

FOEVER A SUBJECTIVE SCIENCE: THE BIAS AGAINST PSYCHOLOGICAL  
EVIDENCE MOTIVATED BY POLITICAL PARTY IDENTIFICATION

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## Abstract

### Forever a Subjective Science: The Bias Against Psychological Evidence Motivated By Political Party Identification

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To further investigate the bias against psychological methodology, this study assessed the difference between quality ratings of two types of psychological evidence (MRI scan or cognitive pencil-and-paper testing) given by an expert witness. Additionally, a language manipulation (subjective or objective) and participants' political party affiliation were assessed in regards to quality ratings. Results indicated a bias against behaviorally-based psychological evidence compared to the neuroscience-based psychological evidence, with neuroscience evidence rated more favorably than behaviorally-based evidence. This rating was accentuated in the evidence conditions when participants were motivated by their political preference. Participants who identified with the political party of the politician rated evidence more negatively than those who did not match his affiliation. The language manipulation failed to elicit strong enough effects in the results. Future research should focus on creating a stronger language manipulation and how moderating effects, such as political affiliation, can influence individuals' opinions on evidence.

## Table of Contents

List of Tables.....	p. iiv
Introduction.....	p.1
Bias Against Psychological Evidence.....	p.1
The Allure of Neuroscience.....	p.4
‘Hard’ Science versus ‘Soft’ Science Methodology.....	p.5
Perceptions of Psychological Evidence Quality.....	p.6
Social Identity Theory and Motivated Reasoning.....	p.7
Social Identification Towards Political Affiliation.....	p.9
The Use of Subjective Language.....	p.10
Subjectivity in Jury Decision Making.....	p.13
The Present Study.....	p.15
Methods and Materials.....	p.17
The Importance of Age-Based Sampling.....	p.18
Participants.....	p.18
Procedure.....	p.19
In-group/out-group manipulation.....	p.20
Case description.....	p.20
Manipulation checks.....	p.21
Dependent measures.....	p.22
Results.....	p.24
Manipulation Checks.....	p.24

Overview of hypothesis tests.....	p.25
Need for cognition.....	p .27
Opinions of evidence.....	p.28
Discussion.....	p.29
References.....	p. 36
Appendices.....	p.42
Appendix A.....	p.42
Appendix B.....	p.44
Appendix C.....	p.46
Appendix D.....	p.47
Appendix E: Informed Consent.....	p.50
Appendix F: Dependent Measures.....	p.51
IRB Approval.....	p.54
Curriculum Vita.....	p.55

## List of Tables

Table 1. Differences in Mean Scores for Type of Evidence by Index.....p.25

Table 2. Differences in Mean Scores for Group Match by Index.....p.26

## Forever a Subjective Science: The Bias Against Psychological Evidence Motivated By Political Party Identification

The field of psychology emphasizes the search to better understand human behavior by studying actions, thoughts, and feelings through processes of investigation with the scientific method. This is similar to other sciences, which also employ the scientific method to study their topics. Yet, psychology is perceived by the general public as less scientific when compared to “hard” sciences such as biology, chemistry, and physics (Lilienfeld, 2012). Implications of this perception extend to the use of psychology in providing scientific evidence towards social issues, public debates, and courtroom trials. It is crucial to understand the problematic perception psychology faces in the general public because scientific evidence holds a persuasive power in determining outcomes of important issues.

### **Bias Against Psychological Evidence**

Similar to many fields of science, psychology follows the traditional steps of the scientific method by conducting both lab and field experiments to provide insights into the unique patterns of the human mind and human behavior (American Psychological Association [APA] Presidential Task Force, 2009). Although many federal agencies and organizations recognize psychology as a science, psychologists are often excluded from opportunities in “hard” science related research programs or funding. In 2008, the National Science Foundation (NSF) Congressional Research Report for Congress listed psychology as a non-STEM (science, technology, engineering, and math) discipline, and psychologists are currently excluded from NSF’s program for scholarships in science as well as research experience programming for teachers (APA Presidential Task Force,



2009). Psychology's inconsistent pattern of recognition as a science generates a challenge for its future funding and research incentives.

To further emphasize this inconsistency, survey data collected for the American Psychological Association (APA) emphasized a "strong foundation in scientific methods and techniques" was indicated as "important" by the general public fewer times for psychologists compared to other fields, such as engineering and medicine (APA Presidential Task Force, 2009). With the broader scientific community dismissing psychology as being unworthy of traditional scientific funding opportunities, this may influence the general public's perceptions of psychology as a science. Additionally, most individuals view themselves as experts of psychology, interpreting human thoughts and behaviors as an intuitive process rather than a process that can be scientifically controlled (APA Presidential Task Force, 2009).

Interpreting psychology as an intuitive process comes from the general public's limited understanding of the discipline, thus not viewing psychology as a "hard" science (Mills, 2009). When evaluating scientific evidence, individuals tend to divide science into categories of "hard" natural sciences and "soft" social sciences (Hedges, 1987). The layman's terms "hard" and "soft" give a generalized perception of each category, one that has implications for how each science is perceived (Cassell, 2002; Simms, 2011). Harder sciences focus on the physical features and components, while softer sciences focus on living persons and more abstract concepts. In addition to these distinctions, the categorization shows preconceived concerns regarding each category's objectivity, with "soft" sciences being perceived as more subjective. The popular beliefs in categories of "hard" and "soft" sciences unintentionally create a science hierarchy that characterizes

“hard” sciences as more rigid and “soft” sciences as more malleable (Cassell, 2002). The perception of psychological methodology as a “soft” science can influence the opinions of other scientists to view psychology as less rigorous or less credible than “hard” science fields (Ferguson, 2015).

To provide a framework for the public skepticism towards psychology, Lilienfeld (2012) assessed the negativity towards psychology by identifying principal sources of these views. He indicated that the general public accepts behavioral sciences as a “softer” approach to scientific study. A survey by Wood, Jones, and Benjamin (1987) indicated that laypersons hold negative views towards psychology, with approximately 15% of individuals not believing psychology was a science and 83% believing daily life experiences provided them with adequate training in psychology. This finding suggests that the general public does not appreciate the scientific component of psychological research (Lilienfeld, 2012).

Additional survey evidence suggests more negative trends concerning psychology’s public image. Research by Janda, England, Lovejoy, and Drury (1998) examined the attitudes toward psychology relative to other disciplines such as biology, chemistry, and economics. They had experts within the disciplines and laypeople rate these disciplines based on the most important contributions made to society. Overall, psychology and sociology were viewed as less important than other disciplines. Janda et al. (1998) also coded any spontaneous comments made by participants and found that 96% of comments concerning psychology were negative. Additionally the expert participants, having substantially more knowledge than average participants, did not have more favorable opinions of psychology than laypeople (Janda et al., 1998). Survey results

are informative ways of gathering opinions for the public skepticism towards psychology, but further scientific inquiry is needed to understand why negative views towards psychology exist.

### **The Allure of Neuroscience**

When evaluating scientific evidence, it can be difficult to identify the motivation underlying public skepticism towards psychology. Lilienfeld (2012) indicated a variety of reasons explaining the public's skepticism towards psychology. In relevance to the current study, he noted neuroscience-based evidence is perceived as more scientific compared to other psychological domains such as personality psychology and cognitive psychology (Lilienfeld, 2012). Media has shown a similar perspective, favoring neuroscience evidence for its perceived power of explanation (Beck, 2010) with psychological evidence having more public interest when it contains neuroscience-based evidence (Weisberg, Keil, Goodstein, Rawson, & Gray, 2008). Weisberg et al. (2008) evaluated the allure of neuroscience by presenting participants with explanations that were either good or bad and with or without additional neuroscience evidence. Evidence containing neuroscience was judged as more satisfying than evidence without it. Even the addition of irrelevant neuroscience information impaired participants' ability to make judgments about the explanations, with bad explanations appearing to be good (Weisberg et al., 2008). Similarly, additional research has found that evidence supplemented with brain images has a persuasive influence on the perceptions of the research being assessed (McCabe & Castel, 2007).

**“Hard” Science versus “Soft” Science Methodology**

In addition to the allure of neuroscience, the general public relies on other superficial details that influence judgments of scientific evidence (Krull & Silvera, 2013). To investigate if the methodology used influenced judgments on the proceeding information, they asked participants to judge topics and equipment on the degree to which they perceived them as scientific. Results revealed that natural science topics were rated as more scientific than the behavioral science topics. Similarly, natural science equipment (microscope, magnetic resonance imaging) was rated as more scientific than behavioral science equipment (questionnaires, video games).

Contrary to the general public’s perceptions of the natural and social sciences, Hedges (1987) provides evidence that the two categories of sciences do not differ in the consistency of their findings. In assessing “hard” and “soft” science methodologies, they found that both categories relied on similar statistical techniques, thus neither natural nor social sciences were deemed as more reliable or valid statistically. Additionally, both categories were vulnerable to extraneous variables that may influence their overall validity. Science attempts to instill an emphasis on objectivity, control, and replication to ensure the highest probability towards claims (Boulter, 1999). In agreement with Hedges (1987) findings, science is focused on redefining its probability as it changes or evolves with time, thus all types of science are vulnerable to errors in their predictions (Boulter, 1999). After assessing the statistical components of both “hard” and “soft” sciences, Hedges (1987) suggested that there is less of a distinction between “hard” and “soft” science categories than what the general public perceives.

**Perceptions of Psychological Evidence Quality**

To further address psychology's negative perception, Munro and Munro (2014) isolated two psychological methodologies: cognitive testing evidence and neuroscience-based evidence. Participants rated psychological evidence based on neuroscience (i.e. MRI scan) as higher quality than the behaviorally-based psychological evidence (i.e. pencil-and-paper cognitive testing) when assessing an expert witness testimony on the mental state of an elected politician. Evidence ratings distinctions were especially evident when the evidence led to unfavorable outcomes for the participants' political party.

Additionally, a follow up to this study was conducted to investigate the "high-tech" appeal of neuroscience-based evidence (Behlen & Munro, 2015). A computerized cognitive testing methodology was added to make the behavioral-based evidence appear more "high-tech". Although the computerized condition failed to show a significant difference between the evidence conditions, this study led to the idea that perhaps the bias towards psychological evidence went deeper than incorporating a "tech" appeal (Behlen & Munro, 2015).

In comparing Behlen and Munro (2015) to the previous study by Munro and Munro (2014), the language used to evaluate the expert witness testimony was unintentionally phrased differently for each study. In the original study, a standard subjective language was used for all conditions with phrases like "in my opinion" presented in the expert witness testimony (Munro & Munro, 2014). For Behlen and Munro (2015), the language in which the evidence was presented was unintentionally written as more objective with phrases like "the results indicated". This was done to standardize all the conditions when the additional computerized cognitive-testing

condition was added. In recognizing this distinction between evidence language phrasing, it was suggested that people might discredit psychological evidence based on the language in which the evidence is presented to the receiver. Perhaps the manipulation of language could either accentuate or neutral the bias towards behaviorally-based psychological methodology, providing further insight for public skepticism.

### **Social Identity Theory and Motivated Reasoning**

Given that people are biased against psychological science, one such motivation for bias can be triggered through an individual's self-concept. Thus, when scientific evidence threatens an individuals' self-concept, they may be more inclined to view the evidence as less credible. This can be established through an individual's knowledge of his or her membership in a group or multiple groups (Greene, 1999). As group membership provides knowledge about the group and an added emotional bond to its members, this results in an overall more favorable bias towards the group (Greene, 1999). Social identity theory states that a person's self-concept and self-esteem is derived from their own personal identity as well as the status and accomplishments of the groups to which they belong (Tajfel & Turner, 2001). Categorization can be based on prominent social categories, such as political party identification (Greene, 1999). Biased favoritism displayed by individuals who strongly identify with their group can be due to extensive emotional significance and values placed on maintaining prominent group membership (Greene, 1999). In-group identification leads people to maintain positive in-group distinctiveness by emphasizing dependence on the group (Nadler et al., 2009). This effect can be particularly strong if the in-group feels threatened (Spears et al., 1997; Voci, 2006).

Threats to a group member's identity can evoke stronger biases from the in-group for strong identifiers. Spears, Doosje, and Ellemers (1997) studied in-group bias when self-identity was threatened. In-group refers to the group to which an individual belongs or identifies with (such as political party affiliation). Self-identity refers to how the individual identifies him or herself to the context of the group (as either similar or different). Self-stereotyping refers to the amount of perceived shared similarity displayed by group members. Results indicated that high and low identifiers responded differently when their group's distinctiveness was threatened. Low identifiers tended to distance themselves from the group, but high identifiers identified more strongly. This supports in-group favoritism by suggesting that group members show solidarity when their in-group is threatened (Spears et al., 1997).

Voci (2006) provided evidence of this relationship between self-identity and in-group favoritism by measuring the role and strength of groups under threat. This was reliable only within a clear group context, thus an individual has to identify with the group receiving the threat (Voci, 2006). By placing a stronger emphasis on a prominent social group, members are vulnerable to greater in-group favoritism (Greene, 1999; Tajfel & Turner, 2001). Yet, the effects of social identity theory are not always consistently strong enough to provoke bias in a way that is measureable (Hinkle & Brown, 1990; Spears et al., 1997). In order to produce a strong enough effect, an individual must have a clear and strong association with the group being selected to evoke a bias, such as that of political party affiliation (Hinkle & Brown, 1990).

When placing a stronger emphasis on group membership, individuals try harder to find support for beliefs they want to be true rather than those of the contrary (Nir, 2011).

Nir (2011) measured motivated reasoning; the tendency to focus on information that reiterates already established beliefs. Specifically, they assessed accuracy goals (search for both confirming and disconfirming information) and directional goals (uphold confirming information and reject disconfirming information) related to perceptions of political party preference. Results indicated that directional goals decreased participants' ability to seek out both confirming and disconfirming information about a topic, whereas accuracy goals improved their ability to see information more neutrally (Nir, 2011). Thus individuals valuing in-group favoritism could emphasize directional goals rather than accuracy goals to confirm that their group is superior.

Seeking out only confirming information, as described in Nir (2011), is especially strong when the information is ambiguous or conflicting. Hodson, Dovidio, and Gaertner (2002) examined ambiguous information when assessing biases towards aversive racism defined as negative evaluations of minorities that are realized by persistent avoidance of interactions with other ethnic groups. Specifically, this study assessed the thoughts, feelings, and behaviors of well-intentioned white Americans to assess the effects of aversive racism. When the applicant presented to participants had either strong or weak credentials, no racial bias occurred; however, when the credentials were ambiguous, participants were biased in favor of the white applicant (Hodson et al., 2002).

### **Social Identification Towards Political Affiliation**

When assessing social identification, people tend to feel strongly tied to their political party identification. Greene (1999) assessed how social identity varied for strong and weak partisans. Strong partisans showed a greater social identification towards their political party than weak partisans. Additionally, strong partisans reported a greater



distinction of their political party than that of weaker partisans suggesting that stronger partisans show a greater bias in setting themselves apart from those individuals not associated with their political party (Greene, 1999). To examine how the in-group biases towards political party affiliation may strengthen over time, Inyengar, Sood, and Lelkes (2012) conducted an archival study of voter surveys in the US and UK. They found that while ratings of one's own political party did not change significantly over time, people tended to rate the opposing political party more negatively. This increased polarization over time thereby creating a greater partisanship between political parties, reiterating how a strong identification can be formed through political party preference (Inyengar et al., 2012).

### **The Use of Subjective Language**

In addition to an individual's social identification, the way a statement is worded may elicit a stronger bias. Subjective viewpoint is a mode of narration located entirely within the participating character's consciousness, thus presenting itself in the form of judgments and opinions (Simpson, 2003). Objective viewpoint is a mode of narration that is neutral and impersonal with the absence of narrator judgments (Simpson, 2003). Writers use points of view to express effectively what they want to convey to their readers. The first-person point of view in narration reports information in a subjective manner, through thoughts and feelings of the direct experience. It is tightly controlled and limits access to information yet has the advantage of portraying false credibility and psychological realism (Diasamidze, 2014). When the narrator disappears within the story, the facts are allowed to present themselves in a more objective manner. With the author's telling replaced by showing, the illusion created is that the information is more direct.

The elements of subjective language can be referred to as statements of judgment, assumption, belief, and suspicion that vary depending on the person (Leo, 2001). Subjective language emphasizes personal language, judgment, assumption, emotion, exaggeration, and drama (“The University of Adelaide”, 2014). Examples of subjective language from Webster’s New World Dictionary College Edition (as cited in Leo, 2001) include statements such as, “He feels upset about the issue”, “They were not prepared for the test”, and “She did not want to contribute”. This is often common in literary works such as F. Scott Fitzgerald’s *The Great Gatsby* in which a passage contains subjective elements stating, “In my younger and more vulnerable years, my father gave me some advice that I’ve been turning over in my mind... (Simpson, 2013).” This first-person narrative defines the statement through personal experience.

In contrast, objective language can be referred to as statements that can be counted or described with information being unvaried from person to person. Objective language emphasizes a clear topic sentence, factual evidence, non-judgment, fair and accurate, tentative statements, and impersonal recommendations (“The University of Adelaide”, 2014). Examples of objective language include statements such as “I saw (something)”, “I counted (the loose change)”, or “I observed (the bird in the nest)”. Further examples of the difference between the subjective and objective language can be directly observed through the newspaper, with headliners presenting facts and editorials presenting facts alongside opinions (Leo, 2001). In literary works such as Hemingway’s *The Killers*, passages contain a more impersonal objective third-person form of narration stating, “Outside the arc light shone through the bare branches...Nick walked up the street...Three houses up the street was...” (Simpson, 2013). Thus the distinction between

subjective language and objective language is that between facts and observations versus feelings, thoughts, and opinions.

In scientific inquiry, people do not like science and subjectivity to coincide. Scientific inquiry is based on objective reasoning, which is typically quantifiable numbers, facts, and figures that transmit into hard information processing (Jahn & Dunne, 1997). This type of thinking has been preferred because it focuses on the actual existence or reality of the object, uninfluenced by emotions or personal prejudice (Leo, 2001). Messages perceived as being subjective are often viewed as less valid because they are affected by the mind resulting in feelings or emotions of the subject rather than the attributes of the object (Leo, 2001). The field of psychology is viewed as having a higher subjective component when compared to other sciences due to topics focused on less quantifiable components, such as perspectives or meanings (Crissman, 1944; Jahn & Dunne, 1997; Leo, 2001).

Unfortunately, the credibility of science appears to be determined by the degree of objectivity it can justify (Das, 1987). Science has the impossible task of trying to analyze and synthesize the human's subjective experience through numerous observations to gather the least subjective and most generalized understanding (Das, 1987). Scientific evidence can be judged based on its perceived subjective elements. Specifically, legal cases involving mental health are often won or lost through establishing or refuting subjective elements of claims (Faust & Ziskin, 1988). Subjectivity in regards to case evidence can be divided into two components: relating to the source of the information and relating to the state of the individual otherwise known as a subjective experience (Faust & Ziskin, 1988).

The source of information, although usually self-report, can be checked against other individuals or facts, yet assessing the psychological state of an individual can be much more circumstantial. For example in assessing a brain injury, a description of difficulties comprehending social interactions being used to determine the extent of damage is a more subjective experience rather than visually seeing which areas of the brain were affected from the injury using neural images (Faust & Ziskin, 1988). Because of this, psychological testing in mental health cases is viewed as more subjective compared to that of other types of scientific testing (Faust & Ziskin, 1988). The current study will investigate a case containing the mental health competency of a politician, having an expert assess the psychological state of the individual on trial. Choosing this scenario is meant to make the study more applicable to the real world as well as provide a setting where psychological methodology is used in providing evidence for decision-making.

### **Subjectivity in Jury Decision Making**

Subjectivity in trial evidence is strongly avoided when presenting a case to a jury. In the court system, a burden of proof is established by the evidence that demonstrates “beyond reasonable doubt”, yet does not require absolutely no error (Burden of Persuasion, n.d.). Reasonable doubt is found if the evidence produced is deemed to be slightly more probable of the defendant’s guilt over their innocence. The standard is that evidence must be “clear and convincing”. If scientific, technical, or other specialized knowledge can help aid in the understanding of the evidence, then an expert witness with qualified knowledge or skills may testify, typically in the form of an opinion (Federal Rules of Evidence, Rule 702). When testifying in the form of an opinion, the court must

determine the reliability of the facts by interpreting the validity of the science or the qualifications of the witness (Evidence, n.d.).

Jurors have been shown to be poor at identifying flaws in scientific research. In a study by Kovera, Russano, and McAuliff (2002), they reviewed the effectiveness of safeguards designed to protect jurors from depending on unreliable evidence. They evaluated overall quality of the expert's evidence and the effectiveness of safeguards, which were deemed as procedures to assist judges and jurors with making these evaluations, especially in hostile environments. Results suggested that jurors, attorneys, and judges are not very skilled at identifying flaws within the research thus able to be exposed to unreliable evidence (Kovera, Russano, & McAuliff, 2002).

In order for an expert witness to be persuasive in the courtroom setting, they must be perceived as a credible source of information (Bank & Poythress, 1982). While a witness may present evidence in an objective manner, it is the subjective appraisal by the jury that ultimately determines the persuasiveness of the expert's message. In the courtroom, mental health professionals may be perceived as helping to uncover the truth in resolving legal conflicts, yet the expert's impact may depend on elements of persuasion within the context of their statements rather than the evidence itself (Bank & Poythress, 1982).

Additionally, persuasion can come from the communicative process between the communicator and the receiver. The receiver of the intended message can have certain personality characteristics that influence the likelihood of attitude change, known as a Need for Cognition (Cacioppo & Petty, 1982). This refers to the degree to which people like to think deeply about things. Individuals high in the Need for Cognition (high-NC)

like to think, ponder, and consider multiple perspectives on issues. People who are low in the Need for Cognition (low-NC) do not enjoy much thought and contemplation on issues. People with high-NC are more persuaded by high-quality arguments and relatively unmoved by peripheral cues of persuasion (Gilovich, Keltner, & Nisbett, 2011b).

Contrary to this, other research suggests that people with high-NC may actually be more vulnerable to biases because these individuals actively process information and form opinions earlier than individuals with low-NC (Kassin, Reddy, & Tulloch, 1990). With previous research indicating mixed results for those high-NC identifiers, assessing this in the current study could provide additional information as to how people form opinions on the evidence conditions.

### **The Present Study**

Previous research by Munro and Munro (2014) indicated that “hard” psychological evidence using neuroscience-based methods was perceived as higher quality compared to “soft” psychological evidence using behaviorally-based methodology. Additionally, Behlen and Munro (2015) suggested that the bias towards “hard” neuroscience-based psychological methods was not simply due to the evidence’s high-technological appeal. To further investigate the bias towards “soft” psychological methodology, this study incorporated perceived Type of Language into the evidence methodology. The current study aimed to replicate the findings of Munro and Munro (2014) but adding a language manipulation to see if the effects they found towards different types of psychological methodologies were moderated by the manner in which the evidence was explained.

In this study, mock jurors read and evaluated expert testimony that consisted of either ‘soft’ (i.e. behavioral) or ‘hard’ (i.e. neuroscience) psychological evidence, which the expert presented in either subjective or objective language. Additionally, mock jurors’ political affiliation was assessed to test whether this impacted their appraisal of the expert’s testimony, thus giving the evidence either overall higher or lower ratings based on their affiliation. This matching was done following completion of the study to allow for the political party affiliation matching to be randomized based on affiliation of the participant.

With the variables of Type of Evidence (behaviorally-based vs. neuroscience-based), Type of Language (subjective vs. objective) and Group Match (participants’ party affiliation was either similar to the politician or different), the present study predicted the following overall main effects:

H1: For overall Type of Evidence, neuroscience-based psychological evidence will be rated of higher quality than behaviorally-based psychological evidence.

H2: For overall Type of Language, objective language evidence will be rated of higher quality than subjective language evidence.

H3: For overall Group Match, participants who identified with the political party of the politician on trial (matched) will rate evidence more negatively than those who did not match.

Additionally, the present study predicted the following interaction effects for Type of Evidence x Type of Language and Type of Evidence x Group Match as well as an overall three-way interaction between the three variables as follows:

H4: A Type of Evidence x Group Match interaction will be found, such that both evidence will be rated more negatively when individuals identified with the political party of the politician (match) than when they did not (mismatch) for behaviorally-based evidence. This difference will not be found with neuroscience-based evidence.

H5: A Type of Evidence x Type of Language interaction will be found, such that the higher quality ratings for neuroscience-based evidence will be accentuated when the evidence is written with subjective language and minimized with objective language.

H6: A three-way interaction between Type of Evidence, Type of Language, and Group Match will be found, such that a participants' party affiliation will moderate the interaction of Type of Evidence and Type of Language further decreasing the quality ratings of the evidence conditions when the participants match the party affiliation of the politician.

### **Methods and Materials**

The study consisted of a 2 (Type of Evidence: behaviorally-based vs. neuroscience-based) x 2 (Type of Language: subjective vs. objective) x 2 (Group Match: matched vs. mismatched) between-groups factorial design using a multivariate analysis of variance. Participants were randomly assigned to the Group Match variable for either an in-group or out-group based on their political partisanship matching (in-group) or mismatching (out-group) the politician.

### **The Importance of Age-Based Sampling**

Although Inyengar et al. (2012) assessed data depicting partisanship in the general population, prominent research that uses political identification to motivated bias has



been focused on samples of college students, such as Greene (1999), Nadler, Harpaz-Gorodeisky, and Ben-David, (2009), and Munro and Munro (2014). Political identity tends to be less developed in college students as they experience growth and alteration of their previous thought processes (Schiff, 1993). In a recent poll of college students' attitudes towards politics, approximately 43% of freshmen declare a "middle of the road" stance, which grew to 47% in 2012 (Egnatios, 2013). Similar evidence has been shown in sources such as the *Huffington Post*, which surveyed college students showing little interest in the 2012 election year (Moller & Powers, 2012). Additionally, Lottes and Kuriloff (1994) found that jurors often experience an increased motivation to evaluate evidence due to the seriousness associated by those who approach jury duty. With college students generally having less experience in a courtroom setting as well as less secure views about their political identity using a more diverse age sample was prioritized to emphasize of a more representative jury compared to an undergraduate sample.

### **Participants**

The sample consisted of 252 participants (males = 112, females = 56%) recruited through Amazon Mechanical Turk (mTurk) using Qualtrics. The forty-four participations (17.5% excluded) were later excluded for failing a manipulation check, which left the final sample of 208 participants (males = 97, females = 53%). Because this number appeared rather large, further analysis revealed twenty-one (48%) participants stated the political party affiliation was not specified in the materials and twenty-three (52%) participants failed to state the correct political party of the politician. Additionally, five participants from the 44 were excluded for failing to know the conclusion of the evidence. Although these participants were excluded from the overall analysis, the

number of dropouts was evenly distributed across all evidence conditions. Participants identified as either Democratic ( $n = 70\%$ ) or Republican ( $n = 30\%$ ) in order to participate. The average age of participants was 36 ( $M = 36$ ,  $SD = 11.52$ ). Most were of Caucasian ethnicity (81%) and currently employed (77%). Residence ranged across 36 states with Florida ( $n = 24$ , 11.5%) as the most frequently represented.

### **Procedure**

Participants were pre-screened based on two political questions and their state of residence. The political questions were identical to two questions used by the American National Election Studies (“American National Election Studies”, 2014) stating “Generally speaking, do you think of yourself as a Democrat, Republican, Independent, or something else?” and “If you selected Democrat or Republican for the previous question, would you call yourself a strong Democrat or Republican or a not very strong Democrat or Republican?” Those who identified as Independent were not eligible to participate in the study through mTurk. The question assessing state residence screened out individuals from Iowa, which was the geographical location used in the scenario. Those who qualified were shown an informed consent. Checking a box at the bottom of the document acknowledged that they read and understood the information. Participants were instructed about the task and asked to make judgments about the scenario. The average time for completion was twenty-five minutes. Participants were paid a total of \$2.00 for completion of the study.

**In-group/out-group manipulation.** Participants read a one-page scenario about an elected politician who had been recently cited for ethics violations (Appendix A). The scenario involved an ethics committee questioning the elected politician’s mental health.

The case called for an expert witness to evaluate the politician for possible cognitive impairments (i.e. early-onset Alzheimer's disease) and assess whether these impairments could affect his ability to serve in office. Included in the scenario was the manipulation that produced the Group Match (in-group vs. out-group) variable. For approximately half the participants used through random assignment, the politician under investigation was a Democrat, with a Republican Governor. For the other half of the participants, the politician was a Republican, with a Democratic Governor. After data collection, participants were grouped for the Group Match variable based on whether their political party identification matched the politician's (in-group;  $n = 94$ ) or mismatched the politician's (out-group;  $n = 114$ ).

All participants were led to believe in the beginning of the case description that if the politician did have early onset of Alzheimer's disease, he would be removed from office. It was clearly stated that the Governor was of the opposing political party and that he would appoint a temporary replacement from his party until the next election. The replacement of the politician by an opponent was incorporated to elicit stronger in-group identification among individuals who matched the politician's party.

**Case description.** After reading the background scenario, participants read the expert testimony containing the Type of Evidence and Type of Language manipulations. Participants were randomly divided between four experimental evidence conditions: subjective behaviorally-based (cognitive pencil-and-paper testing), subjective neuroscience-based (MRI scan), objective behaviorally-based (cognitive pencil-and-paper testing), or objective neuroscience-based (MRI scan). In all conditions, the expert evaluation revealed that the politician had suffered from cognitive impairments due to

beginning stage Alzheimer's disease, thus the overall decision stated was the politician would be unable to perform his duties and would be removed from office (Appendix A).

The case description was divided into three sections and formatted as a trial transcript to appear similar to a "real world" trial. The first three lines of the scenario provided background information of the expert's qualifications. The expert was presented as "Dr. Turner", in an attempt to make the name gender ambiguous. The type of doctorate received, either a psychiatrist (M.D.) or psychologist (Ph.D.), was not specified. The second section consisted of a three-line description of the type of psychological methodology used to make the evaluation, which varied based on the Type of Evidence of the condition. Throughout the descriptive paragraphs, Type of Language was manipulated for both Type of Evidence conditions with the addition of either subjective language (i.e. in my opinion...) or objective language (i.e. the results stated...). For all participants, the final section of the scenario ended with a two-line conclusion statement that the politician had beginning stage Alzheimer's disease and would be removed from office.

**Manipulation checks.** Following the case description, participants completed a questionnaire with manipulation checks to make sure they read and understood the scenario. The first check indicated whether the expert concluded that the politician did or did not have Alzheimer's disease. For the second check, participants indicated the political party of the politician, given the choices of "Democrat", "Republican", or "Not specified in the materials". Due to a failure of one or both of the following manipulation check questions assessing conclusions of the evidence and the political party of the politician, 17.5% of the total participants were removed from the analysis.

The third check evaluated differences between the evidence conditions using a 9-point rating scale ranging from “not at all” (1) to “very much” (9) for the question, “To what degree did Dr. Turner’s evaluation rely on biological-based evidence?” The fourth manipulation check evaluated differences between the types of language conditions (objective or subjective) using 9-point rating scales for the question, “To what degree was Dr. Turner’s evaluation based on opinion rather than fact?” Unlike the other manipulation check questions, this question was placed after the dependent measures to control for the possible priming of participants’ answers for the dependent measures section and did not exclude participants from the overall study.

**Dependent measures.** Participants rated the overall quality of the evidence contained in the expert evaluation in two questions assessing how strong and convincing the evidence was on 9-point scales. These scores were highly correlated ( $\alpha = .94$ ) and combined into an average score labeled the *quality index*. Participants’ perceptions of evidence as reliable, valid, precise, objective, and relevant were assessed with five questions on 9-point scales. These scores were highly correlated ( $\alpha = .92$ ) and combined into an average score labeled the *reasons index*. An example of these questions was, “To what degree is the evidence provided in Dr. Turner’s evaluation reliable or unreliable?” Additionally, these questions were stated in common language such as, “If tested on a different day, would the tests reveal the same or different results?”

The concluding two questions evaluated conclusions and consequences of the evidence. The two questions assessed the degree to which the politician had Alzheimer’s disease and if he was incapable of performing his duties in office on 9-point scales. These

questions were highly correlated ( $\alpha = .84$ ) and combined into an average score labeled the *conclusion index*.

Following assessments of quality and reasons, participants indicated specific aspects of the evidence that best represented their opinion. Participants selected one of seven-statement choice (Appendix F) that best represented their opinion about the evidence provided in the expert's evaluation. The choices were based on statement questions in the quality and reasons index where participants could select one overall statement they felt described the evidence. An example of one of the seven options stated, "The evidence provided was strong and convincing". Additionally, the seventh option allowed individuals to type their own opinion if it differed from the previously stated six opinion statements.

Following the questions assessing quality, reasons, and conclusions, participants completed The Need for Cognition Scale (Cacioppo, Petty, & Kao, 1984) with eighteen statements answered on 5-point scales with 1 being "extremely uncharacteristic of me" to 5 being "extremely characteristic of me". In the final section of the dependent measures, participants answered the remaining manipulation check assessing Type of Language as well as five demographic questions assessing sex, age, employment status, ethnicity, and their political party strength (see appendices).

## Results

**Manipulation Checks.** Manipulation checks were used to confirm that participants read and understood the case scenario as well as to test the effectiveness of the Type of Evidence and Type of Language manipulations. Additionally, the question assessing the

expert's perceived credibility was analyzed across all conditions to make sure the witness was viewed as credible.

An independent samples t-test was used to determine if there were differences in mean scores between the neuroscience-based (i.e. MRI scan) and behaviorally-based (i.e. cognitive pencil-and-paper testing) evidence conditions. The manipulation check question, "To what degree did Dr. Turner's evaluation rely on biologically-based evidence?" showed a significant difference between mean scores for behaviorally-based ( $n = 101$ ,  $M = 5.63$ ,  $SD = 2.54$ ) and neuroscience-based evidence ( $n = 107$ ,  $M = 7.79$ ,  $SD = 1.60$ ),  $t(206) = 7.34$ ,  $p < .001$  at 95% CI. This suggests that participants identified a difference between the two types of evidence conditions, with the neuroscience-based evidence being seen as more biologically-based than the behaviorally-based evidence condition.

An independent samples t-test was used to determine if there were differences in mean scores between the objective and subjective language conditions. The manipulation check question, "To what degree was Dr. Turner's testimony based on fact (ex: "The evidence indicated...") or opinion (ex: "I think the evidence...")?" showed no significant difference between mean scores of objective evidence ( $n = 84$ ,  $M = 7.24$ ,  $SD = 1.70$ ) and subjective evidence ( $n = 124$ ,  $M = 7.14$ ,  $SD = 1.68$ ),  $t(206) = .423$ ,  $p = .810$  at 95% CI. This suggests that participants did not view differences between the subjective and objective language conditions.

A one-way ANOVA was used to determine if participants viewed the expert witness as credible across the three variables of Group Match, Type of Evidence, and Type of Language. The question, "To what extent do you believe Dr. Turner is a credible

witness for this trial?” revealed no difference between the variables of Type of Evidence [ $F(8, 207) = .887, p = .537$ ], Type of Language [ $F(8, 207) = 1.01, p = .427$ ], or Group Match [ $F(8, 207) = .674, p = .714$ ]. This suggests that the conditions did not differ in the perceived credibility ratings of the expert witness, with each variable having high credibility ratings consistent across all conditions.

**Overview of hypothesis tests.** A 2 x 2 x 2 MANOVA was conducted on the three indices (*Quality*, *Reasons*, and *Conclusions*).

*Multivariate analysis.* A significant Type of Evidence main effect was found,  $F(3, 198) = 3.25, p = .023$  Wilk's  $\lambda = .95$ , partial  $\eta^2 = .05$ . Mean score differences for Type of Evidence are shown in Table 1 below.

**Table 1**

*Differences in Mean Scores for Type of Evidence by Index*

Evidence Condition	Dependent Measures Index		
	Quality	Reasons	Conclusions
	<i>M (SE)</i>	<i>M (SE)</i>	<i>M (SE)</i>
MRI scan	7.35 (.17)	7.45 (.16)	7.28 (.18)
Cognitive Testing	6.93 (.18)	6.87 (.17)	6.94 (.19)

*Note.* MRI evidence had significantly higher ratings than cognitive-testing evidence,  $n = 208, p < .05$ .

Consistent with H1, neuroscience-based (MRI scan) evidence was rated more favorably than the behaviorally-based (cognitive testing) evidence. Univariate analyses indicated that the Type of Evidence main effect was statistically significant for the *Reasons* Index [ $F(1, 200) = 6.47, p = .012$ , partial  $\eta^2 = .03$ ], but not for the *Quality* Index [ $F(1, 200) = 2.70, p = .102$ , partial  $\eta^2 = .013$ ] or the *Conclusions* Index [ $F(1, 200) = 1.65, p = .201$ , partial  $\eta^2 = .03$ ]. Thus, individuals rated neuroscience-based evidence as more



reliable, valid, precise, objective, and accurate compared to the behaviorally-based evidence.

There was no significant main effect for Type of Language [ $F(1, 200) = .182, p = .908$ , partial  $\eta^2 = .003$ ] with no statistically significant difference shown between the objective and subjective language evidence conditions, thus not supporting H2.

A significant effect for Group Match was also found,  $F(3, 198) = 2.68, p = .048$ , Wilk's  $\lambda = .96$ , partial  $\eta^2 = .04$ . Mean score differences for Group Match are shown in Table 2 below.

**Table 2**

*Differences in Mean Scores for Group Match by Index*

Group Match	Dependent Measures Index		
	Quality	Reasons	Conclusions
	<i>M (SE)</i>	<i>M (SE)</i>	<i>M (SE)</i>
Matched	6.96 (.18)	7.07 (.16)	6.84 (.19)
Mismatched	7.32 (.18)	7.25 (.16)	7.38 (.19)

*Note.* Matched participants had significantly lower index ratings than mismatched participants,  $n = 208, p < .05$ .

Supporting H3, matched participants rated the evidence more negatively than the mismatched participants for each index. Univariate analyses indicated that the Group Match main effect was significant for the Conclusions Index [ $F(1, 200) = 4.18, p = .042$ , partial  $\eta^2 = .002$ ], but not for the Quality Index ( $[F(1, 200) = 2.10, p = .149$ , partial  $\eta^2 = .010]$  or the Reasons Index ( $[F(1, 200) = .627, p = .429$ , partial  $\eta^2 = .003]$ ).

The two-way interaction between Type of Evidence x Group Match was not significant, [ $F(1, 200) = .612, p = .608$ , partial  $\eta^2 = .009$ ], thus H4 was not supported. These results did not support previous research (Munro & Munro, 2014) indicating an

interaction effect between evidence type and the political affiliation matching that of the politician on trial.

To assess whether objective language in evidence would decrease the difference between behaviorally-based and neuroscience-based evidence and subjective language in evidence would accentuate the difference in ratings, a two-way interaction between Type of Evidence x Type of Language was not significant, [ $F(1, 200) = .314, p = .815$ , partial  $\eta^2 = .005$ ], thus H5 was not supported. These results suggest that Type of Language did not affect quality ratings amongst evidence conditions.

To assess the predicted three-way interaction for H6 on the variables of Group Match x Type of Language x Type of Evidence, results were not significant [ $F(1, 200) = .112, p = .953$ , partial  $\eta^2 = .002$ ]. These results suggest that participants' party affiliation did not moderate the interaction of Type of Evidence and Type of Language.

**Need for cognition.** A multivariate analysis of covariance (MANCOVA) computed using Type of Evidence, Type of Language, and Group Match as independent variables and Need for Cognition as a covariate, revealed that the Need for Cognition scores did not provide additional information as to whether the evidence manipulation was persuasive, with mean score values similar to the initial multivariate analysis across conditions. The pattern did not change from the previous MANOVA analysis.

**Opinions of evidence.** Frequencies computed on the dependent measures questions assessing participants overall opinion of the evidence (Appendix F) indicated that both neuroscience-based and behaviorally-based evidence were selected as 'strong and convincing' 76% of the time, with evidence being selected as 'subjective' 11% of the time. Further analysis using cross-tabulations revealed for Type of Evidence that

neuroscience-based evidence was rated as ‘strong and convincing’ (83%) compared to behaviorally-based evidence (68%). Behaviorally-based evidence was selected as more ‘unreliable’ (7%), ‘invalid’ (2%), and ‘subjective’ (13%) compared to neuroscience-based evidence. These results suggest that neuroscience-based evidence was selected more frequently as being ‘strong and convincing’ than behaviorally-based evidence.

For Type of Language, both objective language (75%) and subjective language (76%) were rated ‘strong and convincing’ compared to the other six selection options, with similar percentages across each opinion selection. These results suggest participants rated both subjective and objective language conditions as similar, selecting ‘strong and convincing’ the most frequently. Additionally, for Group Match (participants matched or mismatched the politician) participants rated evidence as ‘strong and convincing’ for both matched (75%) and mismatched (76%) individuals suggesting evidence was overall described as ‘strong and convincing’ despite political party preference.

### **Discussion**

The current study compared individual perceptions of two different types of psychological methodologies (neuroscience-based and behaviorally-based) that were being used to support expert witness testimony for a mental health evaluation. The purpose of this was to replicate the bias that exists towards psychology, specifically within behaviorally-based methodology, understand individuals’ reasons for this, and determine if these perceptions could be motivated by political party identification. Additionally, this study supplemented the evidence with a language manipulation to assess the effects of language (i.e. subjective or objective) wording on individuals’ perceptions of evidence quality. By replicating previous research by Munro and Munro

(2014) as well as further attempting to isolate the bias against behaviorally-based psychological methodology with the addition of language, this study provides insight into how to better understand public skepticism towards psychological methodology within a real world context of jury decision-making.

To address a primary goal of this study, an attempt was made to emphasize a real world sample for the importance of stressing the existence of a bias against psychological methodology in the general public. Participants' ages and demographics were more representative of a jury distribution compared to a typical college student sample as well as they may have had experience serving on a jury or going through the selection process. Additionally, this non-college student sample was chosen to enforce participants' motivation of political party identification to be strong enough to feel threatened by the evidence presented in the case. College students have been shown to be unsure of their political identification or constantly changing their political identity, thus having a sample of individuals with preferably better established political party identifications was vital to the 'real world' applicability of this study as well as the emphasis of using political party as a strong enough motivator.

In concordance with previous research, this study confirmed that a bias exists against psychological methodology, with neuroscience-based evidence (MRI scan) viewed as higher quality than behaviorally-based evidence (cognitive testing pencil-and-paper). Survey research confirms this negative perception of psychological evidence (Janda et al., 1998), with neuroscience-based evidence having more favorable explanations (Weisberg, 2008). These results support previous research by Munro and

Munro (2014) in that “soft” behaviorally-based evidence is often perceived as less scientific and of lower quality than “hard” neuroscience-based evidence.

In addition to the results confirming the continued presence of bias for behaviorally-based psychological methods, participants’ Group Match illustrated how evidence is evaluated differently when it may threaten an individual’s social identity. Participants who ‘matched’ the political party of the politician (who was going to be replaced by a politician from the opposing party) viewed the evidence less favorably compared to those who did not match the politician on trial. Thus, participants who felt that the evidence threatened their political party preference were perhaps motivated to view that evidence more negatively. Individuals often practice favoritism towards their group identification by placing more significance on that social categorization, such as strong favoritism seen in judgments involving peoples’ political party identification (Greene, 1999). When this identification becomes threatened, favoritism towards ones group can accentuate a more favorable bias of the group compared to others groups (Spears et al., 1997; Voci, 2006).

Implications for this go beyond individuals simply exhibiting in-group favoritism. If the reliance to a group is strong enough to illicit biased favoritism towards those group’s members, perhaps social identifiers can persuade evidence evaluations in jury decision-making. During a jury selection process, it may be important to consider how those individuals socially identify with the defendants as well as the social issues surrounding the case. Not taking an individual’s social identity into consideration when selecting a jury could have unforeseeable consequences as to how these jurors may act in response to their already established favoritism towards their group membership.

To gain further insight into reasoning underlying participants' ratings of the evidence, the selected opinion question (Appendix G) provided participants with the option to summarize their overall perceptions of the evidence. Overall, behaviorally-based evidence was frequently selected as 'unreliable' or 'irrelevant' compared to neuroscience-based evidence. This provided additional support towards the public's skepticism towards psychological methodology, with behaviorally-based methodology lacking ratings of 'strong and convincing' compared to that of neuroscience-based evidence. Behaviorally-based evidence was more heavily critiqued compared to neuroscience-based evidence; with participants selecting 'other' to give an opinion not listed. These results have implications towards how psychological evidence is perceived, whether in a courtroom or in a meeting room, behaviorally-based methodology lacking perceived reliability and relevance can have negative implications for the issues it may try to support. Additionally, the expert witness's credibility was viewed as consistent across all conditions suggesting that the scientist is not necessarily viewed more negatively depending on the evidence presented, but rather the evidence methodology is what is being perceived as less credible between conditions.

Additional information obtained from the Need for Cognition Scale did not provide further reasoning as to why people are biased towards types of psychological evidence, with those high-NC identifiers being no more biased than low-NC identifiers. The results of this scale could be due to a sampling bias, as individuals recruiting for participation as paid surveyors through mTurk. These individuals have had experience with taking research surveys and could perhaps already be high-NC than the average

population or the distinct between participants was not large enough to show any significant effect on the overall analysis.

Although the bias against psychological methodology and participant's social identification influencing overall evidence ratings were consistent with past research, the interactions predicted for H4, H5, and H6 were not significant. In comparing this study to previous research in which this study attempted to replicate by Munro and Munro (2014), the current study did not find an interaction between Type of Evidence and Group Match. In Munro and Munro (2014) they found that individuals who were motivated by their political party identification were more likely to discount the behaviorally-based evidence because the conclusion of the evidence was undesirable to them. Although this interaction was not found in the current study, overall ratings of evidence conditions did show that individuals rated evidence more negatively when it was undesirable to their political party. Thus individuals were still motivated by their group identification when evaluating the evidence conditions.

The current study attempted to merge two areas of literature, linguistics and psychology, to investigate how presenting evidence in a particular point of view (either subjective or objective) would provide further understanding of the bias that exists against behaviorally-based "soft" psychological methods. Unfortunately, conclusions cannot be drawn about the influence of language (either subjective or objective) because the manipulation check question assessing the degree to which the evidence was objective or subjective revealed no difference between the conditions. Because of this, H2 predicting objective language to be favored over subjective language was inconclusive as well as the interaction effects predicted for all three variables. The

addition of a language manipulation was different from previous research by Munro and Munro (2014), which assessed quality ratings between the two previously stated types of evidence motivated by political party preference, especially when individuals were strong identifiers.

Although this study did not show subjective language producing a strong enough effect to influence peoples' perceptions of the evidence, the idea that language wording can influence bias is supported (Leo, 2001). As the results from this study and past research suggest that a favorable bias exists towards neuroscience-based evidence, perhaps the evidence can further confirm this bias when it is presented with subjective rather than objective language. Individuals will seek out the information that confirms their established preferences, thus presenting preferred information in a subjective format may increase the favorability of that information (Kastenmüller, Jonas, Fischer, Frey, & Fischer, 2013).

On the contrary, the favorability of the behaviorally-based conditions had similar ratings across conditions perhaps indicating individuals perceive behaviorally-based evidence to be subjective. It may not matter how the evidence is presented (subjective or objective) because the preconceived bias against behaviorally-based evidence may outweigh the degree to which the evidence is written (i.e. either subjective or objective). In order to test this speculation, future research should focus on developing the language manipulation to be clearer between conditions. Perhaps incorporating a different formatting, such as video or audio footage rather than reading words on paper could strengthen this manipulation. With a change of formatting for the language presentation,



this may elicit a stronger emotional engagement towards the evidence being presenting allowing personal bias to further prevalent.

The field of psychology is viewed as having a higher subjective component when compared to other sciences (Crissman, 1944; Jahn & Dunne, 1997; Leo, 2001). Thus it would be beneficial to understand how to use language to more effectively persuade people about the usefulness and importance of psychological evidence. Further research can provide a more thorough understanding as to why the bias towards behaviorally-based “soft” psychological evidence exists and what can be done to neutralize this bias. Understanding the bias between “hard” versus “soft” psychological evidence is beneficial to advancing the credibility of the field of psychology as well as establishing a stronger, more convincing portrayal of behaviorally based “soft” evidence, like those involving mental health evaluations.

The present study attempted to aide in understanding the bias toward “hard” and “soft” psychological methodologies by expanding upon previous research by Munro and Munro (2014) and Behlen and Munro (2015) with the addition of a language manipulation. While the results did not support the initial hypotheses, this study continued to provide knowledge about the bias that exists towards psychological methods and calls for future research in better manipulating the language component of the evidence. Moving forward, it is imperative to evaluate how to make individuals aware of these biases that could affect decision-making in a number of settings informed by psychological evidence including the courtroom, the boardroom, and the classroom. Understanding the identifying context of the individual as well as the interpretation of the bias is vital to uncovering why behaviorally-based psychological evidence is deemed as

less credible, more unreliable, more invalid, and more subjective than neuroscience-based psychological evidence. Thus, the categories of “hard” versus “soft” science will still be a battle fought within psychology, as psychological methodologies perceived as more behaviorally-based hope to gain credibility in a dominating a technologically-based era.

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Appendix A  
Introduction to Case Scenario

Representative Murray is a 65-year-old elected Iowa state Representative. He is a member of the *Republican (Democratic)* Party. He has recently been cited for several ethical violations involving things like failing to report donations to his campaign and unexcused failures to appear at required committee meetings.

The state rules require that the ethics committee interview anyone who has committed three ethics violations. After the interview, members of the ethics committee questioned Representative Murray's state of mind, in particular his memory. This will be evaluated by a professional to determine if Representative Murray has any cognitive problems that would prevent him from carrying out his duties as an elected representative.

In the following proceedings, an expert witness will be called in to determine the extent of Representative Murray's cognitive deficits. There are two possible outcomes for this case:

1. **Guilty verdict:** If Representative Murray **is** determined to have cognitive problems, he will be forced to resign and state rules will allow the *Democratic (Republican)* Governor of the state to appoint a replacement who will serve until the next election. The Governor has already announced that a replacement will be from the *Democratic (Republican)* Party.
2. **Not guilty verdict:** If Representative Murray **is not** determined to have cognitive problems, he can continue his position (assuming that he does not commit any more ethical violations).

Representative Murray scheduled a professional evaluation. A summary of the report can be found on the next page.

**(Overall Credentials of Expert Witness)**

**Attorney A:** Employed by the University of Iowa Carver College of Medicine, Dr. Turner has provided numerous professional evaluations in a number of similar cases for over 15 years, after receiving a degree from Wake Forest University.

**Attorney A:** What experience do you have Dr. Turner?

**Dr. Turner:** For the last 10 years, I have worked at the University of Iowa Carver College of Medicine assessing patients with cognitive deficits that result both from brain injury or old age, specifically focused on diseases caused by old age such as Alzheimer's disease.

**Attorney A:** Approximately how many patients do you see a week?

**Dr. Turner:** Currently, around five patients with occasional consultations for other Doctors in my department and some outpatient care.

**Attorney A:** What else is it that you do besides assessing patients directly?

**Dr. Turner:** I also teach doctoral students on how to identify cognitive deficits within the  
brain. I currently teach two seminars, one in the fall and one in the spring.

**Attorney A:** You appear qualified as an expert witness for this case, is there anything  
else  
you would like to add?

**Dr. Turner:** Not at this time.

**Attorney A:** Can you tell us what was being assessed in the case of Representative  
Murray?

**Dr. Turner:** I assessed Representative Murray for signs of beginning-stage Alzheimer's  
disease. This is characterized by the loss of cognitive function or thinking abilities.  
Damaged brain tissue makes it difficult to process information and can lead to memory  
loss, confusion, decreased attention span, and problems performing everyday activities.

Appendix B  
Subjective Cognitive-Testing Condition

**Attorney A:** Why did you consider assessing Representative Murray on this disease over any other you have studied?

**Dr. Turner:** In my opinion, it is a likely diagnosis of individuals experiencing cognitive deficits of sudden onset in later age.

**Attorney A:** Please walk us through your assessment of Representative Murray

**Dr. Turner:** In addition to extensively reviewing Murray's medical history, I conducted my

battery of cognitive tests to assess cognitive functioning. These tests provide a pattern of cognitive functioning that is used to identify specific problems in areas like memory, verbal fluency, and executive tasks that are always found among patients with Alzheimer's disease, while at the same time never find problems with visual perception that are definitely not characterized by Alzheimer's disease. The test is administered by myself, the professional, and then completed by the patient verbally or using pencil-and-paper materials. For example, one test of verbal fluency requires the patient to name as many animals as possible in 60 seconds. Another test requires the patient to draw a complex geometrical figure, first by copying it and then of course from memory. For my assessment, I obviously used at least two different tests for each area of functioning for example I had two different tests to assess verbal fluency.

**Attorney A:** And what did you conclude in these findings?

**Dr. Turner:** I found there was clearly no evidence of visual or audio problems that might compromise the results of the testing. However, there were obvious deficits in the areas of memory, verbal fluency, and executive functioning. The pattern of cognitive deficits found in Representative Murray is exceedingly consistent with those found among all my patients with beginning stage Alzheimer's disease. Thus, in my expert opinion, Representative Murray is suffering from beginning stage Alzheimer's disease. Currently, this degenerative disease cannot be cured. Therefore, in my opinion, the symptoms will continue exponentially and will eventually become extremely severe. Clearly, these symptoms will greatly interfere with Representative Murray's ability to fully perform his duties of a qualified elected official.

**Attorney A:** Just to restate that, you are saying that the thinking and memory impairs in Representative Murray will make him unable to perform his duties as an elected official?

**Dr. Turner:** Yes. That is the only logical explanation.

**Verdict:** Thank you for your time Dr. Turner. After assessing the expert evidence for this case, we are going to remove Representative Murray on accounts of cognitive deficits brought about by beginning-stage Alzheimer's disease.

Appendix C  
Subjective Neuroscience Evidence Condition

**Attorney A:** Why did you consider assessing Representative Murray on this disease over any other you have studied?

**Dr. Turner:** In my opinion, it is a likely diagnosis of individuals experiencing cognitive deficits of sudden onset in later age.

**Attorney A:** Please walk us through your assessment of Representative Murray

**Dr. Turner:** In addition to extensively reviewing Murray's medical history, I conducted my magnetic resonance imaging scan or MRI scan of Murray's brain to assess cognitive functioning. The MRI provides a "picture" of the brain that is always used to identify any structural problems like an aneurysm or a tumor that will most certainly be affecting the memory or other cognitive functioning of the patient. Additionally, the MRI can be used to constantly identify atrophy (deterioration of brain cells) or decreased blood flow to certain areas of the brain that are of course linked to Alzheimer's disease.

**Attorney A:** And what did you conclude in these findings?

**Dr. Turner:** I found there was clearly no evidence that an aneurysm or a brain tumor were present in the MRI results. However, there appeared to be obvious atrophy of brain cells in the temporal lobe. The structural markers found in Representative Murray are exceedingly consistent with those found among all my patients with beginning stage Alzheimer's disease. Thus, in my expert opinion, Representative Murray is suffering from beginning stage Alzheimer's disease. Currently, this degenerative disease cannot be cured. Therefore, in my opinion, the symptoms will continue exponentially and will eventually become extremely severe. Clearly, the symptoms will greatly interfere with Representative Murray's ability to fully perform his duties as qualified elected official.

**Attorney A:** Just to restate that, you are saying that the thinking and memory impairs in Representative Murray will make him unable to perform his duties as an elected official?

**Dr. Turner:** Yes. That is the only logical explanation.

**Verdict:** Thank you for your time Dr. Turner. After assessing the expert evidence for this case, we are going to remove Representative Murray on accounts of cognitive deficits brought about by beginning-stage Alzheimer's disease.

Appendix D  
Objective Cognitive-Testing Condition

**Attorney A:** Why did you consider assessing Representative Murray on this disease over any other you have studied?

**Dr. Turner:** Alzheimer's disease affects approximately 5.1 million people over the age of 65 each year in the United States.

**Attorney A:** Please walk us through your assessment of Representative Murray

**Dr. Turner:** In addition to reviewing Representative Murray's medical history, a battery of cognitive tests was used to assess cognitive functioning. These tests provide a pattern of cognitive functioning that is used to identify specific problems in areas like memory, verbal fluency, and executive tasks that are found among patients with Alzheimer's disease, while at the same time find no problems with visual perception that are not characterized by Alzheimer's disease.

The test is administered by a professional and completed by the patient verbally or using pencil-and-paper materials. For example, one test of verbal fluency requires the patient to name as many animals as possible in 60 seconds. Another test requires the patient to draw a complex geometrical figure, first by copying it and then from memory.

It can be shown that at least two different tests for each area of functioning for example there were two different tests to assess verbal fluency.

**Attorney A:** And what did you conclude in these findings?

**Dr. Turner:** The tests showed no evidence of visual or audio problems that might compromise the results of the testing. However, the results indicated deficits in the areas of memory, verbal fluency, and executive functioning. The pattern of cognitive deficits found in Representative Murray is consistent with research indicating deficits found among patients with beginning stage Alzheimer's disease.

Currently the disease cannot be cured. Therefore, the symptoms will continue and eventually become more severe. Representative Murray's symptoms will interfere with performing the duties of an elected official.

**Attorney A:** Just to restate that, you are saying that the thinking and memory impairs in Representative Murray will make him unable to perform his duties as an elected official?

**Dr. Turner:** Yes, that evidence indicates his memory impairments.

**Verdict:** Thank you for your time Dr. Turner. After assessing the expert evidence for this case, we are going to remove Representative Murray on accounts of cognitive deficits brought about by beginning-stage Alzheimer's disease.

Appendix E  
Objective Neuroscience Condition

**Attorney A:** Why did you consider assessing Representative Murray on this disease over any other you have studied?

**Dr. Turner:** Alzheimer's disease affects approximately 5.1 million people over the age of 65 each year in the United States.

**Attorney A:** Please walk us through your assessment of Representative Murray

**Dr. Turner:** In addition to reviewing Murray's medical history, a magnetic resonance imaging scan or MRI scan of Murray's brain was used to assess cognitive functioning. The MRI provides a "picture" of the brain that is used to identify any structural problems like an aneurysm or a tumor that might be affecting the memory or other cognitive functioning of the patient. Additionally, the MRI can be used to identify atrophy (deterioration of brain cells) or decreased blood flow to certain areas of the brain that are often linked to Alzheimer's disease.

**Attorney A:** And what did you conclude in these findings?

**Dr. Turner:** The scan showed no evidence that an aneurysm or a brain tumor were present in the MRI results. However, there appeared to be some atrophy of brain cells in the temporal lobe. The structural markers found in Representative Murray are consistent with those found among patients with beginning stage Alzheimer's disease. Currently, the disease cannot be cured. Therefore, the symptoms will continue and eventually become more severe. Representative Murray's symptoms will interfere with performing the duties of an elected official.

**Attorney A:** Just to restate that, you are saying that the thinking and memory impairs in Representative Murray will make him unable to perform his duties as an elected official?

**Dr. Turner:** Yes, that evidence indicates his memory impairments.

**Verdict:** Thank you for your time Dr. Turner. After assessing the expert evidence for this case, we are going to remove Representative Murray on accounts of cognitive deficits brought about by beginning-stage Alzheimer's disease.



Appendix F  
Informed Consent

**Purpose of this study.** This study is evaluating evidence quality among different scientific methodologies. The way evidence quality is perceived by the general public will be further assessed. Graduate student Margaret Behlen will be conducting this research as part of her first year project for the Experimental Psychology Masters Program at Towson University.

**Procedures.** Participants will be introduced to a case scenario about a politician being assessed for ethical violations. Following the initial case description, evidence pertaining to the case as well as the outcome of the trial will be given. After receiving all of this information, a series of follow up questions pertaining to the case and the quality of evidence will be presented to participants. This study will take approximately twenty-five minutes.

**Risks/ Discomfort.** There are no known risks or discomforts associated with this procedure.

**Benefits.** It is hoped that the results of this study will provide a better understanding of how evidence quality is determined in different psychological methodologies using a similar real-world example of evidence assessment.

**Alternatives to Participation.** Participation in this study is voluntary. You are at the liberty to withdrawal your consent to the experimental and discontinue participation at any time without prejudice. If you are receiving course credit for this research, please consult with your professor for the selection of alternatives to participation in studies.

**Confidentiality** All information collected during the study period will be kept strictly confidential. You will be identified through identification numbers. No publications or reports from this project will include identifying information on any participant. If you agree to participate in this study, please write and sign your name below.

I \_\_\_\_\_, affirm that I have read and understood the

above statement and have had all of my questions answered.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Witness \_\_\_\_\_ Date \_\_\_\_\_

If you have any questions after today, please feel free to contact Graduate Student Researcher Margaret Behlen at (443) 841-4017 or (mbehle2@students.towson.edu), faculty sponsor Dr. Geoffrey Munro (gmunro@towson.edu), as well as the Institutional Review Board for the Protection of Human Participants at Towson University at (410) 704-2236.

**THIS HAS BEEN APPROVED BY THE X IRB APPROVAL CODE: 16-X034**

Appendix G  
Dependent Measures

**Pre-screening Test Questions (Prior to beginning of study):**

1. Generally speaking, do you think of yourself as a Democrat, Republican, Independent, or something else? \_\_\_\_\_
2. If you selected Democrat or Republican for the previous question, would you call yourself a strong Democrat or Republican or a not very strong Democrat or Republican? \_\_\_\_\_
3. What state are you currently a resident? \_\_\_\_\_

**Dependent Measures Questions**

Check the space or circle the number that best represents your answer for each question.

- 1) Did Dr. Turner conclude that Representative Murray does or does not have beginning-stage Alzheimer's disease?

DOES have beginning-stage Alzheimer's \_\_\_\_\_

DOESN'T have beginning-stage Alzheimer's \_\_\_\_\_

- 2) To what degree did Dr. Turner's evaluation rely on biologically based evidence?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
Not at all Very Much

- 3) What political party is Representative Murray a member?

Democratic \_\_\_\_ Republican \_\_\_\_ not specified in materials \_\_\_\_

- 4) How strong was the evidence provided in Dr. Turner's evaluation?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
Very weak Very strong

- 5) How convincing was the evidence provided in Dr. Turner's evaluation?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
Not at all Very  
convincing convincing

- 6) To what degree is the evidence provided in Dr. Turner's evaluation reliable or unreliable (i.e., if tested on a different day would the tests reveal the same or different results)?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
Very unreliable Very reliable

- 7) To what degree is the evidence provided in Dr. Turner 's evaluation valid or invalid (i.e., the tests are or are not measuring what Dr. Turner claims they are measuring)?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
 Very invalid Very valid

- 8) To what degree is the evidence provided in Dr. Turner's evaluation precise/accurate or imprecise/inaccurate (i.e. the test results contain little to no error or a great deal of error)?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
 Very imprecise/inaccurate Very precise/accurate

- 9) To what degree is the evidence provided in Dr. Turner's evaluation objective or subjective (i.e., the evaluations of other professionals would be the same or very different)?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
 Very Very  
 subjective objective

- 10) To what degree is the evidence provided in Dr. Turner 's evaluation relevant or irrelevant (i.e., the evidence provided by Dr. Turner is or is not relevant to the question of whether Representative Murray is able to perform his duties)?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9  
 Very irrelevant Very relevant

- 11) Select **one** of the following statements that best represent your opinion about the evidence provided in Dr. Turner's evaluation.

\_\_\_ The evidence provided is strong and convincing  
 \_\_\_ The evidence is unreliable (if tested on a different day, the results would likely be different)  
 \_\_\_ The evidence is invalid (the tests are not measuring what they are supposed to be measuring)  
 \_\_\_ The evidence is imprecision/inaccurate (the results have a lot of error)  
 \_\_\_ The evidence is subjective (different professionals would have different conclusions)  
 \_\_\_ The evidence is irrelevant (the evidence cannot answer the guilt question)  
 \_\_\_ I have an opinion that is different from all of the options above that I have explained below:

- 12) Based on the evidence provided in Dr. Turner's evaluation, do you believe Representative Murray has beginning-stage Alzheimer's?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

Not at all

Very much

- 13) Based on the evidence provided in Dr. Turner's evaluation, do you believe Representative Murray should be removed from office?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

Not at all

Very much

- 14) To what extents to you believe Dr. Turner is a credible expert witness for this trial?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

Not at all

Very much

**Basic Demographic Information:**

Provide the following information:

1. Age: \_\_\_\_\_

2. Sex:        a. Female                      b. Male                      c. Other \_\_\_\_\_

3. Employment status: a. Full-time              b. Part-time              c. Unemployed

4. Ethnicity:

a. African American

b. Asian American

c. Caucasian/ White

d. Latino/ Latina

e. Other \_\_\_\_\_

5. Politically speaking, I consider myself to be a:

1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7

Strong Democrat

Strong Republican

6. To what degree was Dr. Turner's testimony based on fact (ex: "The evidence indicated...") or opinion (ex: "I think the evidence...")?

1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 9

Not at all

Very Much

**EXEMPTION NUMBER: 16-X034**

To: Margaret Behlen  
From: Institutional Review Board for the Protection of Human  
Subjects, Debi Gartland, Chair  
Date: Thursday, October 22, 2015  
RE: Application for Approval of Research Involving the Use of  
Human Participants

Office of Sponsored Programs  
Et Research

Towson University  
8000 York Road  
Towson, MD 21252-0001

T 410 704-2236  
F 410 704-4494  
www.towson.edu/ospr

Thank you for submitting an application for approval of the research titled,  
*Distinguishing the Subjective Component of Bias Perceptions Towards  
Psychological Evidence Motivated By Political Party Identification*

to the Institutional Review Board for the Protection of Human Participants  
(IRB) at Towson University.

Your research is exempt from general Human Participants requirements  
according to 45 CFR 46.101(b)(2). No further review of this project is  
required from year to year provided it does not deviate from the submitted  
research design.

If you substantially change your research project or your survey  
instrument, please notify the Board immediately.

We wish you every success in your research project.

CC: Geoffrey Munro  
File

## CURRICULUM VITA

Margaret Behlen

612 Wilton Road, Towson, MD 21286

Experimental Psychology

Masters of Arts, 2016

Secondary Education: Notre Dame Preparatory, Towson, MD | 2010

Collegiate institutions attended	Dates	Degree	Date of
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Degree
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Towson University   Towson, MD	08/14 – 05/16	Masters of Arts	May 2016
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Marietta College   Marietta, OH	08/10 – 05/14	Bachelor of Arts	May 2014
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Major: Psychology | Minors: Biology, Leadership Studies

Professional Publications & Presentations:

Stansbury, J., & Behlen, M. (2016, April). *Service beyond the methods: Integrating service-learning into psychology research methods*. Manuscript submitted for publication in The Scholarship of Teaching and Learning in Psychology.

Behlen, M. (2016, April). *Integrating service-learning into psychology*. Student Speaker at the Maryland Psychological Association for Graduate Students Convention.

Murno G., & Behlen, M. (2015, September). *Connecting psychological science with climate change: A persuasion and social influence assignment*. Manuscript submitted for publication in The Scholarship of Teaching and Learning in Psychology.

Behlen, M., & Munro, G. (2015, April). *Biased evaluations towards scientific evidence: “High-tech” versus “low-tech” perceptions of psychological evidence motivated by political party identification*. Poster presented at the Maryland Psychological Association of Graduate Students Annual Convention, Columbia, MD.

Munro, G, Munro, C, & Behlen, M (2015, March). *“Soft” vs. “hard” psychological science: Biased evaluations of scientific evidence that threatens or supports a strongly held political identity*. Poster presented at the Eastern Psychological Association Annual Conference

Behlen, M. (2015, March). *Biased Evaluations Towards Scientific Evidence*. Guest Speaker at monthly research symposium at Marietta College, Marietta, OH.

Professional positions held:

Graduate Assistant | Towson University Office of Student Activities

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Maryland Psychological Association for Graduate Students (MPAGS) Membership Chair

