



Working Memory and Cognitive Load in the Legal System: Influences on Police Shooting Decisions, Interrogation and Jury Decisions[☆]



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The ability of police and jurors to make informed, unbiased decisions is paramount to the integrity of the legal system. Police and jurors as decision-makers follow procedures ensuring that individuals receive a fair trial from the time of arrest to sentencing. However this process has come under public scrutiny with recent negative media attention focused on police shootings, aggressive handling or interrogation of suspects, and jurors' seemingly biased treatment of minority group members. Most researchers studying factors that motivate police and juror behavior focus on the external influences of decision-making, such as the climate of violence in a neighborhood, or culturally-entrenched criminal stereotypes. Fewer have focused on the cognitive factors that impact the internal decision-making processes. In this review we compile the research on individual differences in cognitive ability (e.g., working memory capacity) and event circumstances (e.g., high emotion, attention load), that influence police and jury decision-making. The majority of studies in this area are laboratory-based which may attenuate the transfer of findings to real-world settings, but cognitive mechanisms engaged in the field are likely similar. Overall, this review suggests that overload of cognitive capacity reduces controlled processing ability, which may work to undermine the reliability of decision-making at all phases of the legal process. Field studies are needed to better understand when decision-makers may be overburdened, and what interventions are most appropriate.

Keywords: Memory load, Police decision making, Working memory capacity, Jury decision making

The ability of police, jurors and judges to make informed and unbiased decisions is paramount to the integrity of our legal system. Police and jurors follow procedures and protocols to ensure that individuals are treated fairly from the time of arrest to the time of sentencing. Factors known to influence the veracity of remembered case facts, such as type of questioning, lineup presentation, and witness instructions (i.e., systems variables), can be controlled by police procedure or laws (Wells, Memon, & Penrod, 2006). Other factors outside the control of the legal system, such as crime scene context, duration of the event, and individual differences of individuals involved (i.e., estimator variables), cannot be controlled by procedure or law, and may have deleterious effects on trial outcomes. Among the factors that vary by individual is working memory capacity (WMC), defined as one's ability to hold information in mind for mental manipulation in the face of distraction. Working memory

capacity is an important factor in making controlled decisions in a variety of contexts (Kane & Engle, 2003; Kane, Bleckley, Conway, & Engle, 2001), including the legal system. Since the legal system involves a wide variety of decision-making circumstances, fair outcomes in many cases may depend on the ability to rely upon controlled, rather than heuristic (i.e., automatic), cognitive processes.

In this review, we will discuss the literature on cognitive load and WMC and how the differences in this measure of cognitive ability potentially impact police shoot decisions, interrogation techniques, and ability to interpret nonverbal cues; and juror decision making and ability to interpret case facts. Notably, testing WMC in applied settings is challenging, as such there are relatively few studies conducted with members of the legal system (e.g., judges, jurors, policemen), and even fewer studies conducted in naturalistic environments (e.g., courtroom, crime

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scene, etc.). However, in examining the existing research, we seek to draw some conclusions regarding cognitive processing issues as they may apply to the legal system, identify places where deficits may contribute to unjust outcomes, and ultimately highlight the need for more focused studies on WMC in the legal context.

Cognitive Capacity

Working memory is the cognitive mechanism that supports active maintenance of task-relevant information during the performance of a cognitive task. It is linked to executive function. Research demonstrates that working memory can be overloaded or taxed by attempting to focus attention on multiple simultaneous tasks (i.e., cognitive load), and so working memory research often tests whether an individual's task performance varies with cognitive load (Unsworth & Engle, 2007). Individual differences in WMC are often indicative of cognitive control ability and of the susceptibility to failures during cognitive tasks. Persons with low working memory capacity (LWMC) have fewer available cognitive resources to regulate behavior and decision-making compared to their high working memory (HWMC) counterparts (Kane et al., 2007; Rosen & Engle, 1998; Unsworth, Schrock, & Engle, 2004). As such, they have more difficulty effectively allocating attention (Engle, 2002, 2010).

When the task at hand allows for subjects to respond using automatic processes (requiring little mental effort), both high and low WMC individuals perform at the same rate (Hinson, Jameson, & Whitney, 2003; Rosen & Engle, 1998). However, research demonstrates differences between HWMC and LWMC individuals when successful task completion requires the suppression of an automatic or heuristic response in favor of controlled processing (more effortful processing). Researchers posit that LWM individuals perform significantly worse on controlled tasks specifically because a limited WMC requires them to over-rely on automatic processes (Rosen & Engle, 1998).

With these findings in mind, we examine working memory in the "wild" as it applies to the various segments of the legal system. Suspect apprehension is the first step of the legal process, which leads into questioning/interrogation, and ultimately a trial. The decision-makers at each juncture of this process influence whether a case is evaluated properly.

Police Officer Decision-Making in the Field

Shooting Decisions

Police officers in the field are required to make controlled decisions regarding when to use their weapon, and the ability of the officer to suppress automatic responses (e.g., shoot under any threat) influences those shoot-decisions. For example, Kleider and Parrott (2009) presented participants with a male target holding either a gun or a neutral object (e.g., cell phone). Participants were to "shoot" (via key press) the target if he was holding a gun, but to withhold firing (via key press) if the target held a neutral object. Results demonstrated that LWMC individuals were more likely to shoot unarmed targets compared to those with HWMC. Authors suggest that LWMC individuals made

more errors because suppressing the automatic shoot response required more processing power than participants had available. This finding suggests that having LWMC increases the likelihood of people, including police (see Kleider, Parrott, & King, 2010), making errors in shoot decisions.

Working Memory Load

Stressful conditions for police officers and how such conditions influence WMC have real-world implications for decision-making, as the wrong decision can carry severe consequences. Numerous studies have examined how reduced WMC impacts decision-making across a variety of contexts, and have found that decision-making is compromised under working memory load because overall processing capacity is reduced (Dilchert, Ones, Davis, & Rostow, 2007; Hinson et al., 2003; Payne, Jacoby, & Lambert, 2004). For example, numerous studies have demonstrated the adverse effects of stress on WMC, which has implications for the potential cognitive loads that police officers might experience in the field (e.g., Joëls, Pu, Wiegert, Oitzl, & Krugers, 2006; Morgan, Doran, Steffian, Hazlett, & Southwick, 2006; Taverniers, Van Ruysseveldt, Smeets, & von Grumbkow, 2010). In one such study, Wood, Vine, and Wilson (2015) had subjects view the name of a color (e.g., blue) in the center of a display with two colored circles on each side of the display. The ink color of the word displayed was either congruent or incongruent with the name of the color displayed as a word. Subjects read the name of the color and shot the colored circle that corresponded to the word, rather than the ink color. Results showed that those with LWMC exhibited reduced shooting accuracy compared to those with HWMC when the word and ink color were incongruent. Those with LWMC then showed even lower accuracy when under the stress of threat from a potential shooter. However, HWMC individuals were not adversely affected by either the incongruent word/color pairings or the threat of being shot. Similarly, using police officers, Taverniers et al. (2010) investigated the effect of stress on working memory processing in a police scenario wherein the officer entered and searched the house of a suspect with a history of violent behavior. The experimental group that was under threat of being shot experienced more subjective anticipatory and subjective distress, causing increased cortisol secretion. Performing under stress (i.e., threat of being shot) acted as a load on WMC, reducing WMC and thereby the capacity with which officers had to make judicious decisions. Negative affect and emotional arousal have also been associated with reductions in WMC. For instance, Kleider et al. (2010) [see Figure 1] found that LWMC police officers who experienced increased negative emotionality while under threat shot more unarmed targets and fewer armed targets compared to HWMC officers (however, see Kleider & Parrott, 2009 for an instance of when emotional arousal did not act as a load on WMC for a college-age sample). Authors suggested that the experienced negative emotionality acted as a load upon working memory. This resulted in poor shoot decisions, because LWMC officers lacked the cognitive resources to engage controlled processing versus automatic processing. Fatigue has also been shown to act as a load on WMC,

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