it would not meet the definition of human error. The officer intended to illegally shoot an unarmed person and the action would be considered a ‘violation’ rather than an error by the literature on human error (Reason, 2008). It should also be noted that ‘planning’, as James Reason uses it in his definition of error, can be an explicit or implicit mental process. Human beings are constantly gathering, processing, interpreting, and deciding on appropriate responses to the available and selectively attended sensory stimuli in their environment. The mental processes used to ‘plan’ behavioral responses to these stimuli may be effortful and deliberative but also and more often they are rapid and subconscious (Kahneman, 2011; Reason, 1990). From this perspective, a person who reaches to grab a steering column shifter when the vehicle they are driving has a center console shifter takes an unintended action and makes a relatively harmless error. There is no deliberation about how to shift the vehicle into drive, however the subconsciously ‘planned’ physical action does not achieve the intended outcome.

The scholars who study human error largely agree that systematic errors should be viewed as the undesirable byproduct of otherwise useful psychological processes rather than irrational or maladaptive tendencies (e.g. Dekker, 2014; Kahneman, 2011; Reason, 1990; Woods et al., 2010). In fact, Ernst Mach (1905) wrote, “Knowledge and error flow from the same mental source, only success [or failure] can tell one from the other” (p. 80). James Reason (1990) referred to this as a type of “cognitive balance sheet” in which correct action and systematic error can be viewed as “two sides of the same coin” (p. 2).
We know that cognitive and attentional resources are finite. As humans, we are not able to attend to more than a fraction of the stimuli in our environment at any given time and the more of our attentional resources we devote to an object or task the less we have to give to other objects or tasks (Chabris & Simons, 2010). To overcome this limitation, we tend to rely on pattern recognition and automaticity in our decision-making strategies (Kahneman, 2010; Klein, 2011). The benefit of developing cognitive automaticity – System 1 in Kahneman’s vernacular – is that it utilizes implicit shortcuts (i.e. heuristics and biases) that allow us to speed up our decision-making processes with a relatively high degree of reliability while, at the same time, freeing up our more deliberative attentional and cognitive resources – System 2 – for more complex and/or novel problems. Most of the time, this is very beneficial. In fact, expertise can be defined as the optimization of heuristic decision making (e.g., Klein, 2011; Schmidt and Lee, 2014). However, there is also a downside; the cost of developing automaticity in our decision-making and its subsequent behavioral output is that we give up the ability to monitor the appropriateness of the decision strategy and/or behavioral response being employed at an implicit level and this leaves us susceptible to error – the debit in the cognitive balance sheet. In fact, James Reason (1990) wrote, “…automaticity (the delegation of control to low-level [cognitive] specialists) makes slips, or actions-not-as-planned, inevitable” (p. 2).

Types of Error

Given the vast potential for error across human activities it is somewhat surprising how limited error is in both its abundance and variation. Error tends to be much rarer than correct action and takes a limited number of forms across a wide range of mental and behavioral activities. Thus, according to Reason (1990), “it is possible to identify comparable error forms in action, speech, perception, recall, recognition, judgement, problem solving, decision making, concept formation
Rasmussen and Jensen (1974) developed, and Reason further refined (1990), a “skill-rule-knowledge” framework for understanding the cognitive processes behind three levels of human performance and the subsequent errors that can occur at each level. Reason (1990, p. 43) defines these levels in the following ways:

**Skill-based level**
At the skill-based level, human performance is governed by stored patterns of preprogrammed instructions represented as analogue structures in a time-space domain. Errors at this level are related to intrinsic variability of force, space or time coordination.

**Rule-based level**
The rule-based level is applicable to tackling familiar problems in which solutions are governed by stored rules (productions) of the type if (state) then (diagnosis) or if (state) then (remedial actions). Here, errors are typically associated with the misclassification of situations leading to the application of the wrong rule or with the incorrect recall of procedures.

**Knowledge-based level**
The knowledge-based level comes into play in novel situations for which actions must be planned on-line, using conscious analytical processes and stored knowledge. Errors at this level arise from resource limitations (‘bounded rationality’) and incomplete or incorrect knowledge. With increasing expertise, the primary focus of control moves from the knowledge-based towards the skilled-based levels.

This conception of effortful processing giving way to cognitive shortcuts and implicit automaticity with exposure to similar experiences and patterns, is consistent with Kahneman & Tversky’s (1979) dual process theory. The skill- and rule-based levels neatly align with Kahneman’s conception of System 1 processing, while the knowledge-based level corresponds with the effortful System 2 (Kahneman, 2011). Using Rasmussen’s performance levels, Reason (1990) defines three associated error types: skill-based slips and lapses, rule-based mistakes, and knowledge-based mistakes (Table 2.1).
Table 2.1. Characteristics of skill-based, rule-based, and knowledge-based errors.

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>SKILL-BASED SLIPS AND LAPSES</th>
<th>RULE-BASED MISTAKES</th>
<th>KNOWLEDGE-BASED MISTAKES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF ACTIVITY</td>
<td>Routine actions</td>
<td>Problem-solving activities</td>
<td></td>
</tr>
<tr>
<td>FOCUS OF ATTENTION</td>
<td>On something other than the task at hand</td>
<td>Directed at problem at hand</td>
<td></td>
</tr>
<tr>
<td>CONTROL MODE</td>
<td>Primarily subconscious</td>
<td>Primarily conscious</td>
<td></td>
</tr>
<tr>
<td>PREDICTABILITY OF ERROR TYPES</td>
<td>Systematic and more predictable</td>
<td>Variable and more difficult to predict</td>
<td></td>
</tr>
<tr>
<td>RATION OF ERROR TO OPPORTUNITY FOR ERROR</td>
<td>Though absolute numbers may be high, these constitute a small proportion of the total number of opportunities for error</td>
<td>Absolute numbers small, but opportunity ratio high</td>
<td></td>
</tr>
<tr>
<td>INFLUENCE OF SITUATIONAL FACTORS</td>
<td>Low to moderate; intrinsic factors (frequency of prior use) likely to exert the dominant influence</td>
<td>Extrinsic factors likely to dominate</td>
<td></td>
</tr>
<tr>
<td>EASE OF DETECTION</td>
<td>Detection usually fairly rapid and effective</td>
<td>Difficult, and often only achieved through external intervention</td>
<td></td>
</tr>
<tr>
<td>RELATIONSHIP TO CHANGE</td>
<td>Knowledge of change not accessed at proper time</td>
<td>When and how anticipated change will occur unknown</td>
<td>Changes not prepared for or anticipated</td>
</tr>
</tbody>
</table>

Source: This table was adapted from Reason (1990, p. 62)

Where these errors show up depend largely on our familiarity with the task at hand and the correlated type of cognitive processing we have engaged to solve the problem. The question is, how do these errors show up in the context of police involved shootings?

**Police Use of Deadly Force**

We know that police shootings are relatively rare events (Alpert & Fridell, 1992; Geller & Scott, 1992; Fyfe, 1988; Sherman, 1980). Yet, they have become one of the most “visible and controversial” aspects of the U.S. criminal justice system today (Klinger et al., 2015, p. 194).
Despite the controversy, the vast majority of police shootings never rise to the level of public consciousness (Zimring, 2017). Instead, the public discourse tends to center on just a handful of cases and, as a result, these cases have a disproportionate impact on the public’s perception of police competence and legitimacy (Gau, 2014; Pickering & Klinger, 2016; White, 2015). Four such police shootings will be used as examples for this chapter:

1.) On December 12, 2016, in Bakersfield, California police officers responded to reports of a man brandishing a firearm. Responding officers shot and killed Francisco Serna, a 73-year-old man suffering from the early stages of dementia, who rapidly produced a dark colored object from his pocket that was later determined to be a crucifix (Washington Post, 2016).

2.) On January 1, 2009, in Oakland, California police officers contacted Oscar Grant on a train platform in Fruitvale Station. A struggle ensued between Grant and the officers. During the struggle, Grant ended up in a prone position with his hands pulled underneath his chest and officers on top of him attempting to pull his hands out from underneath him. Unsuccessful, one of the officers told the other officers to “get back” and announced he was going to “TASE” Grant. The officer proceeded to stand up, draw his firearm, and shoot Oscar Grant one time in the back killing him (Martin, 2016). Later, in testimony during his trial for murder, the officer adamantly maintained that he intended to use an electronic control device on Oscar Grant and did not intend to shoot him (California. v. Mehserle, 2010).

3.) On December 26, 2015, in Chicago, Illinois two police officers were dispatched to a domestic disturbance in progress. When the officers entered the apartment complex and began climbing the stairs to the apartment in question, they were confronted by a man
running down the stairs with a baseball bat raised over his head. The closest officer rapidly discharged his firearm seven times at the advancing man. Five of the rounds struck and killed the officer’s intended target. One of the rounds struck and killed Bettie Jones, an innocent bystander (Johnson, 2018).

4.) On November 20, 2014, in Brooklyn, New York two police officers entered an unlit stairwell of a New York City Housing Authority high rise apartment complex. One of the officers, still on probationary status, had his firearm drawn which, as it came out in the later trial of the officer, was an unofficial practice for officers walking up the unlit stairwell of the building. Akai Gurley entered the stairwell fourteen steps below the officers. The officer fired his weapon in what was claimed to be an accidental discharge. The bullet ricocheted off a wall and struck Gurley in the chest, killing him (Wilson, 2014).

Each of these shootings made national and international headlines, officers in two of the shootings were successfully prosecuted and sentenced – a rare outcome when it comes to officer involved shootings (Stinson, 2015), and one of the shootings was made into a popular movie. To say that these tragedies have had a disproportionate impact on the public discourse surrounding police use of deadly force would be an understatement. In addition, the outcome of each of these shootings can be classified as human error using James Reason’s (1990) definition. The shooting officer’s intent in each case did not align with the ultimate outcome. In the case of Francisco Serna, the officers intended to shoot an armed threat but ended up shooting an unarmed man with a crucifix. In the case of Oscar Grant, the officer’s stated intention was to use his TASER but he ended up using his firearm instead. In the case of Bettie Jones, the officer intended to shoot an attacker with a bat, but he did not intend to shoot Bettie Jones as well. In the case of Akai
Gurley, the officer did not even intend to fire his weapon let alone shoot another human being. While each of these cases fall under the general category of police use deadly force, the causal mechanisms behind each are very different, both between the cases and from other instances in which the police intend to use deadly force and the ultimate outcome matches the intention of their action. This is important because, according to Woods et al. (2010), where we find error in a professional setting, we find an opportunity to improve practice and reduce it. In the case of officer involved shootings, this could mean a reduction in some of the most visible and controversial outcomes (Pickering & Klinger, 2016; Sherman, 2018).

**Current Approaches to Understanding Police Use of Deadly Force**

Broadly speaking, there are two approaches to investigating and trying to understand police use of deadly force: The academic approach and the practitioner approach. Equifinality, the principle that a given end state can be reached by many potential means (e.g. Von Bertalanffy, 1973), is a problem for both approaches. On the academic side, the tendency has been to ignore equifinality and indiscriminately aggregate all available cases from a defined population or sample – typically individual cities and departments (e.g Fyfe, 1979; Klinger et al., 2015); a sample of cities and departments from a national level database (e.g. Sherman & Langworthy, 1979; Ross, 2015); or all available cases from a national level database (e.g. Kania & Mackey, 1977; Nix et al., 2017) – on either the outcome variable of the police discharging a firearm (e.g. Fachner & Carter, 2015; Fyfe, 1978) or, even more problematic (e.g. Geller & Scott, 1992; Klinger, 2012), the death of the person against whom force was used (e.g. Nix et al., 2017). This would be akin to aggregating all fatal aviation accidents or deaths in an emergency room and trying to determine the variable or variables that cause planes to crash or patients to die. Given the complexity of these events and the variation in their causal paths, model misspecification would
be all but guaranteed with indiscriminate aggregation on the general outcome and the factors behind any given incident or types of incidents would almost certainly be lost with such a coarse methodological approach. While the superficial correlations that are uncovered may have some value, the systemic causal influences for particular types of incidents within the larger sample are likely to remain opaque. In addition, when it comes to the research on police use of deadly force the variables of greatest interest to academia have largely been sociodemographic, which, according to Shane and Swenson (2019), “[D]o very little, if anything, to help understand the dynamics of a police shooting, or to help reduce use of force encounters, which should be the overriding goal of use of force research” (p. 56). In fact, the bulk of the research on police use of deadly force examines one or more of the following variable categories: situational variables; environmental variables; organizational variables; and individual variables.

There has been substantial academic interest in the situational variables – the “mobilizing and precipitating events” as Geller and Scott (1992) would call them – that lead to police deadly force encounters. However, notwithstanding a few examples (e.g. Klinger, 2004; Klinger & Brunson, 2009; Pickering, 2016; Shane & Swenson, 2019), much of the work has been either theoretical in nature (e.g. Fyfe, 1989; Pickering & Klinger, 2016; Scharf & Binder, 1983) or relied heavily on official police reporting that allowed for relatively superficial examinations of things like precipitating call types (e.g. Fyfe, 1978; Milton, Halleck, Ladner, & Abrecht, 1977) and/or post hoc, legally framed, accounts of the actions taken (e.g. Fridell & Binder, 1992; Fyfe, 1978; Geller, 1989; Geller & Karales, 1981; Geller & Scott, 1992: Horvath, 1987).

Environmental variables focus on the correlations between police use of deadly force and community characteristics such as racial and economic composition, crime rates, and the levels of real or perceived violence (e.g. Fyfe, 1980; Jacob & Britt, 1979; Kania & Mackey, 1977;
Klinger, et al., 2015; Sherman & Langworthy, 1979). While organizational variables have not garnered as much academic attention when it comes to deadly force, the research that has been done has been fruitful and repeatedly demonstrated that police policy, leadership, supervision, and other organizational controls can reduce the number of officer involved shootings agencies experience (e.g., Fyfe, 1979; Milton et al., 1977; Scharf & Binder, 1983; Sherman, 1983). Research on the individual level characteristics of officers and suspects has examined variables such as age and experience (e.g., Blumberg, 1983; Brown, 1984; Doerner, 1991; Fyfe, 1978; Geller & Karales, 1981; Geller & Scott, 1992), education (e.g., Inn et. al., 1977; Sherman & Blumberg, 1981), gender (e.g., Blumberg, 1983; Brown & Langan, 2001; Grennan, 1987; Horvath, 1987; Robin, 1963), and race (e.g., Brown & Langan, 2001; Fyfe, 1978, 1981, 1988; Geller & Karales, 1981; Geller & Scott, 1992).

Though a substantial and growing body of literature on police use of deadly force has accumulated, we have learned very little about the causal factors leading to deadly force encounters or the substantial variation in these dynamic events. By ignoring equifinality and treating all cases in which an officer discharges their firearm in the line of duty as the result of equivalent processes, academics routinely risk model misspecification and water down their ability to identify systemic and causal influences.

On the other hand, law enforcement practitioners tend to treat police shootings as if equifinality is absolute. Many of the classic studies of the police note a culture of professional deference to the involved officer(s) discretionary decision-making and subsequent actions taken during a use-of-force encounter; scholars have ascribed this, in large part, to the inherent danger and the unpredictable nature of human violence (Bittner, 1990; Skolnick & Fyfe, 1993; Muir, 1979; Van Maanen, 1973; Wilson, 1978). To compound matters, the primary, and often only,
modes of professional inquiry into police shootings are focused almost exclusively on the criminal and administrative culpability of the involved officer(s) (IACP, 2012; Klinger, 2004). To use fatal aviation accidents again as an illustrative example, this would be like focusing a plane crash investigation solely on the administrative and criminal culpability of the involved pilot(s). Applying such a narrow lens, both in the case of fatal aviation accidents and officer-involved shooting investigations, would all but guarantee that most causal patterns and systemic influences are missed.

Typologies are specifically designed to remedy equifinality and model misspecification and could be used to address the issues found in both the prevalent academic and practitioner approaches to investigating and understanding police shootings (Bailey, 1994; Collier, LaPorte, & SeaWright, 2012). Discriminately aggregating like cases opens them up to the power of quantitative analysis and allows for a more meaningful examination of causal relationships. In a similar fashion, grouping cases on process rather than outcomes allows for the identification of systemic flaws and weaknesses in current practice.

**Scharf and Binder’s Typology of Potential Deadly Force Outcomes**

Recognizing the problem with treating all police shootings as equivalent processes based on the result, Scharf and Binder (1983) developed a typology of outcomes for potential police deadly force encounters, categorized on whether or not the police fired a shot and whether or not the decision was “correct” (Table 2.2).
Table 2.2. Scharf & Binder’s (1983) typology of potential deadly force outcomes

<table>
<thead>
<tr>
<th></th>
<th>Shots Fired</th>
<th>No Shots Fired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correct Decision</strong></td>
<td>A person who is armed and dangerous and an immediate threat to life is shot by a police officer.</td>
<td>A person who appears to be armed and dangerous is not shot by a police officer, and there are no unfortunate consequences.</td>
</tr>
<tr>
<td><strong>Incorrect Decision</strong></td>
<td>A person presumed dangerous but, in fact, not actually armed or dangerous is shot by a police officer.</td>
<td>A police officer or citizen is injured or killed because a police officer fails to shoot.</td>
</tr>
</tbody>
</table>

*Source: This table was adapted from Scharf & Binder (1983, p. 23)*

Two of the four “logical” outcomes Scharf and Binder (1983, p. 23) identified were categorized as errors:

**False-Positive Errors:** *A person presumed dangerous but, in fact, not actually armed or dangerous is killed by a police officer.*

**False-Negative Errors:** *A police officer or citizen is killed because a police officer fails to shoot.*

While this was an important first step, a superficial examination of the four empirical cases, described earlier in the paper, demonstrates that the categories in Scharf and Binder’s typology are not exhaustive, one of the two fundamental requirements for any typology (Bailey, 1994). In fact, only one of the four cases, the false-positive shooting of Francisco Serna, fits into their typology at all.

**An Extended Typology of Police Shooting Errors**

To address this, an extended typology of police shooting errors has been developed that incorporates all instances in which the police discharge a firearm and the result is an error as Reason (1990) defined it (Table 2.3).
Table 2.3. A new typology of police shooting errors

<table>
<thead>
<tr>
<th>Firearm Discharge</th>
<th>Intended</th>
<th>Unintended</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intended</td>
<td>Misses</td>
</tr>
<tr>
<td></td>
<td>Misdiagnosis Errors</td>
<td>Misapplication Errors</td>
</tr>
<tr>
<td></td>
<td>Unintended</td>
<td>Unintentional Discharges</td>
</tr>
</tbody>
</table>

The typology is categorized by whether or not an officer intends to discharge a firearm and whether or not the object struck by the fired bullet was the intended target of the officer’s behavior at the time of the shooting. Again, this typology only encompasses events in which the police discharge a firearm and the outcome meets the definition of human error. Each bullet fired is treated as a separate event. Therefore, a police shooting involving multiple bullets being fired by a single or multiple officers could and often would result in a mixture of errors and/or correct actions, as was exemplified by the case of Bettie Jones in which the police intended to shoot an attacker but did not intend to shoot Jones, an innocent bystander, as well.

There are a number of reasons for limiting the typology to police shooting errors rather than trying to incorporate all police shootings, as Scharf and Binder did, or including errors that result from the police not shooting. First, apart from police shootings that are intentionally criminal in nature, police shooting errors and particularly those that result in injury or death are likely to be the most controversial and least understood by the public. As a result, they are also more likely to have a disproportionate and negative impact on the public’s perception of police legitimacy and competence when it comes to police use of deadly force (Gau, 2014; Pickering & Klinger, 2016). Second, where we find human error in the professional environment, we find an
opportunity to improve future outcomes (Dekker, 2010; Dekker, 2014; Doyle, 2010; Green, 2017; Institute of Medicine, 2000; Snook, 2000; Sunstein & Thaler, 2008; Woods et al., 2010).

It should be noted that, while the cases used to exemplify each category of the new typology all resulted in a fatality, neither death nor injury is required to meet the definition of a police shooting error. In fact, most police shooting errors occur when a bullet does not strike a human or animal target at all. It should also be noted that police shooting errors have significant officer safety implications in addition to the obvious public safety concerns. Shooting at but missing a subject who is intent on killing an officer or another person could be catastrophic. In addition, all accidental blue-on-blue shootings – incidents in which an officer shoots another police officer – fit neatly into the new typology. Understanding how and why these errors occur and under what circumstances they manifest themselves, could be used to improve outcomes for both the police and the public they serve. The remainder of this chapter will be used to take a closer examination of each category of the new typology.

**Misdiagnosis Errors**

Intended Firearm Discharge + Intended Target Hit = Unintended Outcome (Error)

A misdiagnosis error occurs when a police officer intends to discharge a firearm and hits the intended target of his behavior and the result is an unintended outcome. This type of error would fall into Reason’s (1990) rule-based errors and Scharf and Binder’s (1983) false-positive category of police shooting errors. Police practitioners have a variety of names for these types of shootings including: “cellphone shootings” (PERF, 2012, p. 8), “mistake-of-fact” shootings (Fachner & Carter, 2015, p. 30), and “perception-only” shootings (LAPD, 2018).

An empirical example of a misdiagnosis shooting, from the four cases outlined earlier, is the shooting of Francisco Serna. The police were dispatched to the call of a man with a gun.
When they arrived, the police confronted a man who matched the dispatched description of the person with a gun and had his hands in his pockets. When the man rapidly removed one of his hands from his pocket with an object in it, the police shot and killed him only to discover the object was a crucifix (Washington Post, 2016). How often do these type of shootings occur?

At a Police Executive Research Foundation (PERF) conference in 2012, then Los Angeles County Assistant Sheriff Cecil Rhambo said, “In Los Angeles County we have 5 to 15 [police] shootings a year due to what we call perception issues” (p. 8). Between 2013 and 2017, fourteen percent ($n = 30$) of the shooting incidents reported by the Los Angeles Police Department ($N = 211$) could be classified as misdiagnosis errors (LAPD, 2018). Fachner and Carter (2015), found similar numbers for the Philadelphia Police Department. Between 2007 and 2013, nine percent ($n = 35$) of the shooting cases examined ($N = 385$) would fall under the misdiagnosis category. It should be noted that both sets of numbers represent incident rather than individual bullet level data. It is likely that more than one officer fired and that individual officers fired more than one time in some of the incidents captured in the LAPD and Philadelphia data. If these data are at all representative of the prevalence of this type of police shooting error, the percentage of misdiagnosis errors is not trivial. But, why do they occur?

While it is beyond the scope of this chapter to test the individual categories within the typology, the research on heuristics and biases (e.g. Kahneman, 2011) and recognition primed decision-making (e.g., Klein, 2011) hold great promise for examining this type of error. Experience in any practical domain allows practitioners to develop patterns of key information within their realm of expertise. These patterns or mental models permit them to quickly evaluate situations and to act with less than perfect information by systematically focusing on what is important while ignoring what is not (Klein, 2011).
The police are no different (e.g., Stalans & Finn, 1995); and the classic observational studies of the police are brimming with references to this kind of rapid pattern assessment followed by decisive and often consequential action. James Q. Wilson (1968, pp. 38-39) wrote, “[O]fficers are routinely called upon to ‘prejudge’ persons by making quick decisions about what their behavior has been in the past or is likely to be in the future”. He noted that officers seemed to be particularly attuned to two types of cues: “those that signal danger and those that signal impropriety”. Jerome Skolnick (1966, p. 45) postulated:

The policeman, because his work requires him to be occupied continually with potential violence, develops a perceptual shorthand to identify certain kinds of people as symbolic assailants, that is, as persons who use gesture, language, and attire that the policeman has come to recognize as a prelude to violence.

William Muir (1977, p. 153), called this process “pigeonholing” and wrote:

To anticipate what was going to happen, policemen developed a sense for the patterns in human affairs. They formed concepts, or classifications, which helped them to assimilate and distinguish between discrete persons and events. Concepts were attended by visual procedures by which policemen processed the details of the moment into these abstractions.

Writing specifically about police-involved shootings, David Klinger (2004, p. 83) noted that:

The line separating close calls from shootings is razor thin…when officers do shoot, it is because something – the way armed individuals stand, the way they hold their weapons, the way they move, the words they speak, the look on their faces, some cue – tells them that this moment is different.

While the policing literature has yet to adopt a cohesive term for the type of decision making described above, the psychological and behavioral economics literature would call them heuristics and biases. Daniel Kahneman (2011, p. 98), defines heuristics as “simple [mental] procedures that help find adequate, though often imperfect, answers to difficult questions”. As noted earlier, there are upsides and downsides to this type of implicit pattern based decision-making. On the down side, because they shortcut much of the available information in order to reach a suitable answer quickly, heuristics can and regularly do result in error. If a person attends
to the wrong information and ignores or mistakenly interprets the right information, heuristics can lead to systematic and predictable error (Reason, 1990).

**Misapplication Errors**  
Unintended Firearm Discharge $+$ Intended Target Hit $=$ Unintended Outcome (Error)

A misapplication error occurs when a police officer does not intend to discharge a firearm but does discharge a firearm, the bullet hits the intended target of the officer’s behavior, and the result is an unintended outcome. This type of error falls under Reason’s (1990) skill-based errors of slips and lapses. Practitioners call these shootings “weapon confusion shootings” (AELE, 2012) or “TASER-confusion shootings” (Martin, 2016). While these types of shooting errors are primarily associated with electronic-control devices like TASER, they may also occur with flashlights and other tools an officer might activate during a potential incident.

An empirical example of a misapplication shooting, from the four cases outlined earlier, is the shooting of Oscar Grant. An officer who was struggling with Grant on the ground announced to fellow officers that he was going to “Tase” Grant, stood up, drew his firearm, and shot Grant one time in the back killing him (California. v. Mehserle, 2010). During the subsequent trial of the involved officer, experts who had analyzed the video evidence from the shooting noted that the officer’s firearm did not have a thumb activated safety mechanism like the TASER does and that the officer can be seen making a motion with his thumb, as he drew his firearm, consistent with the motion that a person would make to deactivate the safety on a TASER (Martin, 2016). As of 2012, there were nine documented cases of misapplication shooting errors involving electronic control devices (AELE, 2012). A number of high profile misapplication error have occurred since 2012.
This type of slip, or unintended action, is well documented in the psychological literature (e.g., Norman, 1981). According to Reason (1990), “A necessary condition for the occurrence of a slip of action is the presence of attentional ‘capture’ associated with either distraction or preoccupation” (p. 56). “Slip and capture” errors are often associated with switching to a new tool or process after significant training and/or experience with an ergonomically similar but functionally different tool or process. A relatively benign example would be, after years of driving a vehicle with an ignition that requires a key, a person switches to a vehicle with a keyless ignition. If the person’s attention was on something else as they attempted to start the car, they might attempt to insert the key fob into the steering column and this would be classified as a slip and capture error. These types of errors are well documented in the fields of medicine (e.g., Zhang et al., 2004) and aviation (e.g., Nagel, 1988) and have led to accidental fatalities in both professions.

In talking about the risk for these types of errors, Karl Weick (1985) said:

[S]kills trained just to the point of sufficiency may be potentially the most dangerous, since trainees, trainers and [administrators] alike assume the skill is available. In reality, that skill will be one of the first to disappear under pressure. It will be replaced by a much more primitive action that has been practiced for a much longer period of time (p. 40).

When it comes to firearms and TASER training for police officers, there appears to be just such a training discrepancy. Nationally, new police officers spend an average of 60 hours on firearms and shooting skills during their initial academy training (Morrison, 2006b). After the academy, firearms training continues to be emphasized throughout an officer’s career through in-service training, often on an annual or quarterly basis. TASER certification, on the other hand, requires officers to fire two practice rounds during the initial certification and two practice rounds for recertification every two years (Axon, 2018). From this perspective, if an officer’s attentional
resources were fully engaged – captured – by a struggle with a suspect and, intending to draw an electronic-control device, he unintentionally drew his firearm and shot the suspect; this type of error might also be framed in terms of the frequency-gambling heuristic (Kahneman, 2011). Under time constraints and uncertainty, with System 2 fully engaged in other things, System 1 may be prone to go with the most frequent associated behavioral response.

**Misses**

**Intended Firearm Discharge + Unintended Target Hit = Unintended Outcome (Error)**

A miss occurs when a police officer intends to discharge a firearm but does not hit the intended target of the officer’s behavior and the result is an unintended outcome. This type of error falls into Reason’s skill-based errors. An empirical example of a miss, from the cases described earlier, is the Bettie Jones shooting. A Chicago police officer, responding to the report of a domestic disturbance, shot and killed a man who was attacking him with a baseball bat, but also unintentionally shot and killed Bettie Jones (Johnson, 2018).

Unlike the other categories of this typology, a fairly significant body of literature has been produced on police shooting accuracy in the field. The predominant finding from this body of research is that hit ratios are very low and that they have not significantly changed over the years (e.g., Donner & Popovich, 2018; Geller & Karales, 1981; Geller & Scott, 1992; Landman et al., 2016; White, 2006). Despite variance in the literature, departments rarely achieve hit rates above 50% and most fall well below (Copay & Charles, 2001). In fact, Morrison (2006a) wrote, “[H]it rates hovering around one in five shots have persisted from the earliest measurements in the 1970s through the 1990s, this despite the many changes in such training during the period” (p. 332). Researchers examining 364 officer-involved shootings by the Philadelphia Police Department between 2007 and 2013 found a police hit rate of 18% (Frachner & Carter, 2015).
The Los Angeles Police Department self-reported that between 2013 and 2017 their officers fired a total of 1900 rounds in the field and 509 of those rounds hit their intended target for an average hit rate of 27%. This ranged from a low in 2017 of 18% to a high in 2016 of 42% (LAPD, 2018).

Regardless of the variance and reporting issues noted by scholars (e.g. Donner & Popovich, 2018) it is pretty clear that, as Geller and Scott (1992) so elegantly put it, “The numbers of wounded and slain criminal suspects in the United States pale by comparison to the numbers shot at but missed by police” (p. 100). Even with the highest recorded hit ratios from the research that has been done – around fifty percent – when it is combined with the other error categories from the typology, we find that error is a much more common outcome than correct action when it comes to police shootings. This type of finding has rarely if ever been documented in the professional environment (e.g., Dekker, 2010; Dekker, 2014; Reason, 1990; Woods et al., 2010) and significantly more research needs to be done on both the suitability and transferability of current police firearms training programs.

**Unintentional Discharges**

Unintended Firearm Discharge + Unintended Target Hit = Unintended Outcome (Error)

An unintentional discharge occurs when a police officer does not intend to discharge a firearm but the firearm discharges, the bullet hits an unintended target of the officer’s behavior, and the result is an unintended outcome. This type of error also falls under Reason’s skill-based errors. In addition to unintentional discharges, practitioners also call these shootings, “accidental” or “negligent” discharges (O’Neill et al., 2017).

The empirical example of this type of error, from the cases described earlier in the paper, is the shooting of Akai Gurley. A relatively new officer who was walking up a poorly lit high rise apartment stairwell with his gun drawn, apparently an informal department practice for NYPD officers in this particular building, accidently discharged his weapon. The bullet
ricocheeted off a wall before striking and killing Gurley who had just entered the stairwell at a lower level (Wilson, 2014). Between 2013 and 2017, the Los Angeles Police Department reported 44 unintentional discharges – approximately 17% of their reported shooting incidents (LAPD, 2018). Between 2006 and 2016, the New York City Police Department reported 195 unintentional discharges out of 1037 shooting incidents or approximately 19% of their reported shooting incidents (NYPD, 2017).

Heim et al. (2006a), found that 20% of officers touched the trigger of a drawn firearm during experimental scenarios when it was inappropriate for them to shoot and none of the officers in the study remembered doing it when they were interviewed after the fact. In a follow-up study, Heim et al. (2006b), found that various body movements like jumping, kicking, or grabbing onto objects could cause enough sympathetic pressure to be exerted by the trigger finger to cause an accidental discharge. This type of muscle co-activation was found to be the cause of approximately 24% of the unintentional discharges in two separate studies (n = 137 and n = 171) that analyzed official police reports of the incidents (O’Neill et al., 2017; 2018). O’Neill et al. (2017; 2018) also found that approximately 59% and 47% respectively of the accidental discharges they analyzed were due to “routine firearms tasks” (i.e. cleaning, putting the gun away at the end of shift, placing the gun in a locker when entering a courthouse or jail, loading and unloading, etc.) and that approximately 11% and 13% respectively were due to using an unfamiliar firearm or holster. These are fascinating findings from the perspective of Kahneman and Tversky’s dual-process model and Reason’s levels of performance. As people gain experience with a task or problem, the tendency is to move from effortful cognitive processing to automaticity. Cognitive automaticity – System 1 processing – allows people to devote attentional resources to things outside the task or problem they are working on, but it is not likely optimal
for tasks or problems involving a loaded firearm and, according to Reason (1990), will inevitably result in error.
Chapter 3: (Study 2) Dispatch Priming and Misdiagnosis Shooting Errors

In Los Angeles County we have 5 to 15 [police] shootings in a year due to what we call perception issues. These have become a bigger problem in the last five or six years. These are also called “cell phone shootings.” Typically what happens is that a deputy has contact with an individual, and a short foot pursuit occurs. During that foot pursuit, the individual either makes an affirmative movement, such as a tossing motion, or produces something from their clothing that the officer mistakes for a weapon. The officer responds to this perceived threat by firing his weapon. After the shooting occurs, we discover a cell phone lying nearby or on the person’s body. The circumstances in which the shooting occurs (such as a “shots fired” call, armed robbery call, or ‘man with a gun’ call) may provide context for the officer’s state of mind. Unfortunately, these shootings have been common for us over the last few years (PERF, 2012, p. 8).

- Los Angeles County Assistant Sheriff Cecil Rhambo

Introduction

The situation described by Sheriff Rhambo is not unique to Los Angeles County. On April 30, 2015, San Diego, California police officers were dispatched with information about a man brandishing a knife. Moments after the first officer arrived, he shot and killed Fridoon Rawshan Nehad who approached him with a pen in his hand (Selby, Singleton, & Flosi, 2016). On December 12, 2016 Bakerfield, California police officers were dispatched information about a man brandishing a revolver. In the end, 73-year-old Francisco Serna was shot and killed when he pulled a wooden crucifix from his pocket (Phippen, 2016). From these tragedies, an empirical question emerges. Does dispatching erroneous information significantly increase the likelihood for misdiagnosis errors during potential police shootings?

According to Los Angeles Police Department self-report data, of the 211 shooting incidents between 2013 and 2017, 46% (n = 98) were initiated by a dispatched call for service and 14% (n = 30) were classified as “perception only” shootings. Fachner and Carter (2015), found similar numbers for the Philadelphia Police Department. Between 2007 and 2013, approximately 52% of the incidents that ended in a shooting were initiated by a dispatched call.
for service. Ten percent \((n = 35)\) of the shooting cases examined \((N = 385)\) would fall under the misdiagnosis category.

Paraphrasing Bittner (1990), Peter Manning (1992) wrote, “[T]he core technology of the police is situated decision making with the potential for the application of violence” (p. 354). He later postulated that this core technology may be altered, in both intended and unintended ways, through the introduction of new technology (Manning, 2008). This is consistent with the literature on human error, which has found that the integration of technology into the work environment, even when it is implemented with the best of intentions, fundamentally changes the complexity of human decision making and can impact outcomes in unanticipated ways (e.g., Rasmussen, 1986). While police dispatch technology is certainly not new, little to no research has looked at how this complex communication technology, with multiple human interface points, has modified the core proficiencies of the officers who must adapt it to their decision making framework in the field.

Radio dispatch and computer automated dispatch (CAD) systems provide modern law enforcement officers with a substantial amount of information before they ever reach the physical environment, people, and/or emergency they are responding to. Conceptually, this information should decrease response times and increase an officer’s ability to coordinate a safe outcome (Rubinstein, 1973). Indeed, Fyfe (1989) argued, the police should use pre-event information, like what they receive from dispatch, to help them “diagnose” and prepare for an evolving situation they are responding to and thereby avoid the need for the “split-second” decision-making so often associated with potential police deadly force encounters. This assumes, however, that pre-event information is correct and there are a number of studies that call this assumption into question (e.g., Gilsinan, 1989; Manning, 2008; Scharf & Binder, 1983). If the
police, either implicitly or explicitly, continue to rely on dispatched information that is incorrect to “diagnose” an unfolding situation in the face of contradictory cues or, even worse, affirmative miscues – e.g., someone rapidly producing an object from their pocket – it could create a situation in which an officer is prone to make a misdiagnosis error he or she would not otherwise make.

A number of concepts from the literature associated with heuristic decision-making are particularly relevant to this study. The first is the concept of priming. Priming is the notion that exposure to an earlier stimulus can influence the response to a later stimulus (Eitam & Higgins, 2010). To meet the definition of a prime, this influence must occur outside either the awareness of the prime itself or the intention to use the prime to inform later judgement or action (Loersch & Payne, 2011). Molten (2014) wrote, “[I]t is now virtually axiomatic among social psychologists that the mere exposure to socially relevant stimuli can facilitate, or prime, a host of impressions, judgments, goals, and actions, often even outside of people’s intentions or awareness” (p. 3). In the present context, we might hypothesize that dispatched information about the presence of a weapon before an officer arrives on scene may influence an officer’s decision making and subsequent actions in the field. If the dispatched information is incorrect, this may significantly increase the likelihood for a misdiagnosis error without an officer realizing the increased risk.

Dispatch priming is likely mediated through the availability heuristic and may be strengthened through confirmation bias. Research on the availability heuristic has shown that people faced with a difficult or time compressed decision, tend to favor the first thought that comes to mind. By giving greater credence to available information, as opposed to that which is not already known, people will overestimate the accuracy of the information at hand (Tversky &
Kahneman, 1973). This is particularly true during novel situations in which people have not already developed a more effective patterned response. Given the relative rarity of police shootings (e.g., Geller & Scott, 1992; Alpert & Fridell, 1992), the inherent complexity of deadly force decisions (e.g., Klinger & Brunson, 2009; Artwohl & Christensen, 1997), and the time constraints under which they can occur (e.g., Blair et al., 2011; Lewinski et al., 2014) even very experienced officers may be prone to over reliance on the most readily available information. In the case of misdiagnosis shootings, the availability heuristic is likely compounded by confirmation bias. That is, in the face of uncertainty, people tend to cling to their initial interpretation of an unfolding event, even when presented with better data, and may selectively pick from the emerging information only that which confirms their initial understanding (Greenwald, et al., 1986). When dispatched to a distal call, an officer’s initial understanding of the incident may be formed almost entirely by the information received from dispatch.

As discussed in Chapter 2, police officers, much like the rest of us, use heuristics to simplify complex decisions by attending to key pieces of information and ignoring the rest. This satisficing behavior can optimize performance in complex decision environments, but it can also result in systematic error if a person attends to the wrong information and ignores the right information as it emerges. Given the complexity of potential deadly force encounters and the nature of heuristic decision making, officers who are primed with salient information from dispatch are likely to construct an interpretation of the evolving event based on the most readily available information (i.e., the availability heuristic). Once an officer has constructed an interpretation of the event, they may be slow to relinquish it and may selectively interpret emerging information in light of their previously constructed understanding (i.e., confirmation bias).
If an officer does base a shoot/no-shoot decision on dispatched information, it will prove to be a “brittle” decision rule (Woods et al., 2010). That is, the same decision process that works or even optimizes a response under one set of circumstances results in error under a similar but different set of circumstances. In the case of dispatch priming, it will allow an officer to optimize his or her response when the information is correct but it will also significantly increase the risk for misdiagnosis errors when the information is incorrect. Depending on the nature of the relationship between the dispatched information and the reality of the situation, that error could take the form of a “cellphone shooting” (i.e., a misdiagnosis or false-positive error) or an inadequate response to a legitimate threat (i.e., a false-negative error). To test this theory, I developed two hypotheses:

**H1:** Dispatching the incorrect information about what a subject is holding will significantly increase the likelihood for a shooting error during a shoot/no-shoot simulation.

**H2:** Dispatching the correct information about what a subject is holding will significantly decrease the likelihood for a shooting error during a shoot/no-shoot simulation.

**Methods and Sample**

To test these hypotheses, a randomized controlled experiment was devised utilizing pre-recorded dispatch audio and an interactive police firearms training simulator. These types of simulators have been used to test police decision making, particularly the impact of implicit racial bias on the police decision to use deadly force, in a number of other studies (e.g., James et al., 2016; Chaires, 2015). While firearms training simulators cannot possibly reproduce the dynamic environments or elicit the same cognitive strain an officer is likely to contend with in the field, they do provide for standardized and realistic scenarios in which the situated decision making of
experienced officers with a full range of force options can be observed in a controlled and relatively safe environment. This makes simulators attractive for both law enforcement training and research purposes. In the present study, a Ti Training brand firearms simulator was used in conjunction with a Sirt brand laser training pistol. The trigger pull for the training pistol was adjusted to approximately 5.5 pounds, the factory setting for three of the most commonly issued police duty handguns, the Glock 19, 21, and 22.

**Sample**

The sample was composed of 306 active duty law enforcement officers recruited from 18 different agencies in two different states. The participating agencies were diverse and included a midsized western municipal police department (n = 86), a midsized western sheriff’s department (n = 55), a small western campus police department (n = 33), and an east coast cooperative training center composed of fifteen different departments (n = 132). Based on the collected demographic characteristics (Table 3.1), the resulting sample appears to be representative of the larger U.S. law enforcement population (Walker & Katz, 2013).

Participation in the study was voluntary and confidentiality was extended to both the officers and the agencies involved. The project received approval from both a university institutional review board and an executive officer from each of the participating agencies. Data for the study were collected between July 2016 and October 2016 by the author. Participant recruitment and the experiment itself was conducted during previously scheduled in-service training days at the participating agencies. A brief presentation was given at the start of each training session to solicit volunteers. Potential volunteers were told the study was focused on police decision making using a firearms training simulator. Each volunteer officer was asked not
to divulge the contents of the video scenario they saw or their experience with the study to other potential participants.

Table 3.1. Dispatch priming study sample description ($N = 306$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>(%)</th>
<th>Range</th>
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<th>SD</th>
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<td>(100)</td>
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<td>Last Firearms Training</td>
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</tr>
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<td>Today</td>
<td>47</td>
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<td>This Week</td>
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<td></td>
</tr>
<tr>
<td>&gt;1Week / &lt; 1Month</td>
<td>28</td>
<td>(9.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;1Month / &lt; 3Months</td>
<td>60</td>
<td>(19.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;3Months / &lt; 6Months</td>
<td>20</td>
<td>(6.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;6Months / &lt; Year</td>
<td>16</td>
<td>(5.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. LE = Law Enforcement; SD = Standard Deviation.

**Design**

Volunteer participants were taken one at a time to a secluded study area where they were given a training pistol and asked to stand in a designated location facing a projector screen. Once in position, the participants were read directions from a script. Officers were told they would hear a dispatched call and, after the audio ended, a person would appear on the screen in front of them. Officers were asked to interact with the person on the screen as if it were the first person they were contacting on the dispatched call. After the directions were given and the officers were in
position to participate, they were randomly assigned to one of three dispatch treatments and one of two video scenarios using a random number generator.

Independent Variables

The following dispatch treatments were used:

**Stem (Control) Dispatch:**

Unit one respond to 411 Main Street on a possible trespass in progress. Break. Unit one continuing, the RP is a next-door neighbor who says her neighbors are away on vacation and someone she doesn’t recognize is walking around the house and peering in the windows. Break. Unit one continuing, the subject is a white male wearing a black hoodie, khaki pants, black beanie and sunglasses.

**Gun Prime Update:**

Unit one additional, the RP says the subject appears to be holding a gun.

**Cellphone Prime Update:**

Unit one additional, the RP says the subject appears to be talking on a cellphone.

Officers assigned to the control dispatch treatment \(n = 100\) heard only the stem dispatch. Officers assigned to the gun prime dispatch treatment \(n = 106\) heard the stem dispatch and the gun prime update. Officers assigned to the cell phone prime treatment \(n = 100\) heard the stem dispatch and the cellphone prime update. After listening to the randomly assigned dispatch, officers were presented with one of two randomly assigned video scenarios.

Officers assigned to the cellphone scenario \(n = 146\) were shown a man, matching the description of the person in the stem dispatch, standing in front of a white wall with his hands in his jacket pockets. After approximately six seconds, the man rapidly pulled his right hand from his pocket and pointed a cellphone at the officers as if to film them. Officers assigned to the gun scenario \(n = 160\) were shown the same person, dressed in the same clothing and standing in
front of the same white wall with his hands in his pockets. After approximately six seconds, the man rapidly pulled his right hand from his pocket and pointed a handgun at the officers as if to shoot them.

**Dependent Variable**

The dependent variable for the study was whether or not an officer fired the simulated handgun during the course of the scenario. Shooting at any time during the cellphone scenario was considered a false-positive error. Not shooting during the gun scenario was considered a false-negative error (Scharf & Binder, 1983).

**Results**

A Pearson’s chi-square test of independence with Cramer’s V posttest was used to analyze whether or not the officers shot during the cellphone scenario. The results for the cell phone scenario are shown in Table 3.2 and indicate a significant and strong relationship between the information an officer receives from dispatch and the decision to use deadly force in a simulated environment. When dispatch informed officers the subject appeared to be holding a gun, they shot the person presenting a cell phone more than twice as often \((RR = 2.19)\) as the control group. This provides strong support for the first hypothesis. When dispatch told officers the subject appeared to be talking on a cellphone, only three officers \((RR = .212)\) shot the person presenting a cellphone. This provides strong support for the second hypothesis.

<table>
<thead>
<tr>
<th>Dispatch Treatment</th>
<th>Officer Fired Weapon</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>%</td>
<td>(n)</td>
<td>No</td>
</tr>
<tr>
<td>Stem Only (Control)</td>
<td>28.30</td>
<td>(13)</td>
<td></td>
<td>71.70</td>
</tr>
<tr>
<td>Stem + Gun Prime</td>
<td>62.00</td>
<td>(31)</td>
<td></td>
<td>38.00</td>
</tr>
<tr>
<td>Stem + Cell Phone Prime</td>
<td>6.00</td>
<td>(3)</td>
<td></td>
<td>94.00</td>
</tr>
<tr>
<td>Totals</td>
<td>32.19</td>
<td>(47)</td>
<td></td>
<td>67.81</td>
</tr>
</tbody>
</table>

\[X^2 (2, N = 146) = 36.391, p < 0.000, V = 0.499\]
The results for the gun scenario are shown in Table 3.3. Regardless of the dispatch treatment, 100% of the officers who were assigned to the gun scenario fired their simulated weapon. That is, there were no false-negative errors. Because there was no variation for this group they were excluded from the analysis of the officers who were presented with the cellphone scenario. However, the fact that all of the officers shot at the subject who produced a gun, allows the gun scenario to serve as an effective control for the cellphone scenario and strengthens the findings for that group. When a weapon was produced, officers who were participating in the study reacted appropriately and shot the subject. However, anecdotal evidence and subjective observation seemed to confirm that officers who received the cellphone dispatch treatment shot much later than officers who received either the gun prime or control dispatch treatments\(^1\). Obviously, this would need to be empirically tested with reliable measures before any definitive statement could be made in support of either hypothesis. Given the inherent problems with using “balance tests” in conjunction with experimental data (e.g. Mutz, Pemantle, & Pham, 2018), no additional statistical analysis of the data was done.

\textbf{Table 3.3. Results for gun scenarios}

<table>
<thead>
<tr>
<th>Dispatch Treatment</th>
<th>Officer Fired Weapon</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>%</td>
<td>(n)</td>
<td>No</td>
</tr>
<tr>
<td>Stem Only (Control)</td>
<td>100.00</td>
<td>100.00</td>
<td>(54)</td>
<td>0.00</td>
</tr>
<tr>
<td>Stem + Gun Prime</td>
<td>100.00</td>
<td>100.00</td>
<td>(56)</td>
<td>0.00</td>
</tr>
<tr>
<td>Stem + Cell Phone Prime</td>
<td>100.00</td>
<td>100.00</td>
<td>(50)</td>
<td>0.00</td>
</tr>
<tr>
<td>Totals</td>
<td>100.00</td>
<td>100.00</td>
<td>(160)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

\(N = 160\)

\(^1\)With the objective of assessing whether or not dispatch priming had a significant effect on the likelihood of officers making false-negative errors, the author attempted to measure the differences in shooting response times for the gun scenario. However, unanticipated random processor speed variability in the simulator system made this measurement unreliable.
Limitations

The experimental design of this study makes it vulnerable to the weaknesses of all experimental designs. In as much as voluntary participation makes selection bias a potential issue, the sample does appear to be demographically representative of the larger U.S. law enforcement population (Walker & Katz, 2013). Diffusion cannot be ruled out. However, officers who were not participating in the study were actively engaged in departmental training making widespread diffusion at each location unlikely. In addition, each participant was asked not to divulge the contents of the video scenario they saw or their experience with the study to other potential participants. The generalizability of the findings to other settings is likely the greatest concern given the stark contrast between the laboratory-like settings needed to control an experiment and the chaotic reality of a real-world deadly force encounter. However, there is no reason to think that satisficing heuristic decision making would decrease in the face of a more complex and threatening decision environment. In fact, there is significant evidence to suggest that heuristic decision-making and error rates increase with the complexity, novelty, and consequence of the decision and the environment it inhabits (Kahneman, 2011; Reason, 1990; Woods et al., 2010).

Another potential issue arises from the starting position for the officer’s gun. Each volunteer officer was given the simulated gun before listening to their assigned dispatch treatment and they were asked to hold the gun throughout the experiment. The act of handing the officer a gun and asking them to keep it in their hands during the scenario, likely had a priming effect of its own. It is very possible that this artificially increased the error rate for all of the officers who participated in the study. However, the priming effect of giving the officer a gun and asking them to hold it should be uniform given random assignment and should not significantly change the risk ratios found between the dispatch treatment groups.
Discussion

If the core technology of the police is situated decision-making where there is a potential for violence and this core technology can be altered through the introduction of new technology as Manning (1992; 2008) hypothesized, then it is critical to understand the impact of dispatched information on police decision-making and outcomes. While police dispatch technology is certainly not new, little to no research has looked at how this complex communication technology with multiple human interface points, has modified the core proficiencies of the officers who must adapt it to their decision making and tactics in the field. The present study provides empirical support for Manning’s hypothesis. All else being equal, dispatched information altered the decision to pull the trigger for a significant number of officers, at least within the context of a simulated environment. The dramatic results also demonstrate the brittle nature of relying on dispatched information, whether implicitly or explicitly, to make a split-second shooting decisions in response to the rapid production of an object from a person’s pocket.

When dispatch told officers the subject appeared to be talking on a cell phone and the subsequently encountered subject produced a cellphone, only 6% of the officers made an error, as compared to 28% of the control group. If we look solely at the outcome, the correct information allows the officers to perform at a much higher level. However, when officers were told the subject appeared to be holding a gun and the subsequently encountered subject produced a cellphone, 62% of the officers made a shooting error. It is interesting to note that outcomes for the cellphone scenario could be dramatically altered by slightly changing the information officers received. When the information was correct, officer performance significantly improved. When the information was incorrect, officer performance significantly degraded and error became
much more likely. Woods (2019) would call this a “brittle” relationship. That is, things that improve performance under some or even most circumstances can, under slightly different but similar circumstances, lead to catastrophic failure.

Outcomes, Woods et al. (2010), argue are not good measures of sound decision making or process. Instead, the discovery of human error should be seen as the starting point for deeper investigation rather than an end unto itself. From this perspective, human error becomes a symptom of underlying systemic vulnerability and brittleness rather than the primary cause of a tragedy. Accidents are not viewed as anomalies born out of individual human fallibility, but rather the normative and periodic result of entrenched aspects of the work environment (Perrow, 1984). This has significant implications for both the practitioners who investigate officer involved shootings and the researchers who study them. Both narrow blame oriented legal investigations and the indiscriminate aggregation of cases based solely on an outcome variable will, more often than not, miss or mask the systemic culprits behind these highly contextualized events. Understanding that similarly situated people will process information in similar ways and that circumstances that result in human error will often result in repeated errors over time and across people, opens the door to empirical research and perhaps even efforts at prevention and reduction.

In the case of dispatch priming, even though there is evidence to suggest that priming becomes much less salient once individuals become aware of the prime and its effects (Molden, 2014), it is unlikely and unrealistic to assume dispatchers will not pass information about the presence or possible presence of a weapon on to responding officers. It is just as unlikely, unrealistic, and perhaps even unreasonable to assume officers won’t use, either explicitly or implicitly, the information dispatch provides them to inform their decision making in the field.
However, understanding that officers will rely on dispatched information to make decisions and that the brittleness of this information will increase the risk for error may encourage officers and agencies to employ tactics that, where possible, allow officers more time in which to evaluate a situation before being forced to make such consequential decisions.

With this in mind, a slightly different experiment with British police officers, used a simulator and written “briefing” information rather than dispatch audio, had officers start with their guns in their holsters and found no significant difference between those who were primed with a “threat” briefing and those who were not (Mitchell & Flin, 2007). This suggests there may be a “sweet spot”, somewhere between the holster and pointing the weapon directly at an ambiguously armed subject, which may allow the officer to respond quickly to a confirmed threat while avoiding, in some instances, misdiagnosis shootings with false-positive presentations.
Chapter 4: (Study 3) Muzzle Position and the Police Decision to Use Deadly Force

Errors should be taken as the starting point for an investigation, not an ending.
- Sidney Dekker, 2002

According to David Woods et al. (2010), the goal of accident or error related research should be to learn from error, reduce complexity, and “engineer resilience” into the decision environment for front end operators (p. 83). Similar to the term error, there is more than one way to conceptualize the term resilience. Addressing this issue, Hale and Heijer (2006) write:

Resilience first conjures up in the mind pictures of bouncing back from adversity…responding to disaster…[and] rapid recovery from [disasters]. This captures some of the essentials, with an emphasis on flexibility, coping with unexpected and unplanned situations and responding rapidly to events, with excellent communication and mobilization of resources to intervene at the critical points. However, we argue that we should extend the definition a little more broadly, in order to encompass also the ability to avert the disaster or major upset, using these same characteristics (p. 35).

They go on to write, “This aspect of resilience concentrates on the prevention of loss of control over risk, rather than recovery from that loss of control” (p. 36; see also Rasmussen & Svedung, 2000). From the latter perspective, the goal of resilience engineering is to increase the “elasticity” – the resilience – of otherwise brittle operating environments for frontline workers and thereby decrease the likelihood for catastrophic failure (Weick & Sutcliffe, 2015).

“Resilience engineering” has become a mainstay of the safety science literature and both theoretically and practically applied to other high-risk occupations and endeavors as diverse as healthcare, aviation, and energy production (Dekker, 2019). The objective of resilience engineering is to reduce the complexity – the true enemy of consistently achieving desired outcomes (e.g. Dekker, 2014; Woods et al., 2010) – of the work place and thereby improve the likelihood for desired outcomes rather than errors and accidents. Reducing complexity can be
accomplished in a number of ways including the de-confliction of workplace goals, increasing where possible the time for critical decision-making, pushing greater discretion for creative problem-solving to the line level, and improving the visibility of the problems workers must solve to name a few. In this regard, resilience engineering shares some characteristics with criminal justice initiatives like problem oriented policing in that there is not a formulaic way to implement it and its success is measured by the absence of something – error/accidents in the case of resilience engineering and crime for problem oriented policing – rather than a product or production.

When it comes to potential deadly force encounters, a number of policing scholars have hypothesized that slowing down an officer’s initial response and employing tactics that incorporate better use of distance and cover – an obstacle that provides some protection from potential gun fire or could impede the advance of a violent antagonist – could afford officers more time to make better decisions during potential deadly force encounters (e.g., Fyfe, 1989; Klinger, 2005; Pickering & Klinger, 2016; Sherman, 2018). In fact, Fyfe (1989) explicitly recommended that police should structure their training and tactics in a way that increases the likelihood for correct situational “diagnosis” as a remedy for the uncertainty and error prone nature of “split-second” decision-making (p. 475). Anecdotal evidence from observational studies of the police provide some empirical support for these hypotheses and recommendations (e.g. Scharf & Binder, 1983). However, very little research has gone into examining the types of tactics that are likely to have the greatest impact on outcomes. For instance, how much time do officers really need to make better decisions in a split-second deadly force encounter and what is the impact of that additional time on officer safety?
The purpose of this study is to examine the effects of muzzle position – where police officers point their guns – on police shooting decisions when dealing with an ambiguously armed person – e.g. someone with his hands in his pockets – whom they have reason to believe may be armed. Lewinski et al. (2015), found differences in shooting times between trained police officers who were responding to an auditory stimulus while aiming at a target \((M = 0.51s)\) and those who started in a high ready position – gun pointed slightly below target – \((M = 0.83s)\) and a low ready position – gun pointed at about waist level – \((M = 0.97s)\). The question is, do the fractions of a second afforded by muzzle position provide officers enough time to prevent false-positive errors in situations in which they shouldn’t shoot without increasing the likelihood for false-negative errors or significantly slowing an officer down when they should shoot? Also, is there a proverbial sweet spot, a muzzle-position that does not significantly slow an officer’s response to a deadly threat while minimizing the likelihood for false-positive errors? Can we engineer some resilience into the police response to ambiguously armed subjects? To examine these questions two hypotheses were developed:

\(H_1:\) The lower the starting muzzle position, the less likely police officers will be to make a misdiagnosis shooting error in a simulated environment.

\(H_2:\) The lower the starting muzzle position, the slower police officers will be in responding to a legitimate deadly threat.

**Methods and Sample**

To test these hypotheses, I devised a randomized controlled experiment utilizing pre-recorded dispatch audio and an interactive police firearms training simulator. A Ti Training brand firearms simulator was used in conjunction with a Sirt brand laser training pistol. The trigger pull for the
training pistol was adjusted to approximately 5.5 pounds, the factory setting for three of the most commonly issued police duty handguns, the Glock 19, 21, and 22.

**Sample**

The sample was composed of 313 active duty law enforcement officers recruited from 23 different agencies in three different states. The participating agencies were diverse and included two midsized eastern municipal police departments ($n = 67; 38$), a midsized southern municipal police department ($n = 57$), a small eastern sheriff’s department ($n = 20$), a small western campus police department ($n = 14$), and eighteen different state, county, and municipal agencies who participated in training at an east coast cooperative training center during the data collection period ($n = 117$). Based on the collected demographic characteristics (Table 4.1), the resulting sample appears to be compositionally representative of the larger U.S. law enforcement population (Walker & Katz, 2013).

Table 4.1. Muzzle-position study sample description ($N = 313$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$n$</th>
<th>(%)</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>271</td>
<td>(86.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>42</td>
<td>(13.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>313</td>
<td>(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Range in Years)</td>
<td>313</td>
<td>(100)</td>
<td>22 – 67</td>
<td>37</td>
<td>8.957</td>
</tr>
<tr>
<td>Total Years of LE Experience</td>
<td>313</td>
<td>(100)</td>
<td>1 - 36</td>
<td>11.06</td>
<td>7.593</td>
</tr>
<tr>
<td>Current Assignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>27</td>
<td>(8.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigative</td>
<td>36</td>
<td>(11.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patrol</td>
<td>245</td>
<td>(78.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tactical</td>
<td>5</td>
<td>(1.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>313</td>
<td>(100)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. LE = Law Enforcement; SD = Standard Deviation.
The project was approved by both the University at Albany institutional review board and an executive officer from each of the data collection sites. Data for the study were collected between June 2018 and December 2018 by me. Participant recruitment and the experiment itself was conducted during previously scheduled in-service training days at the participating agencies. A brief presentation was given at the start of each training session to solicit volunteers. Potential volunteers were told the study was focused on police decision making using a firearms training simulator. Each volunteer officer was asked not to divulge the contents of the video scenario they saw or their experience with the study to other potential participants.

**Design**

Volunteer participants were taken one at a time to a secluded study area where they were given the training pistol and asked to stand in a designated location facing a projector screen. Once in position, the participants were read directions from a script. Officers were told they would hear a dispatched call and, after the audio ended, that a person would appear on the screen in front of them. Officers were asked to interact with the person on the screen as if it is the first person they were contacting on the dispatched call. After the directions were given and the officers were in position to participate in the study, they were randomly assigned to one of three muzzle positions using randomly generated numbers from a random number generator:

**Independent Variables**

The following muzzle positions were used:

1. **Aiming**: The sights of the gun was held in alignment with the officer’s visual gaze pointed at the projector screen and the index finger was to be off the trigger and resting along the slide of the training pistol.
2.) **High Ready Position:** The gun was held at the officer’s sternum and the index finger was to be off the trigger and resting along the slide of the training pistol.

3.) **Low Ready Position:** The gun was held at the officer’s navel and the index finger was to be off the trigger and resting along the slide of the training pistol.

The assigned positions were demonstrated for each participant. The officers were asked to assume the assigned position after they heard the dispatched audio and to maintain the position throughout the video scenario unless they made the decision to shoot. They were also told that the scenario may be a “shoot scenario” or a “no shoot scenario”. Once the instructions were given and the officers were in position to start, the following dispatch audio was played for the officer:

Unit one respond to 411 Main Street on a possible trespass in progress. Break. Unit one continuing, the RP is a next-door neighbor who says her neighbors are away on vacation and someone she doesn’t recognize is walking around the house and peering in the windows. Break. Unit one continuing, the subject is a white male wearing a black hoodie, khaki pants, black beanie and sunglasses.

Unit one additional, the RP says the subject appears to be holding a gun.

It should be noted that this was the same dispatch audio that was played for the dispatch priming study’s gun prime condition (See chapter 3 for details). Once the dispatch audio finished, the officers assumed the assigned muzzle-position and were prompted if needed. Once the assigned muzzle-position had been assumed, the officers were presented with one of two randomly assigned video scenarios, either a cellphone scenario or a gun scenario. Again, these were the same video scenarios that were used for the dispatch priming study in Chapter 3. Randomization was completed after the officer had assumed the assigned position using a random number generator.
Officers assigned to the cellphone scenario were shown a man, matching the description of the person described in the dispatch audio, standing in front of a white wall with his hands in his jacket pockets. After six seconds, the man rapidly pulled his right hand from his pocket and pointed a cellphone at the officers as if to film them. Officers assigned to the gun scenario were shown the same person, dressed in the same clothing and standing in front of the same white wall with his hands in his jacket pockets. After six seconds, the man rapidly pulled his right hand from his pocket and pointed a handgun at the officers as if to shoot them.

Dependent Variables

The dependent variables for the study were whether or not the officers fired the simulated handgun during the course of the scenario and how quickly they fired if they did shoot. Shooting at any time during the cellphone scenario was considered a misdiagnosis error. Not shooting during the gun scenario was considered a false-negative error (Scharf & Binder, 1983). In addition, the speed with which an officer shot during each scenario was measured. A GoPro brand camera was used to film the projector screen during each scenario. The participating officers themselves were not filmed. Video analysis software was used to measure the time between a previously designated frame capturing the first movement of the subject starting to draw the object from his pocket to the frame in which a laser strike was first visible if the officer shot. This allowed me to analyze any differences in shooting times between the assigned muzzle-positions.

Results

For the purposes of analysis, a one-way ANOVA with a Tukey HSD posttest was used to analyze the gun scenario response times in seconds. The results for the gun scenario can be
found in Table 4.2 and indicate partial support for the second hypothesis. There was very little difference in response time between the three muzzle-positions. In fact, the only statistically significant difference was between the aimed position with an average of .51 seconds and the low ready position with an average of .62 seconds, making the average difference between the two positions .11 seconds. To put this into context, Lewinski et al. (2014) found that the average time between trigger pulls for a person instructed to pull the trigger of a semi-automatic handgun as fast as they could was .25 seconds. The time sacrificed for starting from a low ready position as opposed to an aimed position was .04 seconds less than half the time it takes to pull the trigger of a semi-automatic handgun between shots. It should also be noted that all of the officers fired their simulated handgun in response to the gun scenario. That is, there were no false-negative errors.

Table 4.2. One-way ANOVA comparison of muzzle-position response times in seconds ($N = 139$)

<table>
<thead>
<tr>
<th>Group</th>
<th>$n$</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range (Min – Max)</th>
<th>Tukey’s HSD Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiming</td>
<td>40</td>
<td>.51</td>
<td>0.143</td>
<td>.32 - .86</td>
<td>Aiming</td>
</tr>
<tr>
<td>High Ready</td>
<td>49</td>
<td>.55</td>
<td>0.175</td>
<td>.25 - 1.03</td>
<td>High Ready</td>
</tr>
<tr>
<td>Low Ready</td>
<td>50</td>
<td>.62</td>
<td>0.169</td>
<td>.35 - 1.17</td>
<td></td>
</tr>
</tbody>
</table>

$F(2, 137) = 5.09, p = .007$

A Peason’s chi-square test of independence with Cramer’s V posttest was used to analyze whether or not the officers shot during the cellphone scenario. The results for the cellphone scenario can be found in Table 4.3 and indicate a significant and strong relationship between muzzle-position and the likelihood for a misdiagnosis shooting error. While the relative risk of making an error starting from the aimed position is only slightly greater than that of making the
same error starting from the high ready position ($RR = 1.12$), the relative risk of making a shooting error more than doubles when starting from the aimed position as compared to the low ready position ($RR = 2.13$). At the average cost of .11 seconds, officers cut their chances of making a misdiagnosis shooting error by more than half by starting in a low ready position rather than an aimed position in this study.

Table 4.3. Results for cell phone scenarios ($N = 174$)

<table>
<thead>
<tr>
<th>Muzzle Position</th>
<th>Officer Fired Weapon</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>(%)</td>
<td>(n)</td>
<td>No</td>
<td>(%)</td>
</tr>
<tr>
<td>Aimed Position</td>
<td>64.29 (36)</td>
<td></td>
<td></td>
<td>35.71 (20)</td>
<td></td>
</tr>
<tr>
<td>High Ready Position</td>
<td>56.92 (37)</td>
<td></td>
<td></td>
<td>43.07 (28)</td>
<td></td>
</tr>
<tr>
<td>Low Ready Position</td>
<td>30.19 (16)</td>
<td></td>
<td></td>
<td>69.81 (37)</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>51.15 (89)</td>
<td></td>
<td></td>
<td>48.85 (85)</td>
<td></td>
</tr>
</tbody>
</table>

$X^2(2, N = 174) = 14.054, p = 0.001, V = 0.284$

Given the inherent problems with using “balance tests” in conjunction with experimental data (e.g. Mutz, Pemantle, & Pham, 2018), no additional statistical analysis of the data was done.

Limitations

The experimental design of this study makes it vulnerable to the weaknesses of all experimental designs. While selection bias is always a potential issue with voluntary participation, the sample does appear to be demographically representative of the larger U.S. law enforcement population (Walker & Katz, 2013). Diffusion certainly cannot be ruled out. However, officers who were not participating in the study were actively engaged in departmental training making widespread diffusion at each location unlikely. In addition, each participant was asked not to divulge the contents of the video scenario they saw or their experience with the study to other potential participants.

The generalizability of the findings to other settings is likely the greatest concern given the stark contrast between the laboratory-like settings needed to control an experiment and the
chaotic reality of a real world deadly force encounter. For instance, an issue arises from differences between a simulated firearm that fires a laser and an actual firearm that fires a bullet. While the time to compress the trigger on both should be approximately the same, the simulated firearm used in this study had no recoil associated with the discharge of a bullet and the function of a live handgun. In addition, a laser travels much faster than a bullet and is not subject to the same ballistic constraints. This means that the measured time in the study is much closer to initial trigger pull time than bullet strike time would be. It would take slightly longer for a bullet to strike a target than it did for a laser. However, the time difference between the muzzle-position response times should not differ significantly. In addition, because the pressure and time needed to initially pull the trigger would not differ between a live firearm with a similar trigger pull to the simulated firearm used. I chose not to measure the accuracy of the first shot due to differences in accuracy caused by weapon recoil and bullet ballistics. This is an area that will need significantly more research before I would be comfortable recommending officers assume a low ready position rather than an aimed position in real world encounters with ambiguously armed subjects when officers have information or reason to believe the subject may be armed.

Discussion

There are a number of interesting implications that can be drawn from this study. Notwithstanding the limitations of a simulated environment and the need to understand differences in first shot accuracy between muzzle-positions, this study clearly demonstrates that resilience can be engineered into split-second shoot/no-shoot decision-making without costing the officer a significant amount of time. In fact, by starting at a low ready position rather than aiming directly at a subject with his hands in his pockets officers cut their chance of making a misdiagnosis shooting error by more than half – 30% rather than 64% - and it only cost them
11/100th of a second. It should be noted that police officers don’t typically train to shoot from the low ready position and no law enforcement firearms qualification course, that I am aware of, starts officers from the low ready position to test their shooting proficiency. Additional training and experience may change the time dynamic further and any associated changes to decision-making should be examined.

While the counterfactual in the dispatch priming study (see Chapter 3) was not built into this study, making direct inferences inappropriate, it should be noted that the same dispatch audio with the gun prime update and the same video scenarios were used in both studies. The dispatch priming study demonstrated that the misdiagnosis shooting error rate increased from 28% for the control (just the stem dispatch) to 62% for those who got the stem dispatch and the gun prime update when they were presented with the cellphone video scenario. In this study, all of the officers listened to the stem dispatch with the gun prime update. Officers that were presented with the cellphone scenario and started from an aimed position made misdiagnosis shooting errors at a very similar rate to the officers who received the stem dispatch and gun prime update in the dispatch priming study (64% and 62% respectively). However, officers that were presented with the cellphone scenario and started from a low ready position – after having been exposed to the stem dispatch with the gun prime update – made misdiagnosis shooting errors at a rate very similar to the control group (stem dispatch only) of the dispatch priming study (30% and 28% respectively). In as much as the priming effect of weapon information seen in the dispatch priming study can be generalized to the current study, the low ready position, at the cost of .11 seconds, had a significant and strong effect in reducing the number of shooting errors.
The time it took for officers to pull the trigger when they were presented with the gun scenario also provides some insight into the decision processes these officers were engaged in. The average time for officers to shoot for all muzzle-position conditions, when they were presented with a person drawing a gun, was .57 seconds. Lewinski et al. (2014), examined police shooting reaction times when officers were presented with a “simple go signal” – the activation of an LED light – and found it to be an average of .31 seconds. This finding was consistent with other research on reaction time to simple visual stimuli (Eckner et al., 2010; Welchman et al., 2010). However, when Lewinski et al. (2014) presented officers with a “decision-making element” – shooting when three LED lights were activated and not shooting when only one or two were activated – the average shooting reaction time increased to .56 seconds, more than double the reaction time to a simple go signal. Blair et al. (2011) utilized scenario role players and found it took police officers who were pointing a handgun directly at a person with a gun visible in hand – at the person’s side or pointed at the person’s head – an average of .39 seconds to shoot after the person initiated a movement of the weapon toward the officer. In the current study, the average time for officers to shoot in response to a gun being produced from a person’s pocket (i.e. not visible to the officer) was .57 seconds. This suggests a more complex decision process than what was seen in the Blair et al. study, where a gun was clearly visible and the officers’ reaction times approached those found in response to simple visual go signals.

There are a number of reasons why the low-ready position may produce fewer shooting errors than aiming directly at a person or the high-ready position. First, it could be that .11 seconds is simply enough additional time for more officers to check their swings. It could also be that lowering the firearm out of the officers’ field of view increases the time – beyond even the .11 seconds – officers’ have to visually identify the object coming out of the person’s pocket.
That is, the officers’ arms, hands and firearms may obstruct their view when they are aiming at a person or even at the high ready position and decrease the time they have to see an object being produced from a pocket or waistband and to accurately interpret behavior. In either case, lowering the firearm may also improve an officer’s ability to communicate with a person in crisis and, perhaps in some instances, increase the chances of defusing a situation before split-second decision-making is even required. There is a significant body of research on the importance of facial expressions to human communication and the role of facial dynamics in social interactions (e.g. Ambadar, Schooler, & Cohn, 2005; Bassili, 1979; Frith, 2009). A heavy emphasis has been placed on verbal communication and de-escalation skills and training for police officers (e.g. Oliva et al., 2010), yet very little research has gone into integrating these skills into police tactics, practices, and training. Training more resilience into tactics, like assuming a lower muzzle-position when dealing with an ambiguously armed person, may allow officers to significantly reduce the chances for a misdiagnosis shooting while at the same time increase the effectiveness of their communication and de-escalation efforts without significantly increasing risk to the involved officers.
Chapter 5: Discussion and Conclusion

“The death of Tamir Rice was an absolute tragedy. It was horrible, unfortunate and regrettable. But it was not, by the law that binds us, a crime.” These words, released to the media on December 28, 2015 as part of a statement from Cuyahoga County Prosecutor Timothy J. McGinty, announced the findings of a grand jury and served to end the official investigation into the death of a twelve-year-old boy with a toy gun at the hands of a police officer. They also articulate the culmination and ultimate finding of a thirteen-month simultaneous criminal and administrative investigation into the conduct of the officers involved. What did the family of Tamir Rice, the general public, and the law enforcement profession learn from this intensive examination of the incident? Only that the officers involved were not criminally culpable nor in substantial violation of their department’s policies when they used deadly force against a twelve-year-old boy. Imagine for a moment that, after an unanticipated death of a person on a hospital operating table, the hospital launched an extensive investigation into what happened and, at the end of the investigation, announced that the surgical team involved did not commit a crime or violate hospital policy in conjunction with the death and then ceased all further inquiry into the incident. Would this be enough for the family of the patient? What would the medical profession learn from this incident and how would similar incidents be prevented or reduced in the future? If this were a pattern of practice, how would it impact the public’s confidence and satisfaction with the hospital?

The Tamir Rice case is certainly not an anomaly. The International Association of Chiefs of Police (IACP) has developed a series of model policies for law enforcement administrators. The current IACP (2012) model policy for officer involved shootings states that:

The investigation of officer-involved shootings shall normally be conducted in two separate
parts and by separate authorities—a criminal investigation and an administrative investigation. The criminal investigation is normally completed by homicide investigators prior to the administrative investigation, which is most often conducted by the department’s internal affairs authority, although circumstances may dictate that concurrent investigations be undertaken (p. 4).

Commenting on these types of investigations, Albert Reiss (1980) argued:

The way a department organizes its review of deadly force incidents is affected by [a] blindness to organizational [and systemic] sources of the use of deadly force. The review focuses on what individuals did and did not do in the encounter in which deadly force was used and not upon what the organization did and did not do or what it might and might not have done (p. 131).

In a similar vein, Bittner (1983) wrote, “Consider what happens when a police officer, by using his firearm, kills or injures someone. Almost invariably inquests are held to determine if the involved officer is criminally or civilly liable for the act. If it is established that he is not liable, the question of the competence of the officer is established” (p. 6). While Bittner remains focused on the actions or “workmanship” of the individual officer(s) involved, he laments department policy and the law as the best, and often the only, measure of police use of deadly force outcomes.

Western culture is ingrained with the notion of personal responsibility (Turner, 1978). According to Reason (1990), “The occurrence of a man-made disaster leads inevitably to a search for human culprits. Given the ease with which the contributing human failures can be subsequently identified, such scapegoats are not hard to find” (p. 216). The police are particularly suited for or, perhaps more accurately, susceptible to single-source blame oriented activities. After all, their very utility within the criminal justice system lies in the ability to identify and assign probable blame to individuals while collecting supporting and exculpatory evidence. It is little wonder that when faced with an organizational crisis like an officer involved shooting, particularly when the shooting is in error, the police resort to the rituals of
accountability and professionalism they know best: criminal and administrative investigations. However, the cost of focusing investigative attention on the culpability of a single actor or small group of actors at the sharp end, rather than taking a more holistic approach, is an institutional and professional blindness to systemic influences (Doyle, 2012).

To compound matters, it has been noted that police departments construct highly formalized structures and rituals that give an external appearance of professionalism and accountability (Crank, 2003; Suchman, 1995; Worden & McLean, 2014). However, as Van Maanen (1973) and others have observed, these structures often have little utility for the day-to-day work requirements of a department’s “street-level bureaucrats” who often find they conflict with or impede their actual work demands and goals (Lipsky, 2010). In order to operate effectively, police departments, as with other institutionalized organizations, have to “de-couple” their symbolic administrative structures from the “technical core” of their street operations (Worden & McLean, 2014). This allows officers to exercise broad discretion in the field with very little supervision and only loose attachment to administrative structures and control (Crank, 2003, p. 188). As a result, officers tend to adjust their everyday practice to the immediate needs and demands of their operational environment (Lipsky, 2010; Muir, 1977; Van Maanen, 1973). This can lead to what Sidney Dekker (2011) called “safety drift” and can result in what Woods et al. (2010) called “brittle” work practices. That is, work practices that are effective and efficient under normal circumstances while at the same time increasing the likelihood for error under similar but slightly different and often unforeseen circumstances. The emphasis on safety in street-level police work, noted by many of the prominent police scholars (e.g. Muir, 1977; Skolnick, 1966; Van Maanen, 1973; Wilson, 1968), can actually exacerbate this drift into brittle practices (e.g. Dekker, 2018).
Murphy’s Law – a popular maxim among law enforcement practitioners – holds that: If anything can go wrong, it will. At first glance, this might seem like a prudent approach to operational safety. However, using the same logic, a police practitioner might assume that if things didn’t go wrong this time, they probably won’t go wrong next time either. The absence of a bad outcome serves as the proof of safe practice and may entrench brittle tactics that are then passed from one practitioner to the next through the oral traditions of field training until it is enshrined as part of the “deformation professionale[sic]” (Van Maanen, 1973, p. 33). According to Hollanagel (2009), a better maxim might be: If anything can go wrong, it usually won’t and, as a result, we learn the wrong lessons from it. These types of adapted work practices often develop out of a necessity to get the job done under the pressures, demands, and conflicting goals of real-world work and, due to the de-coupled nature of law enforcement organizations, can remain largely invisible to administrators and other outside observers. This disconnect between the administration and practice of law enforcement has exasperated researchers and reformers alike, making the “likelihood of achieving significant change seem remote” (Goldstein, 1977, p. 328).

Yet, critical incidents like officer involved shootings, particularly those that result in error, can “produce an unfreezing of previous patterns of organizational behavior, a period in which anything could happen, in which organizations are unusually sensitive to new directions” (Sherman, 1983, p. 99), ideas, and practices. If, as Perrow (2011) said, human error and accidents are truly the “normative and periodic result of entrenched aspects of the work environment,” and if law enforcement organizations take more of a systems based approach to investigating and understanding officer involved shooting errors, rather than the individual blame oriented approach that is currently applied, it would likely provide a window into everyday law
enforcement practice and the systemic vulnerabilities inherent in that practice (e.g. Dekker, 2010; Reason, 1990; Woods et al., 2010). It could also provide valuable information about how to prevent and/or reduce future occurrences. Rather than going to the family and community of a person whose death was the result of an error at the hands of a police officer and telling them that it was a tragedy but that no crime was committed and then ceasing all further investigation, a police chief could go to a family and say, this was a tragedy and we are going to do everything we can to figure out how it happened and keep it from happening again.

Reiss (1980) argued that, due to the relative rarity, there are limits to the value of studying police deadly force encounters as a way of understanding police behavior more generally; I among others (e.g. Doyle, 2012; Shane, 2013), believe police shooting errors – an even rarer phenomena – should be treated as “sentinel events”, similar to the way medicine treats unanticipated deaths in a hospital and aviation treats plane crashes. The National Institute of Justice defines “sentinel events” as “negative outcomes that signal underlying weaknesses in the system or process” and may, if properly understood, “provide important keys to strengthening the system and preventing similar adverse outcomes in the future” (NIJ, 2015, p. 1).

Beyond mere description, the value of a typology lies in its ability to reduce the complexity of equifinality allowing for a closer examination of the individual causal paths to a particular outcome. Typologies also allow us to identify systemic similarities. Bailey (1994) wrote:

Classification procedures allow us to recognize similarities among cases, and group similar cases together for analysis, without having to concentrate on very different cases that may not be of immediate interest. The identification of similarities is the key to medical diagnosis, for example. If we can identify cases as being similar, we can find the persons that suffer from identical symptoms. This done, we are in position to identify the underlying illness. If we are unable to determine such similarities, then the symptoms and the causes go undetected, and the persons suffering from the diseases cannot be identified [or treated] (pp. 12-13).
When it comes to officer involved shooting errors, identifying similar cases allows us to examine the underlying causal influences that lead to those cases and perhaps even develop or ‘engineer’ responses that might prevent or at the very least reduce the number of future occurrences.

While typologies, like all theoretical models, are used to simplify complex phenomena and, in doing so, cannot possibly account for all iterations or combinations found in the real world. This is particularly true, in the case of human error, when combinations of correct action and error are intertwined and perhaps even feed off of each other in rapid succession. However, simplification and categorization typologies provide allow for a closer and more accurate examination of specific types of outcomes within the larger phenomena. I demonstrate the value of this approach with the dispatch priming study, one possible causal path to misdiagnosis shooting errors, and the follow-up muzzle-position study, one possible way to ‘engineer resilience’ into the police response to ambiguously armed individuals. By focusing my research on one specific error type, in this case misdiagnosis errors, I was able to develop a hypothesis about why some of them might occur in the real world and design a study to test that hypothesis. In a similar fashion, by reducing the overwhelming complexity and diversity presented in the consideration of ways to reduce the overall number of officer involved shootings and instead focusing on a possible remedy for a particular type of shooting error, I was able to design a study to test the efficacy of a specific tactic, in this case muzzle-position, designed to reduce the likelihood for misdiagnosis errors.

It should be noted that there are likely many paths to misdiagnosis shooting errors, though the veracity of the available pre-event information and an officer’s interpretation of that information in conjunction with the reality of the unfolding event likely play a central role in most of these errors on the street. With that being said, some may criticize a dissertation
approach that lays out a theoretical typology and then tests only a limited aspect of one category of that typology. However, a primary purpose of typologies is to frame a subset of cases upon which to conduct further analysis (Collier, LaPorte, & Seawright, 2012); and it is fairly conventional for scholars to run deeper analysis and even additional studies on a single categorical subset of cases after developing the larger theoretical typology (e.g. Mutz, 2007).

In addition, some may criticize the comparatively sterile nature of video simulations in comparison to real world deadly force encounters and question the transferability of any findings. However, experimental designs utilizing high fidelity simulations or scenarios, in which experienced practitioners are able to use ergonomically identical equipment, are widely used in both the research of and training for rare and dangerous phenomena in many other high-risk professions including: medicine (e.g., Bond et al., 2007; Cheng et al., 2014; Ziv, Ben-David, & Ziv, 2005) – which has an entire journal devoted to simulation; aviation (e.g., Lee, 2017; Rehmann, Mitman, & Reynolds, 1995); and the military (e.g., Best, Galanis, Kerry, Sottilare, 2013).

In judging the transferability of simulation research and training to the real world, psychologists have long understood that there is a direct relationship between the similarity of the stimulus and task elements – required response – in the simulation to that which is encountered and required in the real world (Galanis, Stephens, Temby, 2013; Thorndike, 1906; Thorndike & Woodworth, 1901). This is known as the theory of identical elements. When the stimulus and response are the “same” in simulation as they are in the real world, one can expect a “high positive” transfer of “knowledge, skills, and abilities” (KSA). When the stimulus is different, but the response is the same, one can expect a “positive” transfer of KSA. When the stimulus is the same, but the response is different, one can expect a “negative” transfer of KSA.
When the stimulus is different and the response is different, one can expect a “neutral” transfer of KSA (Galanis, et al., 2013, pp. 309 - 311). While this research has primarily looked at the transferability of simulation training to real world work environments, it is not a leap to expect the transferability of simulation research to the real world to be bound by similar constraints. This has largely been ignored by scholars conducting “simulator” style research on police use of deadly force “decision-making” using a mouse or keyboard click rather than an ergonomically identical and functionally similar simulated firearm and/or static screen shots with a picture of a weapon or object overlaid rather than the visual stimuli of a human being rapidly pulling an object from a pocket or waistband (e.g., Correll et al., 2014; Johnson, Cesario, & Pleskac, 2018). This was dramatically demonstrated by the differences in outcomes seen in the muzzle-position study. Holding a weapon in slightly different positions dramatically changed the “decision to shoot”. How does clicking a mouse or keyboard change the same decision? A high-fidelity video simulator or highly controlled scenarios that incorporate realistic simulated firearms provide both a similar stimulus, though certainly in a sterile and relatively risk-free environment, and response in comparison to real world encounters and, therefore, likely better transferability.

As Reiss (1980) noted, similar to the difficulties encountered in trying to study how pilots behave during plane crashes or surgeons perform during rare and risky procedures, there are logistical, methodological, and ethical constraints to studying potential police deadly force encounters. High fidelity simulators and scenarios offer a means of studying how professionals interact with the tools and technology they use in the real world and the outcomes of their decision-making under a wide variety of circumstances. While there are certainly still limitations and caution should be taken with any laboratory finding, the results of simulator research have
been used to improve the safety and efficiency of many other high-risk professions and should not be shunned by those who study deadly force encounters.

The typology of police shooting errors I have laid out in this dissertation provides a new way of thinking about, discussing, and understanding police shooting outcomes more generally. If we treat police shooting errors as the ‘normative and periodic result of entrenched aspects of the [police] work environment’ rather than the result of faulty or malevolent individual police officers, then we enhance our ability to detect systemic weaknesses in otherwise accepted practices and can take steps to reduce the likelihood for error in future outcomes. From a research standpoint, by categorizing specific processes (i.e. misdiagnosis, misapplication, misses, and unintentional discharges) that result in police shooting errors rather than on a more general outcome (e.g. police discharging a firearm; deadly force resulting in death), we can improve model specification and begin to understand the causal influences (e.g. implicit and explicit decision processes, tactics, the interface between humans and technology, training) behind each type of shooting error. Understanding these processes can give us insight into the underlying weaknesses found in everyday police practice and clues about how to make these processes more resilient against future errors.
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