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# Belief perseverance: The staying power of confession evidence

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**Belief perseverance: The staying power of confession evidence**

by

**Curt Craig More**

A thesis submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of  
MASTER OF SCIENCE

Major: Psychology

Program of Study Committee:  
Stephanie Madon, Co-Major Professor  
Max Gyll, Co-Major Professor  
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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2018

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**DEDICATION**

This thesis is dedicated to my family. To my wife, Kimberly More, for her love and encouragement. To my parents, Susan More, Bruce More, and Joseph Kitzke, for their support, both emotional and financial. To the grandparents I have lost, Kay Brayshaw, Joe Kitzke, and George More, for their unconditional love. And to the grandparents I still have, Don Brayshaw, Evona Kitzke, and Pat More, for their unwavering love and belief in me.

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**ABSTRACT**

This research examined whether a criminal confession causes people to discount subsequently encountered exculpatory evidence. Participants ( $N = 238$ ) read a crime report across two phases and judged a suspect's guilt after each phase. In phase 1, the crime report presented circumstantial evidence indicative of the suspect's guilt. In phase 2, exculpatory evidence indicative of the suspect's innocence was added. The crime report manipulated whether participants received confession evidence during phase 1 (confession–early) or phase 2 (confession–late). In addition, some participants publicly committed to their phase 1 guilt judgments prior to receiving the crime report in phase 2 (high commitment), whereas others did not (low commitment). Results provided some support for the hypothesis that a confession biases the way that people use subsequently encountered exculpatory evidence to judge a suspect's guilt; under conditions of low commitment, participants more often rendered guilty verdicts in the confession–early conditions than the confession–late conditions. The results are discussed in terms of police investigator and juror decision-making.

## CHAPTER 1. INTRODUCTION

It is well-established that a confession, even a false one, is a highly incriminating form of evidence (Kassin, 2008; Leo & Drizin, 2010). Confession evidence is more powerful than eyewitness and character testimony (Kassin & Neumann, 1997), and can even attenuate the formidable power of DNA evidence under some conditions (Appleby & Kassin, 2016). Jurors will sometimes convict defendants on the basis of confession evidence alone, and they do not appropriately discount confessions that they believed were obtained under duress or that were ruled inadmissible (Kassin et al., 2010; Kassin & Sukel, 1997; Smalarz, Madon, Yang, Guyll, & Buck, 2016). Not surprisingly, jury conviction rates for false confessors are very high, ranging from 73% – 81% (Drizin & Leo, 2004; Ofshe & Leo, 1997).

The power of confession evidence stems, in large part, from the widespread belief that suspects, motivated by self-interest, would not confess to crimes that they did not commit unless subjected to physical abuse or torture (Kassin & Wrightsman, 1981). However, psychological research findings and proven false confession cases reveal this belief to be a misconception. Innocent suspects do sometimes confess to crimes that they did not commit. In fact, false confessions are a leading cause of wrongful convictions in the United States, contributing to the convictions of nearly 28% of defendants who were later exonerated by DNA evidence (“DNA Exonerations Nationwide,” 2016).

Although the widespread belief that false confessions only arise under egregious circumstances is not true, it hints at the way that error and bias may contribute to the power of confession evidence. That is, once people learn that a suspect has confessed, they may develop such a strong belief in the suspect's guilt that they fail to appropriately adjust their guilt judgments in response to subsequently encountered evidence that points to the suspect's

innocence. In psychological terms, a confession may elicit belief perseverance – a cognitive bias in which people cling to their original beliefs even when the basis for the belief has been discredited (Nestler, 2010). The idea that belief perseverance may contribute to the power of confession evidence has been hypothesized by legal scholars (Findley & Scott, 2006), but has not been empirically demonstrated.

### **Error and Bias**

Social psychology has long emphasized the role that error and bias play in perception. This emphasis dates back at least as far as the 1940s and 1950s when *New Look in Perception* researchers proposed that people's motivations, needs, goals, and expectations colored their perceptions of reality (Bruner, 1992; Erdelyi, 1974). Bruner and Goodman (1947) provide a classic illustration of this theoretical perspective. They presented 10-year-old children with coins of varying values. In general, the children tended to overestimate the size of the coins, and this tendency increased as the value of the coins increased. For example, children overestimated the size of a penny by approximately 15%, whereas they overestimated the size of a quarter by more than 35%. These results showed that the children's perceptions of the coins were influenced by their internal psychological states.

As a result of findings such as these, social and behavioral scientists turned their attention to the way that biases may distort judgment and decision-making. Kahneman and Tversky (1973), for instance, introduced numerous cognitive biases and heuristics, and in doing so called into question the prevailing view that people rely on formal statistical rules to make social inferences. For example, they argued that rather than using base rates to make judgments, people instead have a tendency to make judgments on the basis of similarity, that people infer the frequency of events according to the ease with which examples come to mind, and that people

are not sufficiently sensitive to the impact of sample size on probability judgments. The idea that people rely on heuristics when making judgments sparked considerable interest in cognitive biases and the way in which these biases may distort perception.

### **Belief Perseverance**

Of particular importance to the current research is the cognitive bias of belief perseverance. As previously noted, belief perseverance is the tendency for people to cling to their initial beliefs even after the foundation supporting those beliefs has been discredited (Nestler, 2010). Numerous studies in the basic psychological literature have demonstrated this effect, with most relying on what is commonly referred to as the *debriefing paradigm*.

The debriefing paradigm involves two groups of participants who receive conflicting information about a topic. Participants in both groups subsequently learn that the information they received is false, after which they make judgments relevant to the discredited information. Although logically, participants should not use the discredited information to make their judgments, the literature consistently shows that they do. For example, following a discrimination task, participants who received positive feedback rated themselves as having greater discrimination abilities than participants who received negative feedback despite that all participants had earlier been informed that the feedback was false (Ross, Lepper, & Hubbard, 1975). Similarly, participants who were initially informed of a positive relationship between risk-taking and being a successful firefighter continued to rate risky behavior as diagnostic of firefighting success despite having already been debriefed to the false nature of the relationship (Anderson, Lepper, & Ross, 1980).

A key strength of the debriefing paradigm is that it permits a decisive test of the belief perseverance effect. That is, because the information on which participants based their initial

beliefs was completely discredited, any subsequent between-group difference in judgments that is in the direction of the discredited information shows that participants inappropriately used the discredited information. However, it is important not to equate the paradigm with the effect. Even though the debriefing paradigm involves the complete discrediting of information, the concept of belief perseverance does not. Failure to revise a belief when the information on which it was based has been partially discredited is also irrational and also constitutes belief perseverance. In addition, restricting the concept of belief perseverance only to situations involving the complete discrediting of information raises conceptual problems. Most notably, it would mean that beliefs that persevered in the context of less than completely discredited information could not, by definition, indicate belief perseverance. This would be the case even if the degree of discrediting was as high as 99%, and even though the underlying psychological process responsible for the effect is indistinguishable from the process that operates when the degree of discrediting is complete.

In fact, psychological theory never conceptualized belief perseverance as restricted to situations involving the complete discrediting of information. For example, in the opening paragraphs of Ross et al.'s (1975) seminal article on the belief perseverance effect, the authors provided examples that specifically involved the partial discrediting of information: a teacher attributes a student's disengagement to lack of motivation, but later learns that the student is undernourished and sleep deprived; a woman infers romantic interest from a man who gives her flowers, but later learns that the man's father is a florist. In both of these examples, the new information *partially* discredited the foundation upon which the original beliefs were based by way of offering alternative explanations. The logical response would be for the teacher and the

woman to revise their beliefs in a manner commensurate with the degree of discrediting. A failure to do so would indicate belief perseverance.

Although Ross et al. (1975) recognized that belief perseverance can occur in the context of partially discredited information, their experiments used the debriefing paradigm as a way to avoid the complexities created by partially discredited information. However, subsequent to the publication of their article, a number of studies have examined belief perseverance in the context of partially discredited information. These studies, which investigated the belief perseverance effect with a wide-range of topics (e.g., capital punishment, judgments of a suspect's guilt, attitudes toward Richard Nixon) underscore the point that belief perseverance occurs under a broader set of conditions than the debriefing paradigm permits (Carretta & Moreland, 1982; Marksteiner, Ask, Reinhard, & Granhag 2011; Lord, Ross, & Lepper, 1979).

### **The Power of Confession Evidence**

People's tendency to show belief perseverance may help to explain the power of confession evidence. Once a suspect has confessed, people tend to develop an initial expectation or presumption of guilt (Kassin & Neumann, 1997). Moreover, because of the widespread belief that innocent suspects would not confess to crimes that they did not commit, it stands to reason that people would likely hold this initial presumption of guilt quite strongly (Kassin & Wrightsman, 1981). This is not to say that people necessarily presume innocence in the absence of a confession, but rather that a confession increases the certainty or strength with which people presume guilt. Further, even though it is not irrational for a confession to have this effect (a confession should produce a stronger presumption of guilt than if no confession was present) it can still have negative consequences for suspects' outcomes.

For example, a confession that is obtained early in a police investigation may cause detectives to discount subsequently discovered exculpatory evidence more than they would have had the confession been obtained at the same time or after the exculpatory evidence. High profile, proven false confession cases illustrate this hypothesized effect. The police and prosecutor in Jeffrey Deskovic's case continued to believe in the validity of his confession even after learning that DNA recovered from the victim excluded him (Leo & Drizin, 2010). Similarly, the police and prosecutor in the case of the Central Park Five continued to believe in the validity of the confessions made by the five teenagers accused of the brutal attack and rape of a jogger in New York City's Central Park even after discovering that their confessions were riddled with inconsistencies, did not correspond to witness statements, and that DNA recovered from the victim did not implicate them (Weiss, Watson, & Cynwyd, 2013).

Although proven false confession cases such as these provide anecdotal evidence that a confession can lead people to cling to the belief that a suspect is guilty despite the subsequent discovery of exculpatory evidence, only one study has empirically tested this effect (More, Madon, Gyll, & Atkinson, 2015). Participants in the study read a crime report across two phases, rating the suspect's guilt at each phase. In phase 1, the crime report described circumstantial evidence that pointed toward the suspect's guilt. In phase 2, exculpatory evidence that pointed toward the suspect's innocence was added. All participants also received confession evidence, but half of the participants receive it during phase 1, whereas the other half received it during phase 2. Therefore, all participants ultimately received identical evidence, with the only variation being when the confession evidence was presented.

The authors hypothesized that participants who received confession evidence before the exculpatory evidence would be more likely than participants who received it alongside the

exculpatory evidence to presume that the suspect was guilty. However, the findings did not support this hypothesis. Instead, the findings indicated that the timing of the confession evidence did not influence participants' judgments of the suspect's guilt at phase 2. Consideration of the study's methods suggests two factors that may have contributed to this non-significant effect.

### **Ambiguity**

One aspect of the study that may have contributed to the non-significant effect was the nature of the exculpatory evidence. Because More et al. (2015) relied on clearly unambiguous exculpatory evidence, participants may have had no reason to doubt the suspect's innocence. A large literature in psychology indicates that ambiguity increases people's susceptibility to cognitive biases (Tversky & Kahneman, 1974). In fact, this is a central thesis of the literature on error and bias – i.e., that people use heuristics when making probabilistic judgments. Therefore, it is possible that participants in More et al.'s study might have been more likely to discount the exculpatory evidence in favor of their initial guilt judgments had it been ambiguous rather than clearly unambiguous. According to this reasoning, the hypothesized belief perseverance effect may be more likely when a confession is discredited by ambiguous, rather than clearly unambiguous, exculpatory evidence.

### **Commitment**

A second aspect of More et al.'s (2015) procedures that may have contributed to the non-significant belief perseverance effect is that participants were not particularly motivated to maintain their initial guilt judgments. This possibility is consistent with a core theme that runs throughout the psychological literature; namely, that motivational factors influence people's beliefs and behaviors. For example, Cialdini (1984) outlined six key principles of social influence, one of which was the principle of commitment and consistency. According to this

principle, a central motive that influences people's behavior is the need to behave consistently with their previously established beliefs (Cialdini, 1999). If people commit to a belief or behavior, then they are more likely to maintain that belief or behavior at a later point in time (Cialdini, 1984), an effect that has received strong empirical support (Baca-Motes, Brown, Gneezy, Keenan, & Nelson, 2013; Dickerson, Thibodeau, Aronson, & Miller, 1992).

The principle of commitment and consistency may also be relevant to understanding how belief perseverance operates in the context of criminal investigations. Due to internal and external pressures to capture perpetrators and solve crimes, police investigators may be motivated to maintain their beliefs in a suspect's guilt after obtaining a confession. Put differently, after police investigators have obtained a confession from a suspect, they may be disinclined to revise their judgments about the suspect's guilt even if they later discover exculpatory evidence. Therefore, the hypothesized belief perseverance effect may partly depend on people's motivation to maintain their initial beliefs, with stronger effects occurring under conditions of high commitment.

### **Research Overview and Hypotheses**

This research tested two hypotheses. First, it tested the hypothesis that people who encounter confession evidence before encountering exculpatory evidence are more vulnerable to belief perseverance than people who encounter confession and exculpatory evidence simultaneously. Second, it tested whether this predicted effect is moderated by people's commitment to their initial beliefs about a suspect's guilt, with stronger effects occurring among people who are highly committed. The research tested these hypotheses in the context of an experiment that manipulated whether participants encountered confession evidence before or at

the same time as exculpatory evidence, and whether or not they publicly committed to an initial judgment of a suspect's guilt prior to receiving exculpatory evidence.

## CHAPTER 2. METHOD

### Power Analysis

The statistical software G\*Power was employed to estimate the appropriate sample size necessary to detect main effects of confession timing and commitment, plus an interaction effect involving these variables (Faul, Erdfelder, Lang, & Buchner, 2007). The analysis was conducted using the conventional power value of  $1-\beta = 0.80$  at an alpha level of  $\alpha = .05$  (Cohen, 1992). The only known previous study examining confession evidence and belief perseverance had non-significant results with a moderate effect size, Cohen's  $f = .21$  (More et al., 2015). Moreover, studies such as Dickerson et al. (1992) have found a moderate effect of commitment on behavior, Cohen's  $f = .27$ . With these studies in mind, a moderate effect size, Cohen's  $f = .25$ , was used to estimate the sample size (Cohen, 1988). Using this estimate, the power analysis indicated that a sample size of 179 would be required to achieve the desired level of power. The sample size of the current research exceeded this minimum.

### Participants

Participants ( $N = 250$ ) were Iowa State University students who participated in exchange for partial fulfillment of a course requirement. Eight participants were excluded for failing two key attention check questions, and four experimental sessions were terminated due to a computer malfunction. Therefore, there were 238 participants in the final sample, including 84 men and 154 women between the ages of 18 and 50 with a mean age of 19.46 years. There were 199 European Americans, 10 Asian Americans, 9 Latin Americans, 8 African Americans, 1 Native American, and 11 participants who identified as multi-ethnic. All participants were native English speakers. This study was approved by the Institutional Review Board at Iowa State University (Appendix J).

## Design

Participants were randomly assigned to a 2 (phase: phase 1 vs. phase 2)  $\times$  2 (confession timing: early vs. late)  $\times$  2 (commitment: high vs. low) mixed-model experimental design, with repeated measures on the factor of phase (see Table 1). Confession timing manipulated whether participants received confession evidence before (phase 1) or at the same time as (phase 2) exculpatory evidence. Participants in the confession–early conditions received the confession evidence before the exculpatory evidence (phase 1), whereas participants in the confession–late conditions received the confession and exculpatory evidence simultaneously (phase 2). Commitment manipulated the degree to which participants were motivated to maintain their phase 1 judgment of a suspect's guilt. Participants in the high commitment conditions publicly revealed their phase 1 guilt judgments to the experimenter and signed a form confirming their judgment immediately after phase 1 and prior to beginning phase 2. Participants in the low commitment conditions neither publicly revealed nor confirmed their phase 1 guilt judgments prior to beginning phase 2.

## Crime Report

A fictional crime report (see Appendices A, B, and C) described an assault and theft in which a male assailant struck a woman on the head from behind and stole her purse as she was entering a car in a parking lot. The victim was unable to describe the perpetrator, and footage from a surveillance video was too grainy to be useful. Based on the circumstantial evidence, Kyle James became the prime suspect. During an interrogation, James confessed to the crime, but later recanted his confession, claiming that he had been at a local restaurant when the crime occurred. His alibi was supported by a credit card transaction and a questionable eyewitness identification.

## Measures

### Guilt Judgments

Participants judged the suspect's guilt by responding to three questions: (1) *"Based on the information presented in the criminal report, if you had to choose, would you say that Kyle James is more likely to be guilty or innocent?"*, with response options 1 (*guilty*) and 2 (*innocent*), (2) *"How confident are you in your decision?"*, with endpoints 1 (*not at all confident*) and 10 (*very confident*), and, (3) *"How likely do you think it is that James is guilty?"*, with endpoints 1 (*very unlikely*) and 10 (*very likely*). Participants responded to these questions twice, once during phase 1 and then again during phase 2 (see Appendix D). These variables are subsequently referred to as verdict, confidence, and likelihood of guilt.

### Perceptions of Impartiality

Two questions assessed the degree to which participants perceived themselves as having provided an impartial judgment of the defendant's guilt: (1) *"To what extent was your evaluation based on the evidence provided within the crime report?"*, with endpoints 1 (*not at all evidence-based*) and 10 (*completely evidence-based*); and (2) *"How impartial was your evaluation of the case?"*, with endpoints 1 (*not at all fair and impartial*) and 10 (*very fair and impartial*).

Participants' responses to these questions were averaged to create one score per participant with higher scores corresponding to greater levels of perceived impartiality. Participants answered these questions during phase 2 (see Appendix E).

### Manipulation Check

Participants answered five manipulation check questions (see Appendix F). One question used a multiple-choice format to assess whether participants correctly recalled the confession. Responses were coded as 1 (correct) and 0 (incorrect). The four remaining manipulation check

questions assessed the strength of participants' commitment to their guilt judgments: (1) “*After you read the crime report for the first time, how strong was your belief that the suspect was guilty or innocent?*”, with endpoints 1 (*very weak belief*) and 10 (*very strong belief*), (2) “*After you read the crime report for the first time, how strong would new evidence had to have been for you to change your verdict from guilty to innocent or innocent to guilty?*”, with endpoints 1 (*not very strong*) and 10 (*very strong*), (3) “*Thinking about your final verdict in this case, how difficult would it be for someone to convince you to change your verdict from guilty to innocent or from innocent to guilty?*”, with endpoints 1 (*not very difficult*) and 10 (*very difficult*), and (4) “*Thinking about your final verdict in this case, how strong would new evidence have to be for you to change your verdict from guilty to innocent or innocent to guilty?*”, with endpoints 1 (*not very strong*) and 10 (*very strong*). Participants’ responses to these four questions were averaged to create one score per participant with higher scores indicating greater commitment to their guilt judgments.

### **Attention Check**

Eight questions assessed the extent to which participants attended to the crime report (see Appendix G). These questions asked participants to recall the suspect’s name, whether the suspect confessed to the crime, what the suspect’s alibi was, and the circumstantial evidence that the police had against the suspect. Responses were coded as 1 (correct) and 0 (incorrect) and summed to create one score per participant that ranged from 0 to 8, with higher scores indicating a greater degree of attentiveness to the crime report.

### **Suspicion Check**

Four questions assessed participants’ general level of suspicion, prior knowledge about the experiment, and the degree to which they perceived the experimenter to be credible (see

Appendix H): (1) “*Sometimes experiments study questions that are not obvious. Do you believe that is the case in this experiment?*”, with response options 1 (yes) and 2 (no), (2) “*If yes, please indicate what research question(s) might be under investigation in this experiment.*” (open-ended), (3) “*Please indicate what you knew about this experiment before participating.*” (open-ended), and (4) “*Please rate as honestly as possible how believable you found the experimenter when he or she informed you that some of the materials had been left out. This question will remain anonymous and the experimenter will never learn of your rating.*”, with endpoints 1 (*completely unbelievable*) and 6 (*completely believable*). Responses were evaluated to identify participants who identified the research hypotheses, had prior knowledge of the experimenter, or were suspicious about the feigned experimental mistake.

### **Scrambled Anagrams**

As a filler task, all participants attempted to solve up to 44 scrambled anagrams within four minutes (see Appendix I). Pilot testing showed that college students can complete an average of 20 anagrams in this timeframe, with a minimum and maximum of 9 and 32, respectively. The filler task was included to provide a window of time that supported a feigned claim by the experimenter that a portion of the crime report had accidentally been omitted from the materials, thus necessitating that they receive the full crime report and respond to the questions a second time. Because the scrambled anagram task is unrelated to the hypotheses under investigation, it was not scored or used in any of the analyses.

### **Procedures**

Participants were run individually. Upon arrival to the experimental session, the participant signed a consent form and was told that the study was designed to examine how people evaluate evidence in a criminal case. The experimenter then explained that the participant

would review evidence from a real, ongoing case after which the participant received a portion of a crime report that included circumstantial evidence (phase 1). This portion of the crime report also included confession evidence for participants in the confession–early conditions. After reading this portion of the crime report, the participant made several guilt-relevant judgments including a verdict (guilty vs. innocent), confidence rating, and likelihood of guilt judgment. The commitment manipulation occurred immediately after.

In the high commitment conditions, the participant publicly stated his or her phase 1 verdict (guilty vs. innocent) and signed a form confirming it. Participants performed these tasks believing that the signed form would be sent to the county prosecutor’s office to help with the case. To support the veracity of this claim, the experimenter placed the participant’s signed form in an envelope addressed to the county prosecutor’s office and left the room under the guise of depositing it in the mail. In the low commitment conditions, the participant did not publicly state his or her phase 1 verdict, nor sign any form to confirm it.

Following the commitment manipulation, the participant was left alone to work on the filler task for four minutes. Afterward, the experimenter informed the participant that during the filler task, she or he had discovered that a portion of the crime report had accidentally been omitted, thus necessitating that the participant read the full crime report and answer the questions a second time. After having done so, the participant responded to the manipulation checks, attention checks, suspicion checks, and reported demographic information. After all measures had been completed, the experimenter fully debriefed the participant.

## CHAPTER 3. ANALYSES

### Preliminary Analyses

#### Descriptive Statistics

Table 2 presents the means, standard errors, and confidence intervals for participants' verdicts, confidence ratings, and likelihood of guilt judgments organized by experimental condition. Table 3 presents the correlations between variables for the entire sample whereas Table 4 presents the correlations separately for participants in the low commitment and high commitment conditions. Figure 1 presents participants' verdicts, which are shown by condition and phase as they proceeded through the study.

#### Commitment Manipulation Check

An independent samples t-test assessed the effectiveness of the commitment manipulation. Results indicated no significant difference in self-reported commitment levels between participants in the low commitment and high commitment conditions,  $t(236) = 0.80$ ,  $p = .427$ ,  $d = .10$ . Note that  $d$  values of .2, .5, and .8 correspond to small, medium, and large effects, respectively (Cohen, 1988). These results suggest either that the commitment manipulation was unsuccessful or that the self-report questionnaire failed to properly assess participants' commitment levels.

#### Confession Timing Manipulation Check

A frequency analysis indicated that 210 participants (88.2%) correctly identified whether the confession was presented during phase 1 or phase 2, whereas 28 (11.8%) incorrectly reported its timing. A series of independent samples t-tests that compared participants who correctly and incorrectly answered the confession timing manipulation check question revealed no significant differences in their phase 2 likelihood of guilt judgments,  $t(236) = -0.55$ ,  $p = .586$ ,  $d = .11$ , or

phase 2 verdicts,  $t(236) = 0.13$ ,  $p = .901$ ,  $d = .02$ . These results suggest that there were no meaningful differences between participants who correctly identified the timing of the confession evidence and those who did not. Accordingly, no participants were excluded on the basis of their answer to the timing of the confession evidence.

### **Attention Check**

A frequency analysis identified participants who had not adequately attended to the crime report according to the following a priori decision criterion (a) incorrectly answered six or more of the eight attention check questions, (b) incorrectly reported the suspect's name or (c) incorrectly reported that the suspect never confessed. Eight participants were identified. Although all subsequently reported results omitted these participants' data the analyses were conducted both with and without these participant's data included, and no meaningful differences emerged.

### **Suspicion Check**

Evaluation of participants' responses to the suspicion check items indicated that none were suspicious and none correctly identified the study hypotheses.

### **Analytic Plan**

The main analyses address the hypotheses that confession timing influences phase 2 guilt judgments by means of belief perseverance, and that commitment moderates the hypothesized belief perseverance effect. These hypotheses are tested with respect to two measures of participants' guilt judgments: phase 2 likelihood of guilt judgments and verdicts (guilty vs. innocent). As discussed in detail below, support for belief perseverance in these data requires that two effects be significant – i.e., confession timing must have a significant total effect on participants' phase 2 guilt judgments and a significant indirect effect on participants' phase 2

guilt judgments through participants' phase 1 guilt judgments. These effects were tested with the following, closely related sequential models.

### **Model 1: Total Effect of Confession Timing on Phase 2 Guilt Judgments**

The first model (Figure 2) was designed to test whether confession timing had a significant total effect on phase 2 guilt judgments, with a greater perceived likelihood of guilt and a greater likelihood of guilty verdicts expected among participants in the confession–early conditions. This effect reflects a necessary, but insufficient, condition to conclude that belief perseverance had a meaningful impact on phase 2 guilt judgments. It is necessary because it is only possible that belief perseverance had a meaningful impact if confession timing had an effect on participants' phase 2 guilt judgments. However, it is insufficient because the total effect of confession timing captures not only the belief perseverance effect, but also additional effects linked to the experimental procedures, as subsequently detailed. Hence, the second model is needed to parse the total effect of confession timing and isolate that portion associated with belief perseverance.

It is worth noting that, in general, a significant total effect is not necessary to find a mediation effect. However, for the purposes of this research, a significant total effect of confession timing is necessary as a lack of such an effect would suggest that guilt judgments do not vary depending on when confession evidence is encountered. Therefore, a significant indirect effect would be of little consequence if final guilt judgments are not impacted in a meaningful way as evidenced by a significant total effect.

The first model would support the belief perseverance hypothesis if confession timing evidenced either a significant main effect on phase 2 guilt judgments or a significant simple main effect on phase 2 guilt judgments in the context of an interaction involving commitment, or both.

For the continuous guilt judgment of likelihood of guilt, a  $2 \times 2$  (confession timing  $\times$  commitment) regression analysis was performed. For the dichotomous guilt judgment of verdict, a  $2 \times 2$  (confession timing  $\times$  commitment) logistic regression was performed. For both analyses, the experimental manipulations of confession timing (late vs. early) and commitment (low vs. high) were effect-coded as -1 and +1, respectively. If confession timing demonstrates either a significant main effect, or a significant simple main effect, then a second, more detailed path model becomes necessary.

### **Model 2: Belief Perseverance Effect**

The second model was designed to test whether a significant total effect of confession timing on phase 2 guilt judgments revealed by the prior model corresponded to belief perseverance (see Figure 3). This was accomplished by examining whether confession timing evidenced a significant indirect effect on phase 2 guilt judgments through phase 1 guilt judgments. The model tests this indirect effect with the Mplus statistical program (Mplus, 2018). If the first model yields a simple main effect of confession timing on phase 2 guilt judgments in the context of an interaction with commitment, then the second model tests the indirect effect separately for each level of commitment. Therefore, the variable corresponding to the experimental manipulation of commitment is held constant in each group, requiring removal of the two terms involving commitment and their corresponding paths, *d* and *e* in Figure 3. Regardless of these effects related to commitment, the paths *a*, *b*, and *c* are included, and their meanings in the context of the path model merit detailed consideration.

### **Path a: Confession Effect**

Participants made guilt judgments twice, first at phase 1 and then again at phase 2. As shown in Table 1, because the commitment manipulation did not occur until after participants

made their phase 1 guilt judgments, the only difference between the confession timing conditions at phase 1 was the presence or absence of the confession; at phase 1, the confession was present for participants in the confession–early conditions and absent for participants in the confession–late conditions. Therefore, path *a* in Figure 3 reflects the effect of confession evidence on phase 1 guilt judgments above and beyond the effect of the circumstantial evidence presented at phase 1.

### **Path b: Judgment Stability**

Path *b* in Figure 3 represents the stability of guilt judgments from phase 1 to phase 2.

### **Path $a \times b$ : Belief Perseverance**

By definition, the phenomenon of belief perseverance requires that people maintain their initial beliefs in the face of subsequently encountered discrediting information. In the current study, this means that differences in guilt judgments at phase 2 between participants in the confession–early and confession–late conditions must be conveyed by differences in their preceding guilt judgments at phase 1. In terms of the model shown in Figure 3, this corresponds to a significant indirect effect of confession timing on phase 2 guilt judgments via phase 1 guilt judgments ( $a \times b$ ). At this point it is worth restating that this effect only indicates belief perseverance if confession timing also evidenced a significant total effect on phase 2 guilt judgments in the corresponding  $2 \times 2$  analysis previously described. In the absence of a total effect, a significant indirect effect indicates that the information added in phase 2 (exculpatory and circumstantial, as detailed in Table 1) counteracted any effect of the confession evidence on phase 2 guilt judgments, as described next.

### **Path c: Adding Confession Evidence and Procedural Effects**

To understand the direct effect of the confession timing manipulation on phase 2 guilt

judgments represented by path  $c$  it is necessary to understand the differences that exist between the confession timing conditions at the time phase 2 guilt judgments were made. As detailed in Table 1, at the time phase 2 guilt judgments are made, the two confession timing conditions were identical with respect to the information they had received. However, the effect represented by path  $c$  is unique of the indirect effect of the confession itself on phase 2 guilt judgments, represented by path  $a \times b$ . Thus, path  $c$  captures the effect of *adding* the confession in the confession–late condition, thereby causing the total effect of confession timing on phase 2 guilt judgments, path  $a \times b + c$ , to reflect the fact that both conditions have precisely the same information at phase 2.

Path  $c$  also captures three other condition differences associated with confession timing that operate at phase 2 but not phase 1, none of which reflect belief perseverance. First, it captures any primacy or recency effects associated with participants in the confession–early conditions having received the confession earlier than participants in the confession–late condition. Second, it captures any pairing effects caused by the fact that participants in the confession–early conditions received the confession without the simultaneous presentation of exculpatory evidence, whereas participants in the confession–late conditions received the confession simultaneously with the exculpatory evidence. Third, it captures any effects of information quantity that resulted from participants in the confession–early conditions having received the confession in the context of less additional information (only the circumstantial 1 evidence, as detailed in Table 1) compared to participants in the confession–late conditions who received the confession in the context of more additional information (both the circumstantial 2 and the exculpatory evidence, as detailed in Table 1). Thus, path  $c$  includes the potential influence of several procedural effects possibly associated with the confession timing

manipulation, and thereby separates them from the belief perseverance effect represented by the indirect effect, path  $a \times b$ .

### **Moderation of Belief Perseverance by Commitment**

The analytic plan described above also enables evaluation of commitment's ability to moderate belief perseverance. Results consistent with moderation would include a significant interaction of commitment and confession timing on phase 2 guilt judgments in the  $2 \times 2$  model, coupled with significant belief perseverance effects in the follow up path model that differ across levels of commitment.

### **Main Analyses**

The main analyses tested two hypotheses pertaining to the effects of confession timing and commitment on phase 2 guilt judgments. The first hypothesis was that the confession would have a stronger effect on phase 2 guilt judgments among participants in the confession–early than confession–late conditions. The second hypothesis was that the predicted effect of confession timing would be stronger among participants in the high than low commitment conditions. As noted above, these hypotheses were tested with respect to participants' perceptions of the suspect's likelihood of guilt and verdicts of guilty versus innocent.

### **Model 1: Total Effect of Confession Timing**

Following the analytic plan described above, the first set of analyses tested whether confession timing had a significant total effect on phase 2 guilt judgments. First, a  $2 \times 2$  (confession timing  $\times$  commitment) regression analysis was performed using the phase 2 continuous guilt judgment of likelihood of guilt as the dependent variable. Results indicated that confession timing was not a significant predictor of phase 2 guilt judgments,  $b = .103$ ,  $t(234) = 0.91$ ,  $p = .365$ ,  $d = .12$ . Conversely, commitment was a significant predictor of phase 2 guilt

judgments,  $b = -.330$ ,  $t(234) = -2.90$ ,  $p = .004$ ,  $d = -.38$ . The negative beta weight of the commitment predictor indicates that participants in the low commitment conditions were more likely to have a stronger likelihood of guilt belief than participants in the high commitment conditions. The interaction term for the two predictors was not significant,  $b = -.059$ ,  $t(234) = -0.52$ ,  $p = .607$ ,  $d = -.07$ .

Paralleling the regression analysis, a  $2 \times 2$  (confession timing  $\times$  commitment) logistic regression analysis was performed using the phase 2 dichotomous guilt judgment of verdict as the dependent variable. Results revealed that confession timing did not have a significant effect on phase 2 verdicts,  $b = .144$ , Wald  $\chi^2(1) = 1.02$ ,  $p = .313$ ,  $OR = 1.15$ . Note that odds ratios of 1.5, 2.5, and 4.3 correspond to small, medium, and large effects, respectively (Cohen, 1988). Conversely, commitment,  $b = -.272$ , Wald  $\chi^2(1) = 3.65$ ,  $p = .056$ ,  $OR = 0.76$ , and the confession timing by commitment interaction,  $b = -.275$ , Wald  $\chi^2(1) = 3.71$ ,  $p = .054$ ,  $OR = 0.76$ , had marginally significant effects on phase 2 verdicts.

A follow-up analysis was conducted to examine the simple main effects of confession timing. Pairwise comparisons indicated that confession timing had no significant effect on verdicts in the high commitment conditions,  $t(120) = -0.70$ ,  $p = .482$ ,  $OR = 0.79$ . Confession timing did have a significant effect on verdicts in the low commitment conditions,  $t(114) = 2.00$ ,  $p = .045$ ,  $OR = 1.96$ , with participants in the confession–early condition more often finding the suspect guilty than participants in the confession–late condition. Thus, belief perseverance could not have occurred under conditions of high commitment, but may have occurred under conditions of low commitment.

### **Model 2: Belief Perseverance Effect**

As described in the analytic plan, the second model was designed to test whether

significant results associated with confession timing from the first model corresponded to belief perseverance. This was accomplished by examining whether confession timing had a significant indirect effect on phase 2 guilt judgments through phase 1 guilt judgments using the analytic model depicted in Figure 3. The first model showed that belief perseverance was only a possibility for the dichotomous verdict dependent variable, and only for the low commitment condition. Therefore, the second model tested for indirect effects of confession timing on the dichotomous guilt judgment of verdict, doing so separately for each level of commitment. Specifically, the analysis was conducted using the model depicted in Figure 3 that included only paths a, b, and c, and was performed using MPlus with commitment as the grouping variable. Due to the nonsignificant findings in the high commitment conditions, only results from the low commitment conditions are relevant to the belief perseverance hypothesis. Therefore, only the results for participants in the low commitment conditions will be presented. However, for completeness all high commitment results are presented in Table 5.

#### **Path a: Confession Effect**

For participants in the low commitment conditions, results revealed that confession timing had a significant direct effect on phase 1 verdicts (path a),  $b = .48$ ,  $SE = 0.14$ ,  $p < .01$ ,  $OR = 1.62$ . As previously noted, path *a* in Figure 3 represents the effect of confession on phase 1 guilt judgments beyond the impact of the circumstantial evidence presented at phase 1. Therefore, the results for path *a* indicate that the presence of confession evidence significantly influenced verdicts.

#### **Path b: Judgment Stability**

For participants in the low commitment conditions, results showed that phase 1 verdicts significantly predicted phase 2 verdicts (path b),  $b = .64$ ,  $SE = 0.12$ ,  $p < .01$ ,  $OR = 1.90$ .

Recalling that path *b* in Figure 3 represents the stability of guilt judgments from phase 1 to phase 2, the results indicate that verdicts evidenced a degree of stability from phase 1 to phase 2.

#### **Path a x b: Belief Perseverance**

For participants in the low commitment conditions, results revealed that confession timing had a significant indirect effect on phase 2 verdicts via phase 1 verdicts (path  $a \times b$ ),  $b = .31$ ,  $SE = 0.10$ ,  $p < .01$ ,  $OR = 1.36$ . Although there was a significant indirect effect of confession timing, it is worth restating that this effect only represents belief perseverance because confession timing also evidenced a significant total effect on phase 2 verdicts, as reported above for Model 1 with respect to the simple main effect results of confession timing on phase 2 verdicts in the low commitment conditions.

#### **Path c: Adding Confession Evidence and Procedural Effects**

For participants in the low commitment conditions, results revealed that confession timing had a non-significant direct effect on phase 2 verdicts (path *c*),  $b = -.06$ ,  $SE = .13$ ,  $p = ns$ ,  $OR = 0.94$ . However, as previously noted in the analytic plan, path *c* captures several condition differences associated with confession timing that operate at phase 2 but not phase 1, none of which reflect belief perseverance.

#### **Path a x b + c: Total Effect of Confession Evidence**

For participants in the low commitment conditions, results showed that confession timing had a significant total effect on phase 2 verdicts (path  $a \times b + c$ ),  $b = .25$ ,  $SE = 0.13$ ,  $p < .05$ ,  $OR = 1.28$ . This result replicates the simple main effect of confession timing in the low commitment conditions from Model 1. Moreover, the presence of the aforementioned significant indirect effect and a significant total effect indicates support for a belief perseverance effect for participants in the low commitment conditions. Specifically, this indicates that participants who

received confession evidence early at phase 1 had a greater likelihood of providing a guilty verdict at phase 2 with a significant portion of this effect resulting from the perseverance of participants' phase 1 verdicts.

### **Moderation of Belief Perseverance by Commitment**

As noted above, the analytic plan allowed for the evaluation of commitment's ability to moderate belief perseverance. Results were consistent with a moderation effect. A marginally significant interaction between confession timing and commitment on phase 2 verdicts was found in the first model. Moreover, in the follow-up path model, the results supported a belief perseverance effect for participants in the low commitment conditions. Taken together these results suggest that belief perseverance was greater when commitment to an initial verdict was low.

## CHAPTER 4. DISCUSSION

Drawing on research relevant to the cognitive bias of belief perseverance, this research tested whether a confession causes people to discount subsequently encountered exculpatory evidence, and whether this effect is stronger when people are highly committed to maintaining their initial beliefs about a suspect's guilt. Results provided some support for the presence of a belief perseverance effect. However, belief perseverance only occurred under low commitment conditions and not under high commitment conditions, as had been originally hypothesized. In addition, a main effect of commitment emerged such that participants who were committed to their initial beliefs about a suspect's guilt were more likely than those who were less committed to adjust their initial verdicts in response to exculpatory evidence, a pattern that runs counter to the hypothesized moderating effect of commitment.

### **Belief Perseverance**

Although the timing of confession evidence did not have an overall effect on verdicts, it did evidence a simple main effect on verdicts among participants in the low commitment conditions. Specifically, participants in the low commitment conditions who received confession evidence before receiving exculpatory evidence were more likely to find the suspect guilty than participants who received confession and exculpatory evidence at the same time. It is worth noting that this pattern was only present with verdict judgments and not with likelihood of guilt judgments. However, this discrepancy may be due to the fact that the commitment manipulation was implemented in an attempt to make participants feel committed to their verdicts. Participants were encouraged, in the high commitment conditions, to become committed to their initial verdicts by having participants verbally state and sign a form affirming them. By contrast, no such attempt was ever made to make any participants adhere to their original likelihood of guilt

judgments. Therefore, the commitment manipulation may have been experienced as most relevant with respect to verdicts, and rather less so with respect to likelihood of guilt judgments.

The lack of a main effect for the timing of the confession evidence in these data may suggest that the intensity of the manipulation was insufficient. For the purposes of this study, participants received the first portion of the crime report and then completed a four-minute filler task before receiving the full crime report. Considering that investigators often have weeks or even months to ruminate about a given case before possibly receiving exculpatory evidence, this may not have been an adequate amount of time for strong beliefs to develop. The lack of a strong initial belief may have discouraged participants from discounting the subsequently encountered exculpatory evidence.

An alternative explanation that may explain why the timing of the confession did not have a significant main effect on guilt judgments is that the procedures used in this study did not closely mimic the processes of police investigators. In fact, they were more similar to the processes of jurors. Participants in this study were presented with incriminating evidence followed by exculpatory evidence and then asked to make a guilt judgment. This presentation of evidence mirrors that which jurors experience in trials. In court proceedings the prosecution first offers incriminating evidence for the jurors to consider before the defense has the opportunity to provide exculpatory evidence. Moreover, participants in this study did not seek out information or spend weeks investigating and building a strong belief. Further, participants, like jurors, may be motivated to be accurate whereas police investigators may be motivated to avoid being perceived as fallible. Therefore, the results of this study may have failed at assessing how police investigators make judgments, but succeeded at examining the decision making processes of jurors.

### **Commitment**

Although only an interaction with confession timing had been predicted, commitment also had a significant main effect on guilt judgments. Participants in the high commitment conditions gave lower guilt judgments than participants in the low commitment conditions. Thus, commitment had a clear effect, which indicates that the lack of support for what had been hypothesized was not due to a failed manipulation. Additionally, suspicion checks indicated low levels of suspicion and no participants correctly identified the study hypotheses, which indicates that the results were not due to psychological reactance.

### **Accountability**

Based on anecdotal evidence from proven false confession cases and the empirical literature on commitment, it was hypothesized that the predicted belief perseverance effect would be moderated by people's commitment to their initial beliefs about a suspect's guilt, with stronger effects occurring among people who are highly committed. However, the results showed the opposite effect. This raises the possibility that perhaps the experimental manipulation did not manipulate commitment after all, but instead accountability – an expectation of having to justify or explain one's feelings, beliefs, or behaviors to others (Lerner & Tetlock, 1999). Participants in the high commitment conditions were asked to verbally state and sign a document affirming their guilt judgments that they believed were being sent to the county prosecutor in an attempt to impress upon them that their decisions were meaningful. Therefore, participants may have been more analytical in their assessments as research has found that holding people accountable for their judgments and decisions leads them to think in more critical and complex ways such that they are more likely to consider multiple perspectives on the issue at hand (Tetlock, 1983a; Tetlock, 1983b).

Research has long established that the innate need to appear consistent in terms of one's beliefs and attitudes is a fundamental basis of behavior (Festinger, 1957). Most people strive for consistency in terms of what they say and do. Therefore, after committing to a given opinion, especially when that opinion is freely chosen, people are likely to continue to behave in a manner that is in line with their original position (Cialdini, 1999). However, if the commitment manipulation used in the current study inadvertently manipulated accountability, then participants in the high commitment conditions may have more thoroughly assessed the exculpatory evidence and been more likely to entertain the possibility that the suspect was actually innocent despite his confession than participants in the low commitment conditions out of an increased desire to be accurate. To the extent this happened, then a conservative criterion shift may have occurred among participants in the high commitment conditions. That is, participants in the high commitment conditions may have required a greater degree of certainty in the suspect's guilt before being willing to render a guilty verdict. Consistent with this, preliminary analyses showed that participants in the high commitment conditions reported being less confident in their phase 2 verdicts than participants in the low commitment conditions.

### **Limitations**

Several limitations of this research warrant mention. First, the participant sample consisted entirely of college students. Although this limitation characterizes many empirical studies, it has meaningful repercussions for the current research. Due to the relative youth of the sample and their enrollment in a secondary education institute, it is possible that they have greater cognitive flexibility than other populations. Had the sample consisted of a more heterogeneous sample, or even a sample of older adults, participants may have shown a greater tendency to cling to their initial beliefs.

Second, although this study attempted to manipulate commitment, the procedures may not have been especially well-suited to capturing an investigator's sense of responsibility and desire to find justice; participants did not have much personally riding on their guilt judgments. However, this also means that the results are likely a conservative estimate of the possible effects of the timing of confession evidence and commitment on guilt judgments of actual investigators. Relatedly, given that this study relied on the judgments of college students rather police investigators, the results may say more about the way that jurors assess evidence than the way that investigators do.

Finally, the commitment manipulation may have inadvertently manipulated accountability, possibly explaining the presence of belief perseverance in the low, but not the high commitment conditions. A key aspect of commitment in previous studies involves the desire to appear consistent and also to avoid appearing hypocritical. For example, in Dickerson et al.'s (1992) study, participants who signed a flyer in support of water conservation took significantly shorter showers. An individual who signs a flyer supporting the conservation of water and then proceeds to shower for half an hour is behaving in an inconsistent manner and would appear to be a hypocrite. However, in the current study, participants were able to assign a verdict of guilty and then switch to innocent without appearing hypocritical due to the nature of the evidence presented. Therefore, future studies should attempt to create situations wherein participants are motivated to maintain consistency, such as if changing one's mind would be viewed as an admission of incompetence.

### **Conclusion**

The present study applied theory from the literature on error and bias in an attempt to understand the impact of confession evidence on an individual's guilt judgments. Although this

study failed to find an overall belief perseverance effect, it did find such an effect for participants who were not made to feel committed to (or accountable for) their initial guilt belief.

Additionally, it was found that commitment had a meaningful impact on guilt judgments such that those participants who were made to feel committed to (or accountable for) their initial guilt judgments gave lower final guilt judgments. Future studies should examine whether these procedures truly lead participants to feel committed to their beliefs or instead lead to a greater sense of accountability, which then creates a conservative criterion shift in their guilt judgment decisions such that they require a greater degree of certainty of guilt to offer a guilty verdict. Moreover, future research should attempt to include people who are more invested in the decisions by, if possible, recruiting participants from law enforcement.

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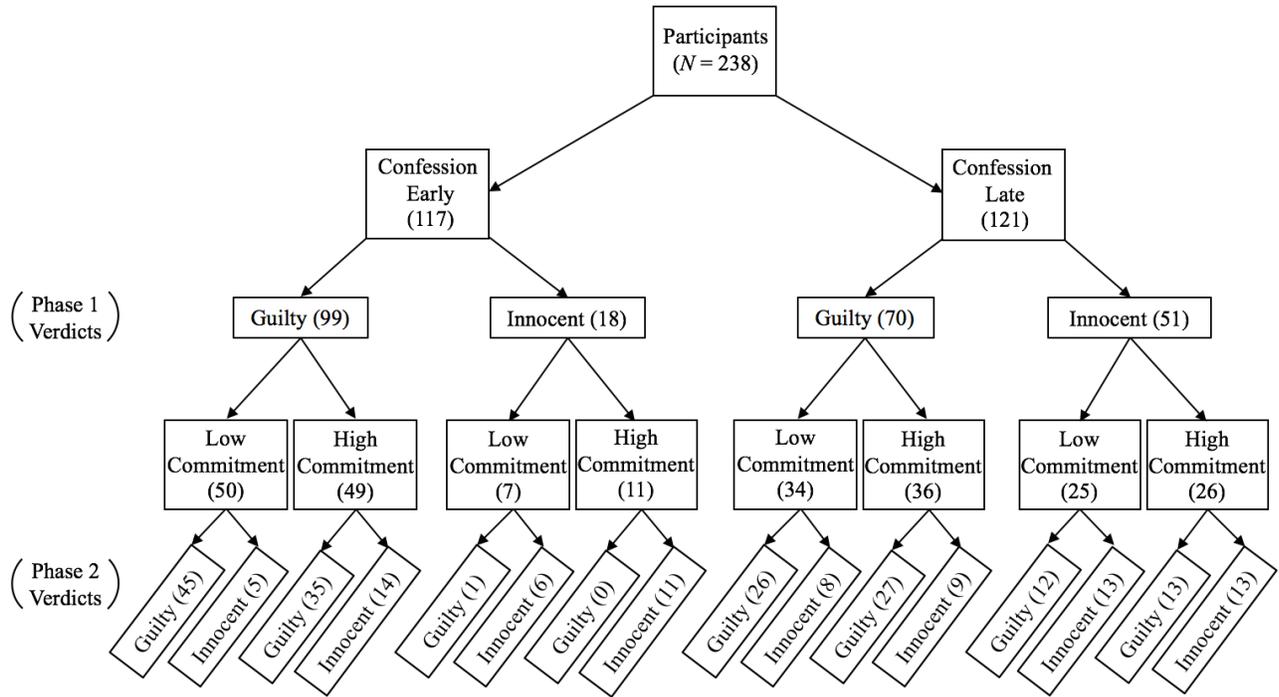
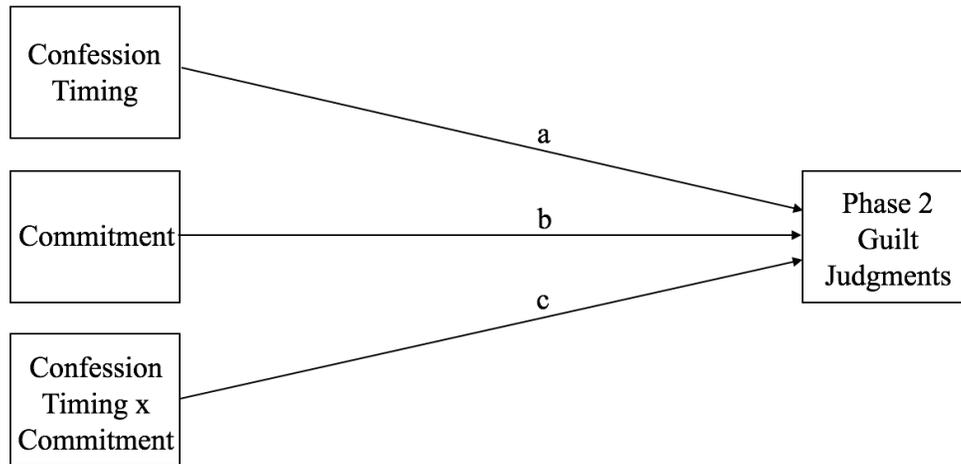
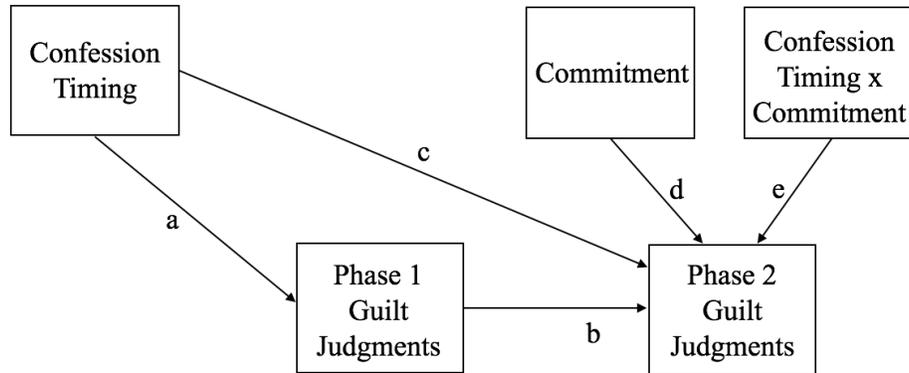


Figure 1. Participants' verdicts by condition and phase as they proceeded through the study.



*Figure 2.* Model examining the total effect of confession timing, commitment, and the confession timing by commitment interaction on phase 2 guilt judgments.



*Figure 3.* Mediated model examining the effect of phase 1 guilt judgments, confession timing, commitment, and the confession timing by commitment interaction on phase 2 guilt judgments.

Table 1  
*Experimental Design: Confession x Commitment x Phase*

Commitment	Confession Timing	Phase 1 Crime Report	Phase 2 Crime Report
High	Early	Circumstantial 1 + Confession	<i>add</i> Circumstantial 2 + Exculpatory
	Late	Circumstantial 1	<i>add</i> Circumstantial 2 + Confession + Exculpatory
Low	Early	Circumstantial 1 + Confession	<i>add</i> Circumstantial 2 + Exculpatory
	Late	Circumstantial 1	<i>add</i> Circumstantial 2 + Confession + Exculpatory

Table 2  
*Descriptive Data for Dependent Variables by Experimental Condition (N = 238)*

Variable	Commitment Low		Commitment High		
	Confession Early	Confession Late	Confession Early	Confession Late	
Phase 1 Verdict	<i>M (SE)</i> 95% CI	88% (4%) 79%, 97%	58% (7%) 45%, 71%	82% (5%) 72%, 92%	58% (6%) 45%, 71%
Phase 1 Confidence	<i>M (SE)</i> 95% CI	7.77 (.24) 7.29, 8.25	6.03 (.23) 5.58, 6.49	7.68 (.22) 7.25, 8.12	5.60 (.20) 5.19, 6.00
Phase 1 Likelihood of Guilt Judgment	<i>M (SE)</i> 95% CI	7.81 (.24) 7.33, 8.29	5.85 (.21) 5.43, 6.26	7.58 (.26) 7.07, 8.10	5.76 (.21) 5.33, 6.19
Phase 2 Verdict	<i>M (SE)</i> 95% CI	81% (5%) 70%, 91%	64% (6%) 52%, 77%	58% (6%) 45%, 71%	65% (6%) 52%, 77%
Phase 2 Confidence	<i>M (SE)</i> 95% CI	6.72 (.19) 6.34, 7.10	6.49 (.21) 6.07, 6.91	6.28 (.21) 5.86, 6.70	5.97 (.23) 5.50, 6.43
Phase 2 Likelihood of Guilt Judgment	<i>M (SE)</i> 95% CI	6.54 (.22) 6.10, 6.98	6.22 (.24) 5.74, 6.70	5.77 (.25) 5.27, 6.26	5.68 (.20) 5.27, 6.08
Incriminating <sup>a</sup>	<i>M (SE)</i> 95% CI	6.36 (.25) 5.86, 6.85	5.89 (.26) 5.36, 6.41	5.92 (.22) 5.47, 6.37	5.68 (.25) 5.18, 6.18
Exonerating <sup>b</sup>	<i>M (SE)</i> 95% CI	4.80 (.18) 4.44, 5.15	5.29 (.21) 4.88, 5.70	5.34 (.21) 4.92, 5.76	5.40 (.19) 5.02, 5.79

<sup>a</sup>Incriminating = Perceived strength of the incriminating evidence.

<sup>b</sup>Exonerating = Perceived strength of the exonerating evidence.

Table 3  
Correlations ( $N = 238$ )

Variable	1	2	3	4	5	6	7	8
1. Confession Timing	-	.00	.30**	.49**	.47**	.05	.08	.06
2. Commitment		-	-.03	-.07	-.04	-.12	-.15*	-.19*
3. Phase 1 Verdict			-	.35**	.67**	.40**	.16*	.32**
4. Phase 2 Confidence				-	.59**	.31**	.45**	.32**
5. Guilt 1 <sup>a</sup>					-	.31**	.20**	.43**
6. Phase 2 Verdict						-	.37**	.69**
7. Phase 2 Confidence							-	.46**
8. Guilt 2 <sup>b</sup>								-
<i>M</i>	-.02	.03	.71	6.75	6.73	.67	6.36	6.04
<i>SD</i>	1.00	1.00	.46	1.96	2.01	.47	1.65	1.78

*Note.* Confession Timing coded as: Confession Early = 1; Confession Late = -1.

Commitment coded as: Commitment High = 1; Commitment Low = -1. Phase 1 Verdict and Phase 2 Verdict coded as: Innocent = 0; Guilty = 1.

<sup>a</sup>Guilt 1 = Phase 1 Likelihood of Guilt Judgment.

<sup>b</sup>Guilt 2 = Phase 2 Likelihood of Guilt Judgment.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 4  
*Correlations by Commitment Low (N = 116) and Commitment High (N = 122) Conditions*

Variable	1	2	3	4	5	6	7
<b>Commitment Low</b>							
1. Confession Timing	-	.34**	.44**	.50**	.18	.08	.09
2. Phase 1 Verdict		-	.29**	.65**	.44**	.23*	.33**
3. Phase 2 Confidence			-	.54**	.47**	.51**	.32**
4. Guilt 1 <sup>a</sup>				-	.36**	.24**	.45**
5. Phase 2 Verdict					-	.47**	.67**
6. Phase 2 Confidence						-	.54**
7. Guilt 2 <sup>b</sup>							-
<i>M</i>	-.02	.72	6.89	6.81	.72	6.60	6.38
<i>SD</i>	1.00	.45	1.98	1.96	.45	1.53	1.76
<b>Commitment High</b>							
1. Confession Timing	-	.26**	.54**	.45**	-.06	.09	.03
2. Phase 1 Verdict		-	.40**	.69**	.36**	.10	.32**
3. Phase 2 Confidence			-	.63**	.17	.39**	.31**
4. Guilt 1 <sup>a</sup>				-	.26**	.15	.41**
5. Phase 2 Verdict					-	.27**	.70**
6. Phase 2 Confidence						-	.37**
7. Guilt 2 <sup>b</sup>							-
<i>M</i>	-.02	.70	6.62	6.66	.61	6.12	5.72
<i>SD</i>	1.00	.46	1.95	2.06	.49	1.73	1.75

*Note.* Confession Timing coded as: Confession Early = 1; Confession Late = -1.

Phase 1 Verdict and Phase 2 Verdict coded as: Innocent = 0; Guilty = 1.

<sup>a</sup>Guilt 1 = Phase 1 Likelihood of Guilt Judgment.

<sup>b</sup>Guilt 2 = Phase 2 Likelihood of Guilt Judgment.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 5  
*Direct, Indirect, and Total Effects of Confession Timing on Phase 2 Guilt Verdicts*

Path	Variable	<i>b</i>	95% CI	<i>p</i> <sup>a</sup>	OR
Commitment Low					
a	Confession Timing on Verdict 1	.484	.217, .775	< .01	1.62
b	Verdict 1 on Verdict 2	.643	.356, .834	< .01	1.90
c	Confession Timing on Verdict 2	-.062	-.313, .202	ns	0.94
a x b	Indirect Effect of Confession Timing	.311	.147, .534	< .01	1.36
a x b + c	Total Effect of Confession Timing	.249	.003, .516	< .05	1.28
Commitment High					
a	Confession Timing on Verdict 1	.350	.106, .612	< .01	1.42
b	Verdict 1 on Verdict 2	.637	.386, .814	< .01	1.89
c	Confession Timing on Verdict 2	-.304	-.524, -.088	< .01	0.74
a x b	Indirect Effect of Confession Timing	.223	.082, .404	< .01	1.25
a x b + c	Total Effect of Confession Timing	-.081	-.310, .162	ns	0.92

*Note.* Paths correspond to those depicted in Figure 3. CI, confidence interval.

<sup>a</sup>Effects tested through bias-corrected bootstrapping procedure which precludes calculation of exact *p* values.

“ns” corresponds to  $p > .05$ .

**APPENDIX A. PHASE 1 CRIME REPORT: CONFESSION EARLY**

On November 15, 2014, just past 8:45pm, a purse was stolen from a woman as she attempted to enter her 2007 Honda Civic inside a local parking garage. Video surveillance showed the perpetrator smoking a cigarette before hitting the woman in the back of the head and taking her purse. The victim never saw the perpetrator's face and film taken from within the parking garage was inconclusive due to the poor quality of the video, which made the perpetrator's face too blurry to identify. Based on the video footage, police could only determine that the perpetrator was male, in his late teens or early twenties, had dark hair, light-to-medium toned skin, and wore blue jeans and a dark colored jacket.

Police searched the nearby area and found a purse in an apartment complex garbage dumpster located approximately three blocks from the parking garage. The purse was returned to the victim who identified it as hers and informed the police that all the contents were accounted for except for approximately \$75 in cash that was now missing. After confirming it was the victim's purse, police went door-to-door in the apartment complex before eventually finding 24-year-old Kyle James. James, a Caucasian with a thin, shortcut beard, was found in his home alone wearing blue jeans and a white t-shirt. A heavy dark blue rain coat was found draped across the back of his couch. James' coat contained a pack of cigarettes and his wallet, which was found to have \$83 in it. After finding James and noting that he fit the description of the perpetrator, police brought him in for questioning.

At the police station, officers brought James to an interrogation room to question him. James waived his Miranda rights and agreed to speak freely with the investigators. During questioning, James came across to the officers as equal parts defiant and annoyed. After approximately two hours of questioning, police offered James coffee and a cigarette and allowed him to use the restroom. After he had rested, investigators returned to questioning him. James consistently denied any wrongdoing, so the officers reminded him that they had footage of the crime.

James accused investigators of being incompetent and continued to proclaim his innocence. The officers countered by playing the tape of the crime and pointing out that he was wearing blue jeans and a dark coat just like the perpetrator. Investigators also reminded James that, like the perpetrator in the video, he is a smoker and he was found with just over \$80 in his wallet right after \$75 was reported missing. Officers continued to question James over the course of the next two hours. During this time, the officers again reminded James of the evidence they had against him at which point James confessed to the crime. He told the police that he was smoking a cigarette while walking by a woman in the parking garage and saw her purse. He told of how he hit her in the back of the head and then fled the scene on foot after grabbing the purse. After verbally confessing, investigators had James write out his confession by hand and sign it.

**APPENDIX B. PHASE 1 CRIME REPORT: CONFESSION LATE**

On November 15, 2014, just past 8:45pm, a purse was stolen from a woman as she attempted to enter her 2007 Honda Civic inside a local parking garage. Video surveillance showed the perpetrator smoking a cigarette before hitting the woman in the back of the head and taking her purse. The victim never saw the perpetrator's face and film taken from within the parking garage was inconclusive due to the poor quality of the video, which made the perpetrator's face too blurry to identify. Based on the video footage, police could only determine that the perpetrator was male, in his late teens or early twenties, had dark hair, light-to-medium toned skin, and wore blue jeans and a dark colored jacket.

Police searched the nearby area and found a purse in an apartment complex garbage dumpster located approximately three blocks from the parking garage. The purse was returned to the victim who identified it as hers and informed the police that all the contents were accounted for except for approximately \$75 in cash that was now missing. After confirming it was the victim's purse, police went door-to-door in the apartment complex before eventually finding 24-year-old Kyle James. James, a Caucasian with a thin, shortcut beard, was found in his home alone wearing blue jeans and a white t-shirt. A heavy dark blue rain coat was found draped across the back of his couch. James' coat contained a pack of cigarettes and his wallet, which was found to have \$83 in it. After finding James and noting that he fit the description of the perpetrator, police brought him in for questioning.

**APPENDIX C. PHASE 2 CRIME REPORT**

On November 15, 2014, just past 8:45pm, a purse was stolen from a woman as she attempted to enter her 2007 Honda Civic inside a local parking garage. Video surveillance showed the perpetrator smoking a cigarette before hitting the woman in the back of the head and taking her purse. The victim never saw the perpetrator's face and film taken from within the parking garage was inconclusive due to the poor quality of the video, which made the perpetrator's face too blurry to identify. Based on the video footage, police could only determine that the perpetrator was male, in his late teens or early twenties, had dark hair, light-to-medium toned skin, and wore blue jeans and a dark colored jacket.

Police searched the nearby area and found a purse in an apartment complex garbage dumpster located approximately three blocks from the parking garage. The purse was returned to the victim who identified it as hers and informed the police that all the contents were accounted for except for approximately \$75 in cash that was now missing. After confirming it was the victim's purse, police went door-to-door in the apartment complex before eventually finding 24-year-old Kyle James. James, a Caucasian with a thin, shortcut beard, was found in his home alone wearing blue jeans and a white t-shirt. A heavy dark blue rain coat was found draped across the back of his couch. James' coat contained a pack of cigarettes and his wallet, which was found to have \$83 in it. After finding James and noting that he fit the description of the perpetrator, police brought him in for questioning.

At the police station, officers brought James to an interrogation room to question him. James waived his Miranda rights and agreed to speak freely with the investigators. During questioning, James came across to the officers as equal parts defiant and annoyed. After approximately two hours of questioning, police offered James coffee and a cigarette and allowed him to use the restroom. After he had rested, investigators returned to questioning him. James consistently denied any wrongdoing, so the officers reminded him that they had footage of the crime.

James accused investigators of being incompetent and continued to proclaim his innocence. The officers countered by playing the tape of the crime and pointing out that he was wearing blue jeans and a dark coat just like the perpetrator. Investigators also reminded James that, like the perpetrator in the video, he is a smoker and he was found with just over \$80 in his wallet right after \$75 was reported missing. Officers continued to question James over the course of the next two hours. During this time, the officers again reminded James of the evidence they had against him at which point James confessed to the crime. He told the police that he was smoking a cigarette while walking by a woman in the parking garage and saw her purse. He told of how he hit her in the back of the head and then fled the scene on foot after grabbing the purse. After verbally confessing, investigators had James write out his confession by hand and sign it.

After bringing James to the police station, officers returned to the parking garage to interview local shop owners about whether they witnessed anyone entering the parking garage around the time of the crime. Diane Forrester, a hair stylist at a salon half a block from the parking garage, informed police that she remembered seeing a young man enter the parking garage while smoking a cigarette. When asked what time this occurred, Diane informed the officers that she was closing up the salon at the time so it would have been just past 8:30pm. She described the man as being somewhere between his late twenties to early thirties and light skinned. Diane told police that the man had short, dark hair and was wearing blue jeans with a black coat. She also thought that he may have had facial hair.

Officers showed Diane Forrester a lineup that included James. Diane took her time and carefully examined each of the individuals in the lineup before she eventually identified James as the man that she had seen outside of the parking garage. After Diane had identified James, officers asked her how certain she was that the man she identified from the lineup was the man she had seen at the parking garage. Diane informed the investigating officers that she thought he was the man she saw, but that she was not certain.

After a few nights spent in jail, James requested to speak to investigators. James claimed that he was innocent and that he had an alibi. He told police that he was at a restaurant at the time of the crime and that he could prove it as he used his MasterCard to pay his bill. Investigators checked credit card records and found that his card was used to make a purchase at a local steakhouse shortly before the crime took place. James' lawyer proclaimed that this provided clear evidence of his client's innocence and moved to have James released immediately. Police were not convinced, however, because James could have easily given his card to someone else to use. Because there were no security cameras at the restaurant, this possibility could not be ruled out.

Investigators obtained access to restaurant records for the night in question and contacted everyone who made a purchase by credit card that evening. Of the twelve individuals contacted, one claimed to have seen James at the restaurant. Susan Brayshaw was at the restaurant with her father for his birthday. She claimed that a man matching James' description was seated at the bar across from her booth while she was having dinner. Upon request, Susan came to the police station where investigators assembled a lineup. Susan identified James as the man from the restaurant. Officers asked Susan how certain she was that the man she identified from the lineup was the man she saw at the restaurant. She responded that she thought it was him. However, she also explained that she had several drinks on the night in question and that her memory for the night was a little hazy.

## APPENDIX D. GUILT JUDGMENTS

1.) Based on the information presented in the criminal report, if you had to choose would you say that Kyle James is more likely to be guilty or innocent?

- Guilty

- Innocent

2.) How confident are you in your decision?

1	2	3	4	5	6	7	8	9	10
Not At All Confident									Very Confident

3.) How likely do you think it is that James is guilty?

1	2	3	4	5	6	7	8	9	10
Very Unlikely									Very Likely

## APPENDIX E. PERCEPTIONS OF IMPARTIALITY

1.) To what extent was your evaluation based on the evidence provided within the crime report?

1	2	3	4	5	6	7	8	9	10
Not At All Evidence-Based								Completely Evidence-Based	

2.) How impartial was your evaluation of the case?

1	2	3	4	5	6	7	8	9	10
Not At All Fair and Impartial								Completely Fair and Impartial	

## APPENDIX F. MANIPULATION CHECK

1.) When did you learn that the suspect in the case confessed to committing the crime?

- a.) NEVER – the suspect did not confess to the crime
- b.) The FIRST time I read the crime report
- c.) The SECOND time I read the crime report

2.) After you read the crime report for the first time, how strong was your belief that the suspect was guilty or innocent?

1	2	3	4	5	6	7	8	9	10
Very Weak Belief									Very Strong Belief

3.) After you read the crime report for the first time, how strong would new evidence had to have been for you to change your verdict from guilty to innocent or innocent to guilty?

1	2	3	4	5	6	7	8	9	10
Not Very Strong									Very Strong

4.) Thinking about your final verdict in this case, how difficult would it be for someone to convince you to change your verdict from guilty to innocent or from innocent to guilty?

1	2	3	4	5	6	7	8	9	10
Not Very Difficult									Very Difficult

5.) Thinking about your final verdict in this case, how strong would new evidence have to be for you to change your verdict from guilty to innocent or innocent to guilty?

1	2	3	4	5	6	7	8	9	10
Not Very Strong									Very Strong

**APPENDIX G. ATTENTION CHECK**

- 1.) What was the suspect's name?
  - a.) Steve Park
  - b.) Mark Lindsay
  - c.) Kyle James
  - d.) Ryan Johnson
  
- 2.) Did the suspect confess to the crime?
  - a.) Yes
  - b.) No
  
- 3.) What was the suspect's alibi?
  - a.) He was at the dentist
  - b.) He was at a restaurant
  - c.) He was at his nephew's graduation
  - d.) He was at a baseball game
  
- 4.) Did the suspect's clothes match the perpetrator's clothing from the video?
  - a.) Yes
  - b.) No
  
- 5.) Was the suspect found with cigarettes?
  - a.) Yes
  - b.) No
  
- 6.) Did the suspect have a similar amount of cash as was stolen?
  - a.) Yes
  - b.) No
  
- 7.) Was the suspect found with house keys stolen from the purse?
  - a.) Yes
  - b.) No
  
- 8.) Did an eyewitness identify the suspect as being near the scene of the crime?
  - a.) Yes
  - b.) No

## APPENDIX H. SUSPICION CHECK

1.) Sometimes experiments study questions that are not obvious. Do you believe that is the case in this experiment? No: \_\_\_\_\_ Yes: \_\_\_\_\_ If yes, please indicate what research questions you believe might be under investigation in this experiment.

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2.) Please indicate what you knew about this experiment before participating.

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3.) Please rate as honestly as possible how believable you found the experimenter when he or she informed you that some of the materials had been left out. This question will remain anonymous and the experimenter will never learn of your rating

1	2	3	4	5	6
Completely Unbelievable	Moderately Unbelievable	Slightly Unbelievable	Slightly Believable	Moderately Believable	Completely Believable

## APPENDIX I. SCRAMBLED ANAGRAMS

A scrambled anagram is a word or phrase made that has had its letters reordered. For example, the letters 'plepa' can be rearranged to create the word 'apple'.

Please attempt to solve the following scrambled anagrams:

- |                 |             |               |          |
|-----------------|-------------|---------------|----------|
| 1.) House       | suho        | 23.) Down     | dnwo     |
| 2.) Screwdriver | drrviewecsr | 24.) Archive  | eahcvr   |
| 3.) College     | ceeogll     | 25.) Left     | lfe      |
| 4.) Laptop      | lpaotp      | 26.) Answer   | earnws   |
| 5.) Dish        | dhsi        | 27.) Contact  | cottanc  |
| 6.) Work        | rkow        | 28.) Straight | ttiahgrs |
| 7.) Laundry     | ladrynu     | 29.) Suit     | tius     |
| 8.) Truck       | tckur       | 30.) Present  | teenspr  |
| 9.) Coffee      | efefoc      | 31.) Thrill   | llhrti   |
| 10.) Vacuum     | uumavc      | 32.) Thursday | daysurht |
| 11.) Driveway   | yweavird    | 33.) Gossip   | poigss   |
| 12.) Baseball   | lblbaaes    | 34.) Sneeze   | eeenzs   |
| 13.) Purple     | plperu      | 35.) Heaven   | neeavh   |
| 14.) Canada     | caaand      | 36.) Ruler    | rlure    |
| 15.) Clothes    | coheslt     | 37.) Push     | phus     |
| 16.) Stairs     | sritas      | 38.) Electric | eccirtel |
| 17.) Rocket     | koctre      | 39.) Cake     | eack     |
| 18.) Mail       | alim        | 40.) Oxygen   | nyxgeo   |
| 19.) Bump       | bmpu        | 41.) Boss     | bsso     |
| 20.) Dance      | dcnea       | 42.) Seven    | svnee    |
| 21.) Glass      | gssla       | 43.) Bacon    | bcnoa    |
| 22.) Plane      | pealn       | 44.) Spoon    | soonp    |

## APPENDIX J. INSTITUTIONAL REVIEW BOARD APPROVAL FORM

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**Date:** 10/29/2015

**To:** Curt More  
W112 Lagomarcino Hall

**CC:** Dr. Stephanie Madon  
W112 Lagomarcino Hall  
Dr. Max Guyll  
W112 Lagomarcino

**From:** Office for Responsible Research

**Title:** Disconfirmation Bias

**IRB ID:** 15-582

**Approval Date:** 10/27/2015      **Date for Continuing Review:** 10/26/2017

**Submission Type:** New      **Review Type:** Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- **Retain signed informed consent documents for 3 years after the close of the study**, when documented consent is required.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- **Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems involving risks** to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. **Approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **IRB approval in no way implies or guarantees that permission from these other entities will be granted.**

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.