EVALUATING THE EFFICACY OF STRESS AS A SCREENING TOOL IN VOIR DIRES: ASSESSING ITS EFFECTS ON COGNITION AND THE ABILITY TO RENDER COMPETENT VERDICTS

by

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ABSTRACT

KALYNE BRITTANY LYNCH. Evaluating the efficacy of stress as a screening tool in *voir dires*: Assessing its effects on cognition and the ability to render competent verdicts. (Under the direction of DR. LORI VAN WALLENDAEL)

Prior research has primarily focused on the usefulness of bias scales in *voir dires* (Kassin & Wrightsman, 1983; Jones et al., 2015), yet studies have additionally shown that jurors experience psychosocial stress (NCSC, 1998; Bornstein et al., 2005). The potential of using the Perceived Stress Scale (PSS; Cohen et al., 1983) as a screening tool was evaluated because stress influences a number of cognitive processes related to decision making (Soares et al., 2012; Morgado et al., 2015). Participants (n = 55) were asked to watch trial videos and read evidence summaries. Perceived stress was assessed at the beginning of the study. Jurors were asked to report a verdict and answer questions related to their comprehension. Highly-stressed jurors demonstrated significantly lower comprehension of the trial evidence than did lower stressed jurors, $t(53) = 2.49$, $p = .02$. Other significant relationships were found in relation to verdicts rendered, verdict consistency, and comprehension. Stress may impact different cognitive processes needed to render a competent verdict, though future studies will need a larger sample size to generalize these results.

DEDICATION

I dedicate my thesis work to my family, friends, and a number of others who have supported me through adversity; without them, this would not have been possible:

For my mother and great aunt, whose words of encouragement and acts of loving kindness supported my personal and academic endeavors; for my grandfather, whose humor created countless smiles; for my family friend George, who has been like a father to me.

For my friends, who constantly provided me with reassurance and strength; and for the individuals who held hope for me, who saw the light in me, and helped me in discovering these things for and in myself.

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INTRODUCTION

In the United States, individuals accused of criminal acts have the right to a trial by jury. A jury must listen and make decisions about the evidence brought forth throughout a trial. Jurors decide using inferences and judgments to render a verdict (American Bar Association, 2019). While the responsibility of deciding guilt or innocence rests solely on the jury, the court system has an obligation to ensure that jurors' verdicts are not influenced by external factors. Jury selection research focuses primarily on identifying the influential role of personal biases and beliefs, yet little has been done to understand whether jurors are cognitively capable of rendering competent verdicts. Jurors with deficits in comprehension or cognition have a similar potential as those who are inherently biased to undermine the integrity of a case, as both biases and cognitive capabilities can predispose individuals toward a particular verdict. A shift toward developing screening tools that can identify the prospective jurors who have the ability to comprehend the case and make informed decisions is imperative in order to ensure that juries are composed only of those capable of rendering fair, just, and competent verdicts. The known effects of stress on cognition create a potential to use a perceived stress scale as a screening tool. Stress may impair an individual's ability to comprehend information or correctly apply it to legal standards when deciding their verdicts. In this study, it was hypothesized that stress would affect comprehension, the consistency of the verdict decision with legal standards, and the chance of rendering a competent verdict.

Voir Dire and Jury Screening Tools

The responsibility of juries to render verdicts requires questioning how the court system can best ensure that the jury's decisions are objective, as defendants have a constitutional right to a fair trial. The first attempts at this are made during the *voir dire*. The primary goal of this

process is to create an impartial, non-biased jury out of the venire (jury pool) by allowing the prosecution and the defense to interview prospective jurors. Both sides attempt to uncover any potential biases or other factors, such as pre-trial knowledge or known associations, which may impede a juror from coming to fair-minded decisions by predisposing them toward a verdict of guilt or innocence (Strier, 1999). Most of the research focuses on developing screening tools to more readily help uncover biases and attitudes which has helped in ensuring fair verdicts. However, there is a need to address other factors that more readily affect the capacities and capabilities of jurors to render verdicts, as unbiased jurors may be incapable of making a well-informed or competent decision due to cognitive deficits.

Predominantly, lawyers screen jurors through structured interviews overseen by the trial judge. Lawyers occasionally use other tools, such as questionnaires, to facilitate or expedite the *voir dire*. Pre-trial questionnaires may allow attorneys to screen potential jurors before they arrive for jury duty or during their individual interviews. General questionnaires obtain basic background and demographic information, such as age, gender, occupation, and educational level of prospective jurors. Lawyers may use a second type of questionnaire in certain cases, such as in a high-profile criminal case. These questionnaires typically include questions that target particular knowledge and opinions relevant to the trial, such as prior awareness or knowledge about the case (National Center for State Courts, 1998).

Researchers have sought to develop other tools to screen jurors for biases and identify the ways these attitudes or beliefs may influence verdicts. Kassin and Wrightsman (1983) developed the Juror Bias Scale (JBS), which presumes that verdicts involve the comparison of two beliefs: Probability of Commission (PC), which refers to the subjective likelihood that the defendant committed the crime based on existing beliefs, and Reasonable Doubt (RD), which refers to the

threshold that an individual needs met in order to convict a defendant. In their study, Kassin and Wrightsman (1983) classified and divided subjects into pro-prosecution and pro-defense bias groups based upon their responses. Results showed that prosecution-biased individuals were more likely to convict, asserted a higher probability that the defendant committed the crime, and adopted a less stringent standard of reasonable doubt.

Similarly, the Legal Attitudes Questionnaire (LAQ; Boehm, 1968) and the Revised Legal Attitudes Questionnaire-23 (RLAQ-23; Kravitz et al., 1993) sought to understand the associations of three subscales of legal attitudes - Authoritarianism, Equalitarianism, and Anti-Authoritarianism - with verdict selection. In a validation study using the RLAQ-23 (Kravitz et al., 1993), Jones et al. (2015) found that those high in Legal Authoritarianism were less likely to convict in less severe cases, yet more likely to convict in cases that were more severe in terms of the type of crime committed and its subsequent punishment. The researchers argued that this result was likely due to these individuals relying on the severity of the punishment as a heuristic in determining whether the defendant was capable or culpable of the accused crime.

Smith and Bull (2012) took a different approach to bias research. Their Forensic Evidence Evaluation Bias Scale (FEEBS) examines pro-prosecution and pro-defense bias constructs in order to determine how evidence, and the subsequent valuation of its strength, is likely to be perceived. They initially found that these biases predicted the strength of DNA evidence and ambiguous forensic evidence in a murder case. In a subsequent validation study, they found the same to be true in different types of cases, such as in a robbery trial and in a sexual assault trial. Those with a stronger pro-prosecution bias rated the strength of ambiguous DNA evidence higher, and those with a stronger pro-defense bias were less likely to find the circumstantial evidence compelling or perceive the defendant to be guilty (Smith & Bull, 2014).

Essentially, the vast majority of scales, similar to those outlined above, were developed for juror screenings in order to identify the ways in which individual differences in biases can affect or predict perceptions of trial information or verdicts. Prior research sought to investigate the role of juror characteristics in verdict selection; however, due to difficulties in conceptualizing personality traits, studies related to juror personality traits were abandoned due to a continued lack of significant results. In more recent years, researchers started attempting this work again because of the significant developments in personality research that led to better conceptualizations and ways to operationalize personality. Arguing that the previous abandonment of research related to the influence of personality and personality traits on verdicts was premature, Clark et al. (2007) conducted a study using the Five Factor Model of Personality (FFM; John & Srivastava, 1999, as cited in Clark et al., 2007). Researchers used the English version of the Big Five Inventory (BFI; Benet-Martinez & John, 1998) to measure Openness to Experience, Neuroticism, Extraversion, Conscientiousness, and Agreeableness. They found high levels of extraversion in jurors were associated with rendering "Not Guilty" verdicts, longer deliberation times, and being the foreperson of a jury (Clark et al., 2007).

Shestowsky & Horowitz (2004) took a different approach by examining how the intrinsic motivation of jurors may affect deliberations, thus affecting the outcomes of cases. Citing prior research on the individual variabilities in deliberation participation, they argued that the Need for Cognition (NC) personality characteristic may serve as a potentially useful tool in predicting juror participation because of the way in which it measures the motivation and enjoyment found in thinking. Using the Need for Cognition Scale (NCS; Cacioppo & Petty, 1982), researchers found that those with high NC levels were more likely to contribute throughout deliberations, enjoyed debating, focused more on persuading others, and resisted the strong arguments of other

jurors (Shestowsky & Horowitz, 2004). While NC is an important construct that focuses on the motivation to engage in thought, it does not measure the degree to which these thoughts are well-reasoned or logical. This is noteworthy, as the resistance of high NC jurors to being persuaded, along with their tendency to engage in debates with the motivation to persuade others, may cause illogical or unjust verdicts. This further demonstrates a significant need to create a screening tool that goes beyond assessing biases or personal characteristics.

Competent Verdicts

While researchers have sought to understand ways in which biases or personality traits can be used as predictive tools to screen jurors, there is a general lack of inquiry into screening jurors' capacity to make competent decisions. Finucane and Guillion (2007) defined competent decision-making as the ability to comprehend and integrate information in an internally consistent manner. To do so, individuals must be able to identify the relevance of information presented and inhibit impulsive responses. The Theory of Reason-Based Choice is related to the notion of competent decision-making, often being used in the context of law and case studies. The premise of the theory posits that individuals make decisions that are reasonable, justified, and associated with positive feelings. Furthermore, decisions in the context of this model are thought to be reached by assessing the quantity of evidence that supports the selection of one choice over another (Shafir et al., 1993).

Deciding on a verdict can be seen as a combination of Finucane and Guillion's (2007) conceptualization of a competent decision and a reason-based choice. A competent verdict requires juror comprehension of information presented throughout the trial, the judge's instructions, and the definitions of the crime(s) committed. Jurors must forego making a judgment until the trial is complete, requiring jurors to consistently integrate new information as

it is presented. Additionally, upon completion of the trial, jurors must identify relevant information to justify and render their verdict according to the legal burdens of proof (Black, 1990).

Determining the competency of a verdict cannot rely on outsider judgments of whether it was the "correct" decision. Bornstein and Greene (2011) argue that juror decision making should be assessed in three ways: determining juror comprehension, evaluating the degree to which jurors relied on evidence in determining the verdict, and comparing the verdict selection(s) to the verdicts of expert decision-makers. While juror comprehension and the reliance on evidence are listed separately, there is likely an interaction between these two guidelines. A lack of understanding of any aspect of the trial (e.g. judge instructions, the definition of the crime, etc.) has the potential to inhibit fair verdicts.

Comprehension

The basis of making a competent decision may then be dependent upon an individual's capacity and ability to comprehend information in the trial. Deficits in comprehension could lead to an unjust verdict, as there is the potential for jurors to rely on inaccurate information as they decide on a verdict. Fully understanding all aspects of the trial before deciding if the defendant is culpable is essential to rendering a competent verdict, yet prior research has demonstrated that juror comprehension of a case is typically poor; most jurors understood less than 50% of all aspects of the trial (Bornstein & Greene, 2011). These deficits in comprehension have massive implications, as Lynch and Haney (2000) found that participants who poorly understood the instructions associated with a homicide case were more likely to find the defendant guilty and sentence them to death.

Similarly, it has been demonstrated that individuals who lack motivation or have deficits in cognitive abilities rely on heuristic processing rather than systematic processing when evaluating evidence because it requires fewer cognitive resources (Chen et al., 1996; Chen et al., 1999). Relying on heuristics, such as the representativeness heuristic, is likely to cause jurors to engage with inherently biased prototypes because they compare information in the trial to their pre-existing beliefs or expectations. Greene and Ellis (2006, as cited in Winter & Greene, 2007) found that heuristic use impaired the ability of jurors to comprehend, integrate, and apply evidence to the legal criteria for guilt that is given by the judge.

This research demonstrates the importance of comprehension in decision-making; therefore, it is imperative to research factors that could potentially influence comprehension in jurors. Jurors commonly experience stress, though the reported levels may differ significantly depending on a number of circumstances, such as personal life events, the type of trial they may serve in, and their perceptions of any given situation. The differences seen in comprehension could be associated with the variations seen in reports of stress, as stress is known to affect cognition. Understanding how best to conceptualize stress as it relates to jurors' experiences, and creating an appropriate, measurable conceptualization, has the potential to be useful in screening out jurors who cannot render a competent verdict as a result of stress impacting their cognitive abilities.

Juror Stress

In particular, a large body of research focuses on identifying the sources of stress in jurors (e.g., Kaplan & Winget, 1992; Cusack, 1999; Lonegran et al., 2016). The National Center for State Courts (1998) composed the Jury Duty Survey (JDS), the Jury Environment Scale

(JES), and the Jury Duty Stress Scale (JDSS) to understand jurors' experiences and perceptions of stress. They found that the top sources of stress could be attributed to:

> (1) Deciding on a verdict, (2) jury deliberations and discussions, (3) disruptions to daily routine, (4) fear of making a mistake, (5) violent crimes, (6) jury selection (*i.e. voir dire*/jury panel), (7) crime against children, (8) answering questions in front of other people, (9) sentencing a criminal defendant and (10) dissension/differences among jurors. (NCSC, 1998, as cited in Bornstein et al., 2005)

A follow-up study conducted by Bornstein et al. (2005) similarly found that disruptions to daily life and trial complexity accounted for the most variance in their data. "Trial complexity" was conceptualized by using questions that pertained to comprehension, such as difficulty understanding law, deciding guilt, and understanding testimony. They also found that external stress was positively correlated with longer criminal trials, and over half of jurors perceived that other jury members experienced significant levels of stress (Bornstein et al., 2005). Chopra (2002) found similar results in terms of the sources and experiences of stress. However, jurors in her study additionally reported beliefs that stress effected the thought processes and decisions of other jurors, which further supported the findings of prior studies (e.g., NCSC, 1998; Bornstein et al., 2005).

Research suggests that while the majority of jurors experience mild to moderate levels of stress as a result of their service, a minority experience severe traumatic stress (Lonegran et al., 2016). The severity of stress experienced by jurors is often linked directly to the type of case, as trials involving violence crimes or the death penalty have been associated with more traumatic stress symptoms (NCSC, 1998; Bornstein et al., 2005). Some studies focused specifically on identifying the direct impacts of a trial on the psychological and physiological stress experiences

of jurors. In a study by Robertson et al. (2009), 23% of the 64 jurors surveyed reported moderate to severe levels of stress post-trial. Antonio (2008) surveyed 1198 jurors; 60% expressed that they had been emotionally upset as a result of jury duty, with 36% of these individuals subsequently reporting physiological symptoms of stress, such as insomnia and a loss of appetite.

Primarily, studies have focused on identifying the sources of stress after jury service is completed, which has resulted in identifying the extent to which jurors are experiencing stress only after a trial is complete; however, researchers identified a variety of external stressors, such as disruptions to daily routine (NCSC, 1998), likely to impact jurors at the outset of a trial. Therefore, it is important to begin to study juror stress before a trial begins in order to understand if it impacts their experiences of serving on a jury, their stress level after the trial is complete, and their ability to make competent decisions. The stress associated with external sources, such as situations in their personal lives, likely impacts their ability to render a competent verdict because stress affects cognitive aspects and capabilities implicated in decision making.

Cognitive Effects of Stress

Significantly, juror research tends to overlook the influential role of stress on decision-making. Jurors self-reports of stress in themselves, and other jurors, have been identified post-trial. This is a profound limitation, as stress is experienced by jurors preceding and throughout the entirety of the trial. Numerous studies, some of which are outlined below, have investigated the effects of stress on cognition, finding that it can affect multiple cognitive processes associated with decision making.

A study conducted by Soares et al. (2012) specifically sought to understand the effects of stress on behaviors and decision-making. Subjects were exposed to a prolonged stressful situation and compared with controls on an instrumental behavioral task. Chronically stressed

individuals were biased due to an increase in relying on habits in making their decisions, rather than goals. Furthermore, they displayed an insensitivity to the valence or consequence of the outcome. Using fMRI imaging, they demonstrated that maladaptive levels of stress affected cognition and behaviors by modulating the structure of brain networks and processes, such as those in the Prefrontal Cortex (PFC). However, they re-tested the group that had been exposed to chronic stress weeks after they had ended the exposure to the stressful situation, and found that these changes were reversible once stress had been decreased (Soares et al., 2012). These results are noteworthy, as they support the plausibility of using stress as a screening tool. A stressor may negatively impact cognition, causing a prospective juror to be judged as unfit to serve; however, this same individual could become capable of serving at a different point in time if the source of significant stress that caused cognitive deficits is removed.

There are also known differences in how stress can impact cognition. While chronic stress is known to impair decision-making, individuals may benefit from more acute levels of stress or stressors. Acute stress has been found to improve performance depending on the complexity of the task, the intensity of the stressor, the level of arousal, and individual characteristics (Bourne & Yaroush, 2003). While chronic stress has been found to impair memory consolidation and retrieval, acute stress can promote memory formation and consolidation (Morgado et al., 2015). These findings directly coincide with the proposition of the Yerkes-Dodson Law (Yerkes & Dodson, 1908). In their work, Yerkes and Dodson (1908) discussed the idea that there is an optimal zone of arousal, which tends to fall in the middle of the full range of arousal states; therefore, significantly low levels of stress or significantly high levels of stress would likely impede cognitive processes, whereas mid-range levels of stress could facilitate cognitive processes. Studies on the effects of stress in the context of decision

making have further supported the Yerkes-Dodson Law (Yerkes & Dodson, 1908). Results from this research found there to be a curvilinear relationship between stress and performance in cognitive tasks (Preston et al., 2007; Eysenck 1975a, 1975b); stress was found to have an inverted-U relationship on decision-making performance, as increased stress improved performance up to a point and began to deteriorate toward the more extreme levels of stress.

Other studies have specifically assessed the impacts of stress in decision-making and cognitive tasks. Wemm and Wulfert (2017) assigned their participants to either a social stressor condition or a control condition to study the effects of stress on decision-making in an ambiguous situation. Those in the social stressor condition were asked to quickly prepare for and participate in a mock job interview; individuals in this condition had delays in learning and made less advantageous choices in the decision making task than their counterparts. Additionally, these participants had higher heart rates, higher levels of skin conductance, and more negative affect than those in the control task (Wemm & Wulfert, 2017).

Psychosocial stressors may then cause impediments in cognitive processes or impairments in pre-existing cognitive abilities. Deterioration in both working memory and long-term memory, as well as decreased attention spans and increased error rates in tasks, have also been directly attributed to the experience of psychosocial stress. Baradell and Klein (1993) specifically found that performance quality in an analogies task was affected by the interactions of aversive life event stress, state anxiety, and sensitivity to body sensations (private body consciousness). They noted an increased reliance on dysfunctional strategies in participants' engagement with the task, such as temporal narrowing, in order to compensate for the negative influences of stress on cognition. These findings can likely be explained by the effects of stress on the Prefrontal Cortex (PFC). As previously mentioned, the brain networks and processes

within the PFC are altered by stress (Soares et al., 2012); cognitive processes associated with the PFC include knowledge intensive-reasoning, perceptual reorganization, as well as in the detection of conflict and the subsequent construction of a resolution (Sousa, 1998; Sousa & Almeida, 2012). Therefore, stress directly affects and often impairs the processes or abilities needed to make decisions.

This brief overview of research demonstrates that stress experienced by jurors is likely to affect their cognition, thus impairing the abilities and processes needed to make a competent decision. Screening jurors for all of the cognitive aspects that are needed to decide a verdict is not feasible; however, because stress has been shown to impact decision making, it has the potential to be a useful screening tool in the *voir dire*. It is possible that the variations in the levels of stress of potential jurors may be associated with their comprehension of their trial or their ability to consistently apply information in their decision; therefore, assessing stress may help screen out jurors who are unable to render competent verdicts.

Conceptualizing Stress and its Relation to Juror Verdicts

Jurors in the outlined studies predominantly attributed their stress to psychosocial sources. As a result of these findings, it is important to rely on psychosocial conceptualizations and measurements of stress that may be used in screening jurors during the *voir dire* process. Lazarus and Folkman's (1984, as cited in Berjot & Gillet, 2011) definition of psychological stress can be used as a framework in understanding the importance of screening jurors' stress reactivity. They posit that the relationship that an individual has with the environment, and their subsequent appraisals, creates demands that may tax or exceed their available resources or coping mechanisms. This definition encapsulates the idea that multiple sources of stress could be perceived in a way that would max out their cognitive load.

Perceptions or appraisals of stressors vary from person-to-person. Each individual has a unique set of coping skills as it relates to stress, as well as different life experiences, which likely influence the amount of stress that can be caused by any particular situation; therefore, it is important to focus on a conceptualization of stress that accounts for these variations in the appraisals of potential stressors in order to better determine the effects it can have on jurors' cognition. Cohen et al. (1983) developed the Perceived Stress Scale (PSS), which assesses the degree to which situations in one's life are perceived as stressful. Their scale creates a composite score of psychological stress based on social and interpersonal appraisals of stressors. This encompasses Lazarus & Folkman's (1984, as cited in Berjot & Gillet, 2011) conceptualization of stress because it gives individuals the opportunity to appraise the stress experienced by certain aspects of their environments.

Research has demonstrated that jurors experience stress as a result of personal sources (NCSC, 1998) and sources directly related to the trial (Bornstein et al., 2005; Chopra, 2002). The differences in appraisals of these psychosocial stressors will lead to variations in the experiences of stress. Stress is directly implicated as an influential factor in a number of cognitive processes (e.g., Soares et al., 2012; Morgado et al., 2015); however, because there are differences in the perceptions of stressors, simply identifying the psychosocial sources of stress will not help in determining whether certain sources directly impact jurors' cognition. Therefore, it is important to understand how jurors perceive or appraise stress, as their overall level of stress is likely to be a better predictor of cognitive deficits than assessments of which types or causes of stress are present in their environments. Furthermore, because stress is known to affect processes related to decision making (Wemm & Wulfert, 2017), it is important to measure overall levels of perceived stress because this has the potential to affect their ability to render competent verdicts.

The Present Study

The present study sought to expand prior studies that have focused on developing screening tools to aid in the *voir dire* process. By seeking to understand if the Perceived Stress Scale (PSS; Cohen et al., 1983) can be used as a screening tool, it fills in a gap in research related to the impacts of stress on the cognition of prospective jurors and their ability to render a competent verdict. It was hypothesized that perceived stress would affect comprehension of the trial, the consistency of the verdict rendered with legal standards, and whether the reported verdict was competent. There was the potential for the nature of the relationship between stress and these variables to be curvilinear or linear. The Yerkes-Dodson Law (Yerkes & Dodson, 1908) posits the idea that there is an optimal zone of arousal, which stress may follow. In this case, low levels and high levels of stress could have negatively impacted the ability to render competent verdicts. A second possibility, however, was that jurors could have benefitted from lower levels of stress, as this may have enabled them to more effectively attend to the trial due to a lighter cognitive load; this had the potential to show that only increased, higher levels of stress negatively impacted comprehension and the abilities needed to make a competent decision regarding the culpability of the defendant.

METHODS

Participants

Recruitment began at the beginning of July. All participants were required to have been at least 18 -years -old in order to participate, and were asked to self-identify if they met the following additional inclusion criteria, which are requirements for serving on a jury in the United States**:** that they were a U.S. citizen and that they had not been charged with a felony nor were they awaiting trial for a felony charge. There were 86 respondents, 31 of whom were excluded from analyses due to insufficient completion time (< 30 minutes, determined by the pilot study data) or incomplete responses. Overall, 55 participants were recruited through online convenience sampling due to time constraints and a worldwide pandemic (COVID-19). Of these 55, 31 were undergraduate students at the University of North Carolina at Charlotte enrolled in psychology courses during the summer semester; these students were recruited through the psychology department's SONA online system and were given credit for their participation. Of the remaining participants, 13 were recruited through social media recruitment posts on Facebook and Instagram, six were recruited through an email or listserv, and five indicated that they had been recruited in some other way. Participants were not given compensation if they were recruited through these methods.

There were 42 female participants, 12 male participants, and one who preferred not to disclose their gender. Participant ages ranged from 18 to 73, with an average age of 32 (*SD* = 14.75). Participants were asked to indicate whether they had been diagnosed with depression, anxiety, or ADHD; 25 participants responded that they had been formally diagnosed, 23 indicated that they did not have one of these diagnoses, six felt that they had one of these

diagnoses but had not been formally diagnosed, and one participant did not wish to answer. A summary of participant demographics can be found in Table 1.

Material and Measures

Trial Materials

Videos used in the study were edited from a real criminal trial, *CA v. Sommer (2007)*, available through CourtTV's website. In this case, the defendant was accused of First Degree Murder by poison for financial gain. The prosecution claimed that the defendant had poisoned her husband with arsenic in order to obtain his $250,000 life insurance policy. Concrete and circumstantial evidence was brought forth by the prosecution and the defense. Both sides made cogent arguments with evidence provided and through the use of witness testimonies, thus creating a trial of moderate complexity. Four videos were created from this trial: opening statements by the prosecution and the defense; the 911 call made by the defendant on the morning of her husband's death; the prosecution's closing statements; and the defense's closing statements. Each video was approximately five minutes long, except the video for defense's closing statements was approximately 10 minutes long; this was done to balance the amount of time given to the evidence and arguments presented by the prosecution and the defense, as the 911 video had been entered in as evidence by the prosecution. The researcher developed a summary of the main points and arguments posited by each side, which was provided to participants.

Additional materials were developed by the researcher. A set of instructions was given to participants that provided them with information about what to expect and how to navigate the study. The second set of instructions was given after the case videos and summaries had been viewed. These were instructions on rendering a verdict that were created from the set of

instructions given to the jury by judge at the conclusion of the real criminal trial. These materials can be found in the Appendix.

Perceived Stress

The Perceived Stress Scale (PSS; Cohen et al., 1983) is composed of 10 items that measure the degree to which one appraises situations as stressful. The questions ask participants to identify how often they had certain feelings or experiences in the past month, such as how often they had felt angry or irritated because of unexpected events and how often they felt that they were able to cope or handle personal problems. Items are rated on a 5-point Likert scale with 0 = *Never*, 1 = *Almost Never*, 2 = *Sometimes*, 3 = *Fairly Often*, and 4 = *Very Often*. PSS scores were calculated by reverse scoring items four, five, seven, and eight, and then summing the scores of the 10 items altogether. The potential range of scores was from 0 to 40, with higher scores indicating higher levels of Perceived Stress. PSS scores were used to place participants into one of three groups: Low Stress, Moderate Stress, or High Stress. Based off of the findings discussed in Cohen and Janicki-Deverts (2012), participants who scored 0 to 8 were placed in the *Low Stress* group (more than one standard deviation below the mean of the norming group), those who score from 9 to 23 were placed in the *Moderate Stress* group (within one standard deviation of the mean of the norming group), and those who scored 24 or above were placed in the *High Stress* group (more than one standard deviation above the mean of the norming group). The PSS (Cohen et al., 1983) has been shown to have adequate internal reliability: where α = .78 was found in one sample and α = .91 was found in the other two samples, respectively (Cohen & Janicki-Deverts, 2012). It has been also been demonstrated that the PSS has both predictive and concurrent validity, as it is correlated with other constructs such as depression and social anxiety,

yet it is also a better predictor of typical outcomes in question than life even scores (Cohen et al., 1983).

Verdict Rendered

One question asked participants to record their verdict after viewing the case. For the purpose of understanding Verdict Consistency, responses were scored as (1) *Guilty* and (0) *Not Guilty*.

Legal Burdens of Proof

The Legal Burdens of Proof (LBOP) are standards in legal proceedings that are requirements that must be met in order to convict a defendant (i.e., the defendant is innocent until proven guilty in the court of law). Generally, there are three primary standards that comprise the LBOP that must be met in order to convict a defendant (Black, 1990):

1. Beyond a Reasonable Doubt: This standard requires that the evidence is fully satisfies a guilty verdict to a moral certainty.
2. Clear and Convincing Evidence: This standard requires that the facts asserted by the prosecution throughout the trial have a high probability of being true.
3. Preponderance of Evidence: This standard requires that the prosecution provides more evidence in its favor than the defense.

It was important to understand whether participants gauged all of the three LBOP to be satisfied, as the congruence between the LBOP and the Verdict Rendered aided in understanding whether the participant's verdict was consistent. The researcher developed the three questions, found in the Appendix, that coincide directly with each of the three standards outlined by Black (1990). LBOP was scored as follows: (1) *LBOP Satisfied* = 3 "Yes" Responses and (2) *LBOP Not Satisfied* = any other combination of responses.

Verdict Consistency

Verdict Consistency (VC) was determined by assessing the congruence between the Verdict Rendered (VR) with the Legal Burdens of Proof (LBOP). This variable was scored as either (1) *Consistent Verdict* or (0) *Inconsistent Verdict*. A *Consistent Verdict* had two separate fulfillment possibilities: VR Guilty and LBOP Satisfied, and, VR Not Guilty and LBOP Not Satisfied. Any other combination was scored as an *Inconsistent Verdict*.

Comprehension

Participants were asked seven questions created by the researcher that directly tested their understanding of evidence and information presented in the trial videos and in the two summaries of the arguments and main points of the Prosecution and the Defense (see the Appendix for these summaries). The researcher ensured that there were no leading questions; the effects associated with these types of questions are known to influence or alter memories (Loftus, 2005), which may affect juror perceptions of evidence or the trial. For the purpose of determining verdict competency, comprehension was assessed based on the total number of questions answered correctly, and was scored as follows: (2) *Full Comprehension* = seven questions correct, (1) *Partial Comprehension* = one to six questions correct, and (0) *No Comprehension* = zero questions correct.

Verdict Competency

This was assessed by using the previous constructs outlined above: Comprehension and Verdict Consistency. Using the definition of a competent decision constructed by the researcher, which was informed by Finucane and Guillion (2007), Bornstein and Greene (2011), and the theory of Reason-Based Choice (Strier, 1999), there were two possible scores: (1) *Competent Verdict*: Full Comprehension and a Consistent Verdict or (0) *Incompetent Verdict*: Partial

Comprehension, or No Comprehension, or an Inconsistent Verdict (the presence of any of these, with or without the others, indicated an *Incompetent Verdict*).

Pilot Study Material Testing

A small pilot study was conducted in order to assess the materials developed by the researcher. There were 44 respondents, though one was excluded due to incomplete responses; this left 43 participants for data analyses. All of the participants were psychology students at the University of North Carolina at Charlotte. Ages ranged from 18 to 33, with an average age of 22. It was determined that there was enough variability within the pilot data to support the goals of the current study. Stress scores (M = 19.5, SD = 15.34) ranged from 6 to 29 and comprehension scores (M = 5.59, SD = 1.69) ranged from 3 to 7, demonstrating that there were no floor or ceiling effects present. The verdict measurements similarly demonstrated variation, as there were 24 “Guilty” verdicts and 19 “Not Guilty” verdicts. Additionally, the mean time of completion was 38 minutes and 8 seconds, indicating that participants were spending an appropriate amount of time on the study.

Procedure

Participants were given instructions that informed them that they were being asked to play the role of a juror. They were instructed that their role would be to render a verdict after watching videos and reading information from a criminal trial. Participants were asked to complete the 10-item Perceived Stress Scale (PSS; Cohen et al., 1983) before viewing trial information.

Following the completion of the PSS (Cohen et al., 1983), participants were asked to watch the four trial videos and read the summaries of the arguments made by the prosecution and defense. Following the last video, the next page in the survey included a set of instructions about

how to render their verdicts, based directly off of the instructions that were given to jurors in the real criminal trial. The instructions included how to interpret evidence, what the charge was, and what must have been present in order for the participants to find the defendant guilty. After reading the instructions, participants were asked to report their verdicts and answer three questions about the legal burdens of proof. These questions asked participants to indicate whether they were entirely convinced that there was proof the defendant was guilty, whether they believed that there was a high probability that the facts asserted by the prosecution were true, and whether the prosecution had more convincing evidence than the defense.

Following the verdict questions, participants answered seven questions that assessed their comprehension of the case. The questions were of moderate complexity and asked about information that was presented in the trial summary, such as the potential motive of the defendant. Questions assessed comprehension of evidence and claims made by both the prosecution and the defense to ensure that the participant understood the arguments of both sides.

The final section completed by participants included five demographic questions. Following the demographic questions, participants were debriefed about the entire nature and purpose of the study. Information and resources were presented to participants in case they had experienced emotional distress as a result of their participation. A graphic of the full procedure and order of materials can be seen in Figure 1.

RESULTS

Stress

Stress scores (M = 17.55, SD = 5.57) were used to place participants into *Low*, *Moderate*, and *High* stress groupings in order to test the hypothesis that there was an optimal zone of stress that facilitated cognitive performance needed for verdict competency, as informed by the Yerkes-Dodson Law (Yerkes & Dodson, 1908). The percentages of competent verdicts were 50% for those in the *Low Stress* group (n = 4), 41.9% for those in the *Moderate Stress* group (n = 43), and 12.5% for those in the *High Stress* (n = 8) group. As seen in Figure 2, the data did not suggest a curvilinear relationship nor was their adequate data to test for this hypothesis. A small sample size in the *Low Stress* group (n = 4) prevented chi-square tests from being valid or significant. In order to mitigate some of the effects of sample size on the results, and due to differences seen in the *High Stress* group between these other two stress groups, the researcher combined the *Low* and *Moderate* stress groups into a single category; therefore, participants with stress scores of 0 to 23 were placed in the *Lower Stress* group and those with scores of 24 or above were placed into the *Higher Stress* group. All subsequent analyses used this alternate grouping of stress, as this created fewer cells that were missing the minimum expected values in chi-square analyses. A summary of the chi-square analyses can be found in Table 2.

Verdict Findings and Stress

Overall, there were 27 *Not Guilty* verdicts rendered and 22 *Guilty* verdicts rendered. A chi-square test was to determine if stress was associated with the verdicts rendered. The results of the test indicated a significant relationship, $\chi^2 = 5.53$, $p = .02$. The *Lower Stress* group (n = 47) found the defendant guilty 12.5% of the time while the *Higher Stress* group (n = 8) found the defendant guilty 49.1% of the time.

Verdict Consistency and Stress

The relationship between verdict consistency and stress was assessed using a chi-square test. The results indicated that there was no significant relationship between stress and the consistency of verdicts, $\chi^2(1) = .03$, $p = .88$. There were 6 *Inconsistent Verdicts*; 83.3% came from the *Lower Stress* group and 16.7% came from the *Higher Stress* group.

Comprehension and Stress

The relationship between comprehension and stress was tested using an independent-samples t-test. There was a statistically significant relationship found between stress and total comprehension scores, $t(53) = 2.49$, $p = .02$. The average score for the *Lower Stress* group was 5.95 ($SD = 1.28$) and the average score for the *Higher Stress* group was 4.63 ($SD = 1.99$). Of the participants that had full comprehension, 95.8% were in the *Low Stress* group. These findings indicated that those with higher levels of stress were less likely to fully comprehend the trial. A summary of the number of comprehension questions by stress groups can be found in Table 3.

Verdict Competency and Stress

A chi-square test was used to test the hypothesis that stress would show a direct relationship with verdict competency. There were no statistically significant results, χ^2 (1) = 2.62, $p = .12$; however, there was a trend seen in the data. Only one participant from the *Higher Stress* group ($n = 8$) rendered a *Competent* verdict. Participants in the *Lower Stress* group ($n = 47$) had more variability, with 20 rendering a *Competent* verdict and 27 rendering an *Incompetent* verdict.

Other Findings

After initial testing, the researcher conducted additional analyses to help with in better understanding the trends seen in prior results.

Only six verdicts were found to be *Inconsistent*; these were all of which were a result of participants responding *Guilty* and indicating that they had not been convinced beyond a reasonable doubt (Question 1 of the "Legal Burdens of Proof"). An independent samples t-test was used to assess whether there was a relationship between age and verdict consistency. While not significant, the test indicated a trend such that the mean ages associated with *Inconsistent* verdicts were lower ($n = 6$, $M = 21.5$, $SD = 3.83$) than the mean ages associated with *Consistent* verdicts ($n = 49$, $M = 33.09$, $SD = 15.1$), $t(53) = -1.86$, $p = .07$.

There were 34 verdicts found to be *Incompetent* and 21 verdicts found to be *Competent*. Of those that were found to be *Incompetent*, only 9% ($n = 3$) were because their verdict was *Inconsistent*. Another 9% ($n = 3$) were due to the verdict being *Inconsistent* and the participant having only partial comprehension. Most of the *Incompetent* verdicts were due solely to deficits in comprehension (82%, $n = 28$).

A one-way Analysis of Variance (ANOVA) was conducted to understand the relationship between a mental health diagnosis and comprehension. Results initially indicated a statistically significant result, $F(3,51) = 3.02$, $p = .04$; however, upon further inspection, only one participant responded that they preferred not to disclose their diagnosis. That participant had a significantly lower comprehension score than the means of the other responses to this question in which it was being compared to. After excluding this case, there was no statistically significant relationship, $F(2,50) = .194$, $p = .82$.

A Pearson correlation was run to assess the relationship between stress and age. It was found that there was a marginally significant negative correlation, $r(53) = -.26$, $p = .06$. This indicated that stress was likely to decrease with age. An additional independent samples t-test was used to determine if there was a relationship between age and the consistency of verdicts.

There was a marginally significant difference in the average age between *Inconsistent* verdicts (M = 21.5, SD = 3.83) and *Consistent* verdicts (M = 33.08, SD = 15.11), $t(53) = -1.86$, $p = .07$. This indicated that younger individuals were more likely to have their verdicts judged to be *Inconsistent*.

DISCUSSION

Overview

The results did not indicate that there was a direct relationship between stress and the competency of verdicts nor was there sufficient data to allow testing of the hypothesis, informed by the Yerkes-Dodson Model (Yerkes & Dodson, 1908), that moderate levels of stress would facilitate optimal performance. This may have been due to an inadequate sample size, as there were not enough observed "low stress" values to be able to test for any significant relationships. Given the limited sample size, stress was re-grouped into "Lower" and "Higher" stress groups for subsequent data analyses.

Inconsistent verdicts rendered in this study were rare; however, only one of the six of inconsistent verdicts was from a highly stressed individual. There was a statistically significant relationship between the stress groupings and comprehension. Individuals with lower levels of stress were significantly more likely to have full comprehension than those highly stressed. Subsequently, deficits in comprehension accounted for the reason that most verdicts were judged to be incompetent. This indicated that stress may not directly impact both elements of a competent decision in the same way.

A potential explanation for the difference seen is that these two parts of competent decision making required different aspects of cognition. A consistent decision required individuals to select the verdict that coincided with their beliefs about whether the evidence satisfied the three burdens of proof, whereas the comprehension questions focused on knowledge acquisition of trial-relevant information. These two constructs that composed verdict competency required different sets of cognitive processes and domains of knowledge.

In assessing verdict consistency, the researcher was able to examine whether an individual's decision used logic or whether it was based on another factor. A consistent verdict required congruence between the verdict rendered and whether the individual believed that the legal burdens of proof were satisfied; therefore, a consistent verdict would have required logically applying beliefs about the three standards, such as being convinced beyond a reasonable doubt, in selecting a verdict. Participants may have relied on biases or heuristics, instead of using legal definitions, to inform their decision if their verdict was found to be inconsistent. The prototypes used to make a decision would have been more familiar to the individual and thus would have facilitated more consistency between their responses to the questions about the legal burdens of proof and the verdict that they rendered; therefore, heuristic use or a bias reliance could explain why there were so few inconsistent verdicts.

The comprehension questions required a different set of cognitive processes, such as mechanisms related to knowledge acquisition and memory, because they asked directly about trial-specific knowledge that was unfamiliar. It is likely that increased stress would inhibit the cognitive processes needed, such as attention and working memory, which would have resulted in problems with encoding and retrieval. This is supported by the finding that only one highly stressed individual demonstrated full comprehension of the trial.

Furthermore, post-hoc data analyses indicated that it was plausible that verdict consistency was better explained by age rather than stress in this sample. It was found that there was approximately a seven year difference in the average age between those whose verdicts were judged to be competent and incompetent. This demonstrated that it was age that accounted for the inconsistencies seen in verdicts. This is further supported by the pilot study conducted in which there were 10 inconsistent verdicts in a smaller sample which was comprised solely of

students and had a lower mean age. A potential explanation for this finding is that the Pre-Frontal Cortex (PFC) is not done developing until an individual is in their mid-20s (Arain et al., 2013). The lack of development of the PFC in the younger participants in this study may have contributed to impulsive responses, an increased reliance on heuristics, or a reliance on "gut feelings" as they made their decisions. All of the inconsistent verdicts were a result of rendering a "Guilty" verdict and responding that they had not been convinced beyond a reasonable doubt. Increased heuristic use, or deciding based on feelings, may have caused a less stringent standard of "reasonable doubt" to be used in their decision-making. The discrepancy seen could also be accounted for by deficits in the abilities associated with the PFC, such as knowledge-intensive reasoning (Soares et al., 2012).

These findings indicate that it is important to understand how personal characteristics, such as age, may interact with consistency, comprehension, and competency; prior research has demonstrated that personal characteristics are likely to influence biases and juror decisions (e.g., Clark et al., 2007). Stress seemed to predispose participants toward their verdict selection, as highly stressed individuals were more likely to report a verdict of "Not Guilty." Additionally, highly stressed individuals tended not to have full comprehension. This countered the results from a study by Lynch and Haney (2002) that found that those who poorly understood the instructions were more likely to find a defendant guilty. A potential explanation for this is that there may be a difference in stress levels between those who are "death qualified" and those who are not. The participants in Lynch and Haney's (2002) study were able to sentence the defendant to death; therefore, because it was found all but one participant in the higher stress group in this study found the defendant "Not Guilty," it is possible that the composition of "death qualified" juries includes more jurors with lower levels than higher levels of stress.

These differences seen may also be a result of stress impacting comprehension of completely different aspects of a trial, which was discussed above. Lynch and Haney (2002) specifically focused on jurors' understanding of instructions. Comparing the responses to the questions about the legal burdens of proof and reported verdict did test for some comprehension of instructions, such as the instruction about only finding the defendant "Guilty" if they were convinced beyond a reasonable doubt; however, all of the questions used for the operationalization of comprehension in this study assessed only participants' understanding of information of the specific criminal trial that was presented. Therefore, it is possible that stress affected the comprehension of instructions and the facts specific to the trial differently.

Limitations and Future Directions

While there were some statistically significant results, these should be interpreted with caution. The sample was composed of significantly more females than males, and over half of the participants had been recruited from UNCC's SONA system. Additionally, convenience and snowball sampling were used due to time constraints and the constraints imposed by a worldwide pandemic (COVID-19). The combination of these factors did not generate a representative sample, nor was the sample size adequate for some analyses. While efforts were made to improve external validity by asking participants to self-identify that they met juror criteria and by using real trial videos in the study, the sample limits external generalizations.

The statistically significant results found between stress and comprehension, as well as comprehension and verdict competency, may be related to other known influential factors related to jury service. Jurors were not screened for biases, which are known to affect conviction rates and personal standards of "reasonable doubt" (Kassin & Wrightsman, 1983), and the interpretation of evidence (Smith & Bull, 2012). Similarly, personality characteristics were not

accounted for. Traits such as extraversion (Clark et al., 2007) and Need for Cognition (Shestowsky & Horowitz, 2004) have been show to impact juror participation. Future studies should attempt to screen for biases using pre-existing scales (e.g. Juror Bias Scale; Kassin & Wrightsman, 1983) and known personality traits that affect verdicts in order to assess the extent to which stress or these other factors interact with one another or account for variabilities in data.

A profound limitation in prior jury stress research studies (e.g. NCSC, 1998; Bornstein et al., 2005, etc.) is that juror stress and the sources of stress were only accounted for post-trial. This study addressed one of these limitations by assessing the overall level of perceived stress at its outset; however, participants were not asked to disclose the most significant stressors present in their lives. Identifying these sources may have helped in determining whether they were more chronic or acute in nature. These types of stress are known to impact cognition differently (Bourne & Yaroush, 2003; Morgado et al., 2015) and knowing the type that participants were experiencing more may have helped in interpreting the data. However, the sources of stress would have differed significantly than those of other studies, because of the nature of this study. Potential jurors typically have additional sources of stress at the outset of a trial that are mostly acute in nature, due to the requirements of jury service. NCSC (1998) found that the third leading cause of stress related to jury service was “disruptions to daily life”; however, this study did not create a similar source of stress in jurors. Future studies could mitigate this weakness by asking participants to come into a lab and simulate a *voir dire*. Doing this would create a similar stressor reported by jurors because this would create some disruption to an individual’s daily schedule.

The trial and materials used created a degree of ambiguity, which is supported by there being an almost even split between the two verdicts (27 “Not Guilty” and 22 “Guilty”). The case contained circumstantial and direct types of evidence; however, in order to create a study with a

time length that would be more likely to garner complete responses, the materials used presented only the opening and closing statements, the 911 clip that had been entered in as evidence, and summaries of the evidence and main arguments by both parties. It is likely that not including any witness testimonies or expert witness testimonies may have impacted the results. Jurors must make their own interpretations of the veracity of the testimonies of witnesses. Future studies should seek to find ways to incorporate most aspects of a trial, and different types of cases, in order to understand how stress may impact cognitive processes, such as interpretations or perceptions of the evidence.

This study specifically asked questions related to the trial to measure comprehension; this is a notable weakness because this did not assess participants' understanding of legal terms, procedures, instructions, etc. While there were few inconsistent verdicts, it is possible that this was a result of individuals basing their decisions off of misinformed definitions of the crime or instructions. In addition to assessing whether a juror understood materials presented throughout a trial, the inclusion of questions that ask about relevant legal terminology could help in better understanding if stress impacts comprehension of these aspects differently.

The focus was specifically on individual jurors; however, verdicts are rendered by a jury composed of 6 to 12 members. Future studies should look to assess how stress impacts jury deliberations. Prior research has demonstrated the usefulness of other scales, such as the Big Five Inventory (BFI; Benet-Martinez & John, 1998), in understanding what may occur in deliberations (Clark et al., 2007). Different levels of perceived stress may impact the discussions and interactions between jurors. Additionally, measuring stress at the outset of a trial could help in understanding which jurors are more likely to be selected.

Conclusion

This study incorporated novel ideas about juror decision making and how to conceptualize verdicts. The results indicated that stress may impact verdict competency through comprehension. The findings also indicated that stress may impact a juror's cognition in different ways, as participants with higher levels of stress were able to render verdicts that were consistent with the legal burdens of proof, but seemed less able to comprehend specific details of the evidence. This indicated that stress may impact cognitive processes that are related to interpreting or attending to the trial; however, the sample size was too small for these findings to be generalizable. This study represents a first step toward understanding the potential of using a stress scale in *voir dire[s]*. Repeating this study with a larger, more representative sample is the next step in discovering the true nature of the relationship between stress, cognition, and competency as it relates to juror decisions.

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Table 1

Demographics Grouped by Lower and Higher Levels of Stress

	Lower Stress	Higher Stress	Total
Gender			
Female	36	6	42
Male	10	2	12
Prefer Not to Disclose	1	0	1
Recruitment			
SONA	27	4	31
Social Media	12	1	13
Email	3	3	6
Other	5	0	5
Diagnosis			
Yes	22	3	25
No	21	2	22
Not Formally	3	3	6
Prefer Not to Disclose	1	0	1
Race/Ethnicity			
White/Caucasian	23	3	26
Hispanic/Latinx	4	1	5
Black/African-American	8	0	8
Asian or Pacific Islander	4	1	5
Other	5	2	7
Prefer Not to Disclose	3	1	4

Table 2

Frequencies and Chi-Square Results for Verdict Variables and Comprehension in Lower and Higher Stress Groups

	Lower Stress		Higher Stress		
	n	%	*n*	%	χ^2
Verdict Rendered					5.53^{*b}
Guilty	27	57.4	1	12.5	
Not Guilty	20	42.6	7	87.5	
Verdict Consistency					$.03^{a}$
Inconsistent	5	10.6	1	12.5	
Consistent	42	89.4	7	87.5	
Comprehension					3.69^{**b}
Partial	24	51.1	7	87.5	
Full	23	48.9	1	12.5	
Verdict Competency					2.62^{b}
Incompetent	27	57.4	7	87.5	
Competent	20	42.6	1	12.5	

*$p < .05$, **$p < .01$ from significance

Note. Letters were used to indicate the number of cells where the number of observed cases were less than the expected value. A chi-square value with a subscript of "*a*" indicated that one cell had less than the expected count. A chi-square value with a subscript of "*b*" indicated that there were two cells that had less than the expected count.

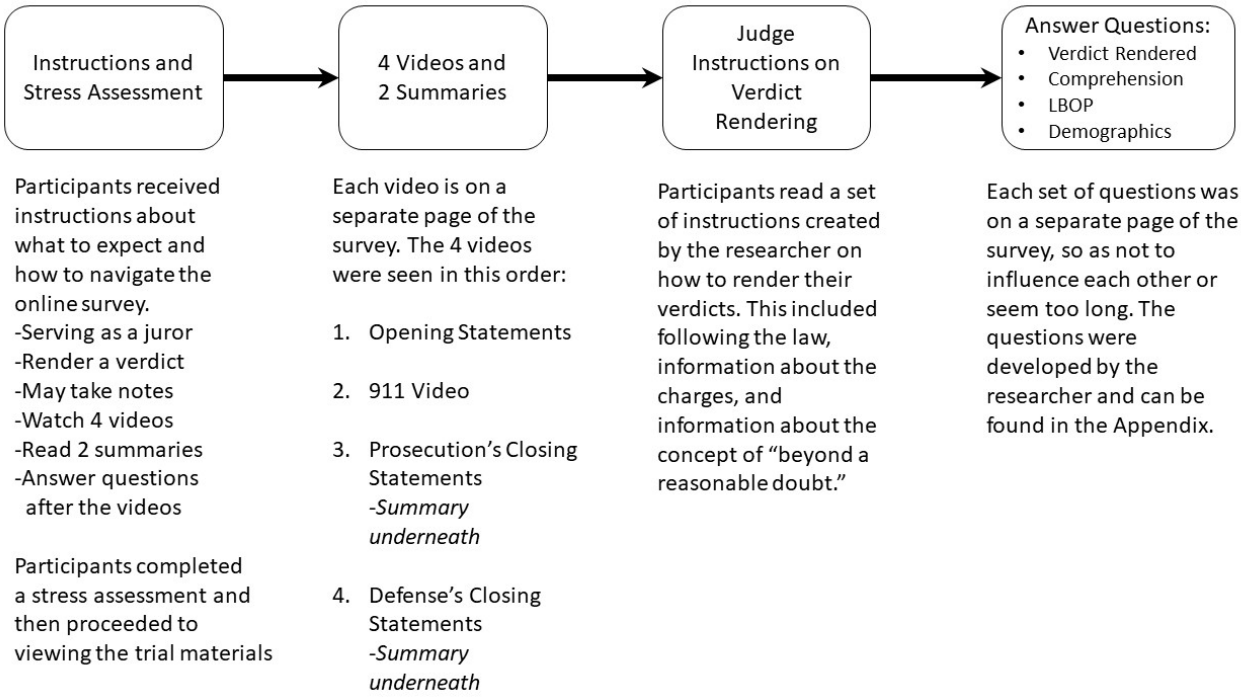
Table 3

Frequencies and Percentages of the Number of Comprehension Questions Correct by Lower and Higher Stress Groups

	Lower Stress		Higher Stress		Total	
	n	%	*n*	%	*n*	%
2 Correct	1	1.8	2	3.6	3	5.5
3 Correct	1	1.8	1	1.8	2	3.6
4 Correct	5	9.1	0	0	5	9.1
5 Correct	8	14.5	1	1.8	9	16.4
6 Correct	9	16.4	3	5.5	12	21.8
7 Correct	23	41.8	1	1.8	24	43.6
Total	47	85.5	8	14.5	55	100

Figure 1

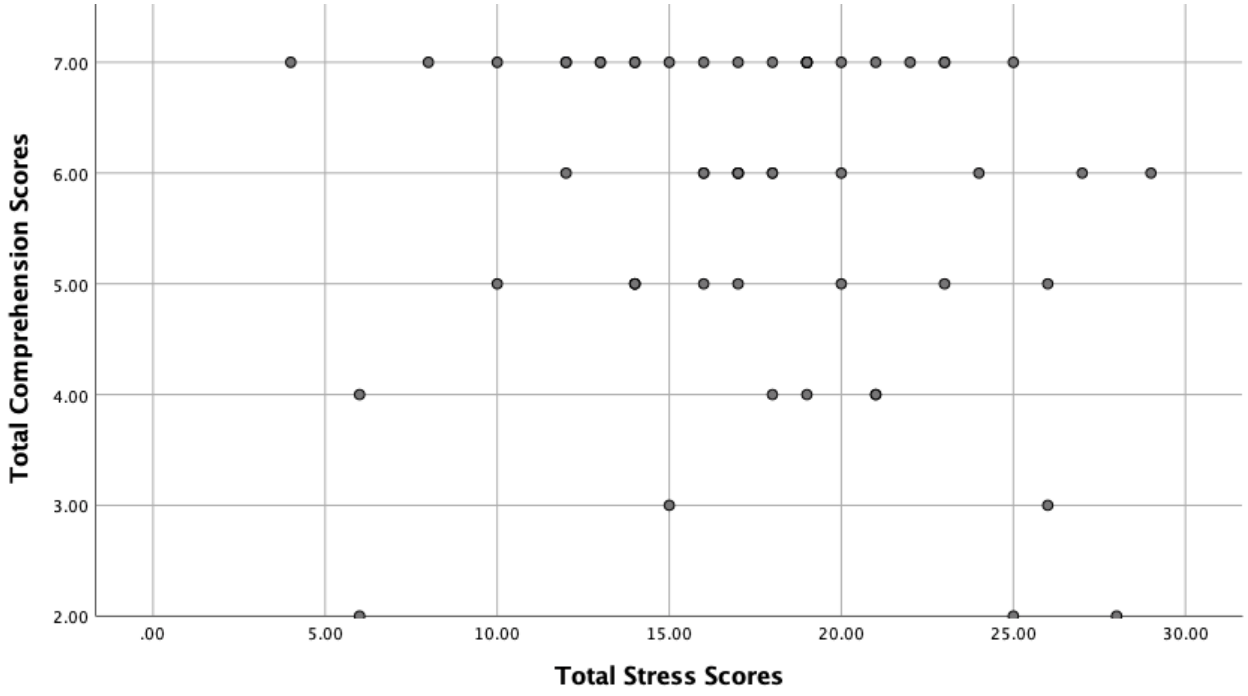
Flowchart of the Study's Procedure



Note. The flowchart depicts the study's procedure after informed consent had been obtained. Debriefing is not depicted; this occurred after the demographic questions had been answered.

Figure 2

Association Between Perceived Stress and Comprehension Scores



Note. Each dot represents individual scores of stress by comprehension that were seen in the data. Repeated scores are not shown. The data suggested that there was not a curvilinear relationship between stress scores and comprehension scores.

APPENDIX: MATERIALS CREATED BY THE RESEARCHER

Instructions Given Before Beginning the Study (and after Informed Consent)

You are being asked to serve as a member of the jury in a trial. Your role is to make a decision about the guilt or innocence of a defendant. You will be asked to make your verdict after watching videos and reading information from a criminal trial. You are asked to watch four videos in their entirety and to read two summary statements in their entirety.

You are allowed to take notes. If you wish to do so, you may get the necessary materials before going on to the next step in this study. If you wish to take notes, please use only pen/pencil and paper.

You will be asked to complete an assessment before watching the videos and reading the summaries. After you have watched the videos and read the material, you will be asked to render your verdict and answer some questions.

After you have read these instructions and you are prepared to continue, you may go to the next page. Participation in this study is completely voluntary and you may exit the browser at any time if you would like to withdraw.

Once you begin, please complete the study in one sitting and do not open any other browsers.

Summarizing Information Given to Participants

Prosecution's Main Arguments and Supporting Evidence

The defendant has been charged with 1st Degree Murder by Poison for Financial Gain.

The prosecution outlined that the defendant and her husband had been experiencing financial difficulties. They provided evidence that approximately 2 weeks before his death, the trust fund that they had been relying on to supplement their income had run out and they brought witnesses to the stand that testified that the couple often had to borrow money from friends and family. On the morning of his death and in the days following his death, multiple witnesses testified that she had made inquiries into about the money that she could expect as a result of his death.

The year prior, the defendant's husband made her the sole beneficiary of his life insurance policy. Testimony and evidence provided demonstrated that she was aware of this policy and its amount of $250,000.

Evidence was provided that the defendant wanted breast augmentation surgery. She had two separate consultations, the first approximately two weeks before her husband's death, and the second occurred the week prior to her husband's death. A Valentine's Day Card from her husband was brought forth as evidence. In the card, her husband suggested that she may be able to have the surgery the following year as a present.

Credit card transactions indicated that weeks prior to his death, the defendant opened an account on a single's dating website. In the months directly following his death, witnesses testified that the defendant had multiple intimate relationships with other men and that she was often out partying. During this time, she had breast augmentation surgery.

The tissues of the defendant's husband were sent to a lab approximately 6 months after his death due to some questions about the cause and nature of his death. Heavy metal tested was conducted. It indicated that the defendant had over 1,000 times the normal amount of arsenic in some tissue. All of the tissues tested indicated that there were lethal levels of arsenic present. It was noted that though the defendant's husband was sick days prior to his death, many of the symptoms noted in the medical records from these visits were symptoms of arsenic poisoning.

Defense's Main Arguments and Supporting Evidence

The defendant is presumed innocent unless proven guilty in the court of law.

The defense brought forth evidence that depicted the extent of emotional distress the defendant experienced due to the death of her husband. The defense brought forth witnesses that stated that the defendant was appropriately and extremely upset about her husband's death when they arrived to the home after she had called 911. The 911 call was brought forth as evidence, and they noted that in the call she asked if she could do CPR and that the call included statements by the defendant in which she did "not know what she would do without him."

Credit card information was brought forth by the defense. They showed that the credit card was in both the defendant's name and her husband's name. The defense claimed that the defendant's husband would have known about the single's dating website account due to the charge being placed on their joint credit card. A Valentine's Day card given days prior to the death of the defendant's husband was brought forth as evidence. The defense stated that the defendant's husband was aware of her desire to have breast augmentation surgery due to the statements he made in the card, making it known that the defendant was not attempting to have the surgery secretly.

The defense countered the statements made by the prosecution and witnesses about the defendant and her husband's financial difficulties. They argued that the defendant was making inquiries into finances directly after his death due to the need to take care of her three children. Evidence was brought forth that about how the defendant used some of the money from the life insurance policy. The defense argued that she was generous with the money. Evidence showed that she paid for a meal for a friend. Additionally, testimony demonstrated that she paid off a loan for a car that she had been using. It was noted that the car was not in her name; instead, it was in the name of a friend who had taken out the loan in order to help the defendant. The defense used the evidence of the car loan and witness testimony to argue that finances were not a problem, because the defendant and her husband had friends and family that could provide them with money if needed.

Witnesses that had seen the defendant's husband in the days prior to his death noted that he had felt sick after eating an egg roll. The defense argued that the symptoms that the defendant's husband had experienced could have been attributed to food poisoning from the egg roll. The defense brought forth evidence that there were discrepancies with the arsenic testing, such as varying levels of arsenic in each tissue sample, a lack of information about who had custody of the tissues leading up to the testing, and that it was the first time conducting this testing for the forensic evaluator. The defense pointed to lack of a direct link between the defendant and arsenic due to a lack of financial records or information regarding the purchase of arsenic.

Judge Instructions Prior to Rendering a Verdict

You must follow these instructions and consider them altogether.

You must decide on what the facts are and it is up to you to decide what happened based only on the evidence and information provided to you. You may not use the internet or any other resources to aid you in any part of this process. You may use your notes if you took any.

Do not let bias, sympathy, prejudice, or any public opinions influence your decision. You must follow the law as you make your decision.

The defendant has been charged with 1st Degree Murder, by poison, for financial gain. You must find the defendant guilty if it has been proven beyond a reasonable doubt that the defendant murdered by using poison and that the death would not have occurred without the act. Arsenic is classified as a poison and can kill by its inherent properties. In determining if this is proven beyond a reasonable doubt, you must have an abiding conviction that the charge was true by examining all of the evidence. In examining the evidence, you must determine which facts and evidence are the most convincing and likely to be true. If the evidence does not prove her guilt beyond a reasonable doubt, she must be acquitted.

Questions Used to Determine Verdict Consistency

Reported Verdict Question

1. Please report your verdict on the charge of Cynthia Sommers with 1st Degree Murder by poison for financial gain:

Guilty

Not Guilty

Three Research Questions Used to Determine Legal Burden of Proof

1. Are you entirely convinced that there was proof that the defendant was guilty of the crime that they were accused of?

Yes

No

2. Was there a high probability that the evidence and facts provided by the prosecution was true?

Yes

No

3. Did the prosecution have more convincing and probable evidence than the defense?

Yes

No

Questions Used to Assess Comprehension

Note: Correct responses have been highlighted in bold. Participants received the questions without any indication of the correct answers.

1. What did the prosecution argue was the primary motive for murder?

   A - The defendant murdered her husband to get out of her unhappy marriage with him.
   B - The defendant murdered her husband for financial gain.
   C - The defendant murdered her husband because Todd did not treat her children from a prior marriage well.
   D - The defendant murdered her husband because she no longer wished to be a military wife or live on the military base.

2. What did the defense propose could be a reason (or reasons) that the defendant was innocent?

   A - Todd had been sick prior to dying of natural causes.
   B - The prosecution could not determine if she had purchased arsenic.
   C - She asked financial questions so close to his death because she was concerned about taking care of her children and making ends meet.
   D - All of the above were proposed reasons of innocence made by the defense.

3. What did the heavy metal testing determine about the arsenic levels in Todd's tissues?

   A - There was no arsenic present in any of the samples.
   B - There was some arsenic present, however, the levels were normal.
   C - There were lethal levels of arsenic present, however, the arsenic levels varied in each of the tissues.
   D - There were lethal levels of arsenic present and the arsenic levels were similar in all of the tissues

4. What did the prosecution state could be a reason (or reasons) that the defendant's behavior was suspicious?

   A - She partied excessively after his death and had multiple sexual encounters with men.
   B - Having an account on an online singles dating website prior to his death.
   C - She asked multiple questions about money, finances, and taxes directly after his death.
   D - All of the above are reasons that the prosecution stated could be reasons her behavior was suspicious.
   E - None of the above are reasons that the prosecution stated could be reasons her behavior was suspicious.

5. What did the defense claim were concerns about the arsenic testing?

A - It was the evaluator's first time conducting the heavy metals and arsenic testing.
B - The levels of arsenic varied in all of the tissue samples substantially.
C - There was no chain of custody associated with the tissue samples.
D - All of the above were concerns raised about the arsenic testing by the defense.
E - None of the above were concerns raised about the arsenic testing by the defense.

6. Did the defendant know about Todd's life insurance policy before his death and did she know how much the policy was worth?

A - Yes, she was aware of his policy and how much it was worth.
B - Yes, she was aware of his policy; however, she was unaware of how much it was worth.
C - Yes, she was aware of his policy; however, she thought it was worth a different amount than its actual value.
D - No, she was unaware of his policy and its worth.

7. Was Todd aware that the defendant wanted to have breast augmentation surgery?

A - Yes, he was aware, and he did not approve of it.
B - Yes, he was aware, and he was okay with her moving forward with the surgery immediately.
C - Yes, he was aware, but felt that they could not afford it around the time of his death.
D - No, he was unaware of her desire to have breast augmentation surgery.