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Physiological measures differentiate distinct domains of immanent justice reasoning

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Physiological Measures Differentiate Distinct Domains of Immanent Justice Reasoning

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Abstract

Just-world theory research investigates how an individual's world-view influences his/her behavior when confronted with injustice. The purpose of the present study was to examine the utility of multiple continual physiological measurements as predictors of just-world motivated behavior such as immanent justice reasoning (IJR) in a replication of Callan, Ellard, and Nicol's (2006) study. Participants (N=109) were assigned to one of two narrative groups – either an adulterous scenario or a non-adulterous scenario. It was hypothesized that levels of IJR would be higher in the justice-threat than the non-threat condition, and that measures of physiological arousal would predict IJR. Results show that significantly higher responses of IJR were observed during the non-adulterous condition. Additionally, physiological indicators of emotional arousal correctly predicted IJR. These results indicate that physiological measures are useful in assessing justice-threat scenarios, and further research should use such indicators in addition to self-report affect measures.

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Introduction and Review of Literature

Human beings have always struggled against odds in order to carve out a place in the world. Yet people seem to maintain a sense of optimism while constantly surrounded by misfortune and tragedy. Why do people labor long and hard under harsh circumstances, while evidence of the tenuousness of their existence is unavoidable? The fruits of our labor can be stolen without notice. How do people maintain the belief that the world is a just place, and that a given person will get what they "deserve" in the end? These questions are fundamental to the study of just-world theory. Just-world theory suggests that – in general – people have a cognitive bias to perceive the world as morally fair or just. It is the endeavor of just-world theorists to study how this cognitive bias influences a person's attitudes and behaviors.

The study of just-world theory formally began with Lerner and Simmons' (1966) pioneering study, in which the authors noticed a peculiar phenomenon in their research participants. While participants watched a video of a girl being mercilessly electroshocked for failing at a cognitive task, Lerner and Simmons observed that participants tended to blame the victim for her poor performance. The authors found that there was a relationship between how much the participants denigrate the character of a victim and whether or not the participants had the power to alleviate the victim's suffering. The results showed that participants who were unable to help the victim were significantly more likely to derogate the character of the victim. These findings suggest that when participants were unable to ease the suffering of a victim, they found strategies that alleviated the stress they felt. Lerner and Simmons hypothesized that people have an ingrained sense of justice, as well as a general tendency to protect this sense of

justice by modifying their own attitudes when it is threatened by injustice that they cannot control:

> They proposed that people need to believe that the world is a just place in which individuals get what they deserve. The need to believe in a just-world is reflected in how people respond to justice and injustice in the world and, more broadly, in the way that people orient their lives around issues of deservingness. For example, when the notion of a just-world is threatened by contrary evidence, like the innocent victims in Lerner and Simmons's [sic] experiment, people may engage in a variety of behaviors that help to maintain a sense of justice. These behaviors range from helping or compensating the victim to psychological rationalization of the victim's fate – for example, perceiving the victim's fate as deserved (and, therefore, less unfair) because of her unworthy character. (Hafer & Begue, 2005, pp. 128 – 129)

Theories Regarding Belief in a Just World

Lerner hypothesized that people come to function in the world as if they have a personal contract that provides hope that their struggles might not be in vain (Lerner, 1977; Lerner & Miller, 1978). That is, in order for people to believe that the effort they exert in life will pay off, they may develop an implicit assumption that there are rules to the way the world works (i.e. a personal contract). Researchers have hypothesized that if this were not the case, it would be hard for people to justify the amount of effort they invest in their future. It was assumed that this

belief in a just world (BJW)[1] was a natural developmental process because individuals must learn to subjugate their immediate will, and delay rewards from personal investments for a later time:

> From this perspective, the fate of others becomes important in part because indications that others are not getting what they deserve (to the extent that others are seen as members of one's own world) threaten the notion that the world is just and, therefore, one's commitment to the personal contract, a concept around which much of life is organized. (Hafer & Begue, 2005, p. 130)

Lerner (1977) expected nearly all people, under reasonably stable living conditions, to develop a theory (i.e. belief) that the world is just, and he suspected that people are motivated to protect this belief when the events in a person's life present contrary evidence. Lerner originally developed the theory to explain the findings in Lerner and Simmons (1966) – that people have a general motivation to maintain a belief in justice, and that they have a variety of strategies to do so (Lerner, 1980). Historically speaking, cultures have employed this human characteristic through the creation of complete ethical frameworks, which were socially engineered to convince common people that goodness of character and hard work will result in rewards in this life or in the next. This concept is not unlike the Puritan ethical framework in the United States (Weber, 1905/2002).

Personality and Individual Difference Measures regarding Belief in a Just World

A self-report measure was developed by Rubin and Peplau (1975) in order to measure the relative strength (i.e. degree) of an individual's BJW. Rubin and Peplau's work was based on

[1] Contained in Appendix A is a key of all acronyms used throughout this document for the reader's convenience.

prior research that suggested a person's tendency to blame victims, under controlled conditions, could be predicted by assessments of the participant's religiosity, authoritarianism, and locus of control. The researcher's goal was to develop an individual difference personality construct assessment that had more predictive power towards just-world motivated behaviors (JMB), such as victim blame, rather than other less direct assessments (i.e. religiosity). In Rubin and Peplau's self-report survey, they selected direct questions about participants' beliefs that focused on how just participants believed the world to be (e.g. "Basically, the world is a just place"). The direct questioning approach evolved from Rubin and Peplau's original assessment, and many just-world theorists use these individual difference assessments as indicators of individuals' implicit need/motivation to believe in a just world (Hafer & Begue, 2005; Schmitt, 1998), and attempt to predict subsequent JMB from these indicators.

Rubin and Peplau's (1975) just-world measure was the gold standard until recently when a new generation of measures was adopted. Several critiques have been written about Rubin and Peplau's general psychometric measure (Furnham, 1998, 2003; Furnham & Procter, 1989; Maes, 1998; Schmitt, 1998). The first consideration focused on the semi-orthogonal nature of the two types of questions in their scales (e.g. just and unjust questions). Just questions take the form: "People who get 'lucky breaks' usually have earned their good fortune," and unjust questions: "Good deeds often ***go*** unnoticed and unrewarded." This suggested that questions that positively assert that the world is a just place are assessing a distinctly different construct than questions that negatively assert that the world is unjust. That is to say, a participant might report both that the world is just and that the world is unjust, which means something unique to just-world theory (Dalbert, Lipkus, & Goch, 2001). This phenomenon could potentially be a result of certain response biases, especially an affirming response style. Some researchers in this area have built

validity measures into their scales to assist in accounting for this behavior. The most popular measures to date, however, have unfortunately dropped such validity measures from the scales. Additionally, Rubin and Peplau's assessment used specific questions of a non-general nature (e.g. "It is often impossible for a person to receive a fair trial in the USA."), which led to relatively low levels of reliability, as represented by Cronbach's alpha (see Schmitt, 1998; Furnham & Procter, 1989). Improved measures were devised (see Dalbert, 1999; Dalbert, Montada, & Schmitt, 1987; Furnham & Procter, 1989; Lipkus, 1991; Maes & Schmitt, 1999) in order to further develop Rubin and Peplau's BJW measure and have been commonly used since. Regardless of the psychometric improvements made to BJW assessments, self-report individual difference measures of a BJW remain weak predictors of JMB (Hafer & Begue, 2005).

Additionally, newer theories suggest that self-report measures do little to assess implicit motivation at the core of just-world theory, and that researchers should seek alternative means to assess implicit motivations (see Dalbert, 2001; Hafer, 2000; Kay & Jost, 2003). Moreover, it has been found that the new generation of BJW measures have their own set of problems, such as response bias issues and a positive correlation with social desirability measures (Guzewicz & Takooshian, 1992; Heaven & Connors, 1988; Kassin & Wrightsman, 1983; Lerner, 1978; Loo, 2002; Schmitt et al., 1991). This suggests that much of what BJW measures might be assessing is actually a social desirability or affirmation response bias.

Just-World Theory Scenario Domains

Due in part to the extraordinary diversity of ways by which a person may be threatened because of injustice, experimental investigations of just-world theory have sought to utilize a great variety of different scenarios of injustice (i.e. contextual topics/domains). An example of a scenario might be in a school setting, such as getting a bad grade undeservingly (Dalbert &

Stoeber, 2006). Another would be in the American judicial system (Kivisto & Swan, 2011) as to whether or not someone can expect a fair trial; either way, distinctions between these different environments are rarely the topic of interest. Experimenters are most concerned with whether or not a scenario will induce a group of participants to exhibit JMB.

It seems that sexual assaults are one of the most commonly investigated scenarios. This is possibly because of the propensity for sexual assaults to provoke a potent defensive emotional response in participants. This suggests that emotional intensity is an influential component in justice-motivated rationalizations. Other domain scenarios have been used, for instance: HIV/AIDS (Correia & Vala, 2003), car accidents (Callan, Ellard, & Nicol, 2006), gambling losses (translated, Schmitt, 1991), kidnappings (Ellard et al., 2002), electric shock (Feinberg et al. 1982), poverty (Pancer, 1988), shootings (Simmons & Mitch, 1985), stalking (Sheridan et al., 2003), layoffs (Skarlicki et al., 1998), and even inflicting injustices on participants experimentally (Dalbert, 2002). All of the aforementioned have been experimentally used to provoke an intense sense of injustice in a participant.

Just-World Motivated Defensive Strategies

Lerner (1980) outlined strategies that people use to reduce threats to their personal beliefs in a just world (i.e. justice-threats). He believed that each strategy would fit into one of nine categories. The first two are considered rational strategies. They consist of (1) a motivation to prevent the possibility of an injustice occurring in the future ("prevention"), and (2) a motivation to compensate a victim of an injustice ("restitution"). Both strategies incorporate the acknowledgement that an injustice did occur, hence their label of "rational." In addition to the rational strategies, Lerner added four non-rational strategies to the list. They consist of (3) denial/withdrawal, characterized by an avoidance of a threat, (4) reinterpretation of cause,

characterized by a rationalization that a victim is to blame based on possible actions which make the victim responsible for their misfortune, (5) reinterpretation of character, where qualities of a person are changed in order to make them seem more deserving of, for example, a layoff and (6) reinterpretation of outcome, to interpret an outcome as not really being as bad, or even as a valuable experience. The "non-rational" rationalization strategies all incorporate an unwillingness to acknowledge that an injustice has occurred.

Lerner (1980) proposed two additional defensive strategies that could be better understood as worldviews. (7a) The first world view is called ultimate justice. This is best characterized by a belief that people will, at some point, receive justice. Ultimate justice incorporates ideas (i.e. beliefs) such as fate, a reward or punishment in an afterlife, and/or a general expectation of "karma." (7b) A variant of ultimate justice is immanent justice reasoning (IJR) which, instead of stretching the resulted consequences of one's behavior to a point in the unforeseen future, IJRs make a much closer connection between one's actions and his/her consequences, temporally and causally (Maes & Kal, 2002). That is, ignoring metaphysical explanations, IJR simply assumes that justice will be served in a timely and decisive manner. Alternatively, as Piaget coined, "fault will automatically bring about its own punishment" (Piaget, 1932/1965, p. 256). (8) The second worldview was coined by Hafer and Begue (2005) as a "multiple worldview." This consisted of a perspective that the rules of one's personal contract only apply in certain environments. For example, injustice might be the rule in other countries stricken with poverty and corruption, but in the environment of the observer/individual, one's expectations of a just world are realistic. Distinctions could even be made with environments that are bumped up against (or even layered upon) each other; for example, a ghetto surrounded by a city could have distinctly different rules from the city that encircles it.

(9) The last defensive strategy was called the "penultimate defense" by Lerner, and was coined in Hafer and Begue as the "False Cynic" defense. This strategy occurs when a person expresses that they do not believe the world to be a just place, yet harbors strong implicit feelings to the contrary (Holmes, Miller, & Lerner, 2002). It is evident that, if experimental participants use the "False Cynic" defensive strategy, this could greatly distort explicit self-report measure results.

One of the difficulties with studying different defensive strategies is that, in any ambiguous and open-ended injustice provoking scenario, nearly any injustice defensive strategy can be used. Using Callan, Ellard, and Nicol's (2006) first study scenario as an example, a man falls victim to a horrific car impact while walking across the street. Just-world theory would suggest that because of the injustice threatening, and emotionally arousing nature of the event, people are highly likely to utilize defensive strategies to explain such an event (in order to calm themselves or reduce dissonance). One way different defensive strategies could be characterized is by what a person says about an event. A few examples of what a person might say, that is dependent upon what justice motivated defensive strategy is being used, include: "I should petition the local government to install better walk/don't walk signals" (prevention), "I should go bring him flowers in the hospital" (restitution), "I doubt he even got hit that hard, and the news anchor is exaggerating" (denial/withdrawal), "He must have forgotten to look both ways before crossing the road" (reinterpretation of cause), "He must have been an unperceptive and careless individual" (reinterpretation of character), "I am sure he learned a valuable lesson about crossing the road" (reinterpretation of outcome), "He is in a better place now" (ultimate justice), "Well, that's California for you, no one there knows how to drive" (multiple worldview), and "You never know when a freak accident is going to happen" (penultimate defense).

Three things become immediately clear when noting the ease and diversity of these different strategies. First, an individual has many ways at his/her disposal to eliminate justice-threats. Second, that not any one explanation is mutually exclusive of another as an explanation for unjust events, and that it is not only possible, but also likely that an individual will use multiple approaches. Third, there are individual differences in the propensity to utilize different methods, and some methods might not be used at all by a given individual. For example, an ultimate justice explanation such as, "Evil doers will get their comeuppance in the afterlife," does not likely lend itself to be used among individuals who do not believe in an afterlife.

There are many different strategies for investigating JMB. JMBs seem to manifest in situations that are perceived to be unfair to the observer. An experimental manipulation is performed by comparing two scenarios: one with a hypothesized justice-threat (i.e. experimental condition), and another scenario as similar to the experimental condition scenario as possible, but without any perceived injustice (i.e. control condition). The experimental manipulations used to create levels of justice-threat provocation have multiplied over the years, and used an assortment of different variables. Some examples are: the duration of an injustice (Ellard et al, 2002; Hafer, 2000b), the noticeability or salience of an injustice (Schuller et al., 1994), how responsible a participant feels when s/he are the subject of an injustice (Correia & Vala, 2003), attractiveness of person (utilizing the halo effect; Callan, Powell, & Ellard, 2007; Dion & Dion, 1987), how severely a person suffers (Callan, Ellard, & Nicol, 2006), whether or not the perpetrator of injustice was punished (Hafer, 2000a), and whether or not a participant was allowed to compensate a victim (Lerner & Simmons, 1966). All these experimental manipulations can be reduced down to three general methods as outlined by Hafer and Begue (2005). It is also important to note that these methods are "ambiguous with respect to fairness" (Hafer & Begue,

2005, p. 136). The first is the character of the target, next being the behavior of the target, and the final aspect being the intensity of the consequence.

The measures used to evaluate JMB are just as diverse, and are often crafted in order to target a particular defensive strategy. Examples are measures that assess the participant's tendency to blame the victim (Triplet, 1992), a participant's assessment of a person's deservingness of misfortune or reward (Correia & Vala, 2003), a participant's perceived senselessness of an unjust event (Lodewijkx et al., 2001), the proximate avoidance of a participant from a perceived injustice (e.g. distance stood from a poster of a starving child in Africa; Pancer, 1988), the amount a person would pay in restitutions to a victim (Skarlicki et al., 1998), how demonic or evil a perpetrator of an injustice is perceived to be (Ellard et al., 2002), whether or not/how much a participant will believe that two events are causally related (Callan, Ellard, & Nicol, 2006), and the effects of cognitive load on IJR behaviors (e.g. participants memorized a long string of digits before responding, which impacted their likelihood to blame the victim; Callan, Sutton, & Dovale, 2010).

Experimental Methods Regarding Just-World Theory

There is some finesse involved in how experimenters choose the method they want to use to induce a justice-threat, because it must be tailored to the JMB they wish to detect. Designs seem to be custom-made in order to show that a particular type of defensive strategy is being performed (i.e. answering questions about whether or not a particular strategy even exists). Yet, when an experiment is designed to show that a particular strategy exists, it may also conceal other strategies that participants might be utilizing. An example of this might be an experimental question that asks about the social character (i.e. victim blame denigration, by a reinterpretation of character) of a woman who is actively being shocked on video while trying to perform a task.

This particular scenario was reported in Lerner's (1980) book and was based on an unpublished study (pp. 76 – 77). Under this type of scenario, researchers often chose to observe whether participants were blaming the victim by assessing if participants believed the woman in the video was not very good at her task. This defensive strategy is best interpreted as a reinterpretation of the women's character. Nevertheless, under the same scenario, participants might alternatively utilize the reinterpretation of outcome defensive strategy instead of reinterpretation of character. An example of participants reinterpreting the outcome of the scenario would be if participants adopted the attitude that the woman's punishment helped her to improve her task performance. Lerner's (1980) study even suggested in the experiment's introduction that electrical shocks were being used on the woman to give her incentive to improve her performance. In assessing whether participants believe the woman is generally bad at her task would ask different questions than if they were assessing whether participants believed the woman's punishment improved her performance. Thus, if researchers only assessed one of the two defensive strategies, the other strategy would not be observed regardless of how commonly it was used. Alternatively, if researchers assessed multiple strategies in succession, each question may have influenced how participants answered subsequent questions. Therefore, there are pros and cons to observing only one JMB defensive strategy in an experiment.

A second example of this is demonstrated in Ellard et al. (2002), who investigated a participant's tendency to label a perpetrator of injustice as "evil," while observing individual difference scores of general BJW. The study found that when general BJW measures were high for a participant, it increased the likelihood that said participant would demonize the perpetrator of injustice. This defensive strategy can be interpreted as a subset of the "multiple worldview" where the unjust act is ameliorated into a rare, senseless anomaly unrepresentative of the real

world. One of the strengths of this experiment is that it provides direct support that the strategy of demonization exists. A drawback, however, is that in order to demonstrate this behavior is indeed being performed, it requires there to be a relatively low percentage of individuals in the sample who are readily prone to declaring they believe in the existence of demonic interventions. Believing a demonic influence is the cause for injustices is by no means a universal belief, however, it only takes one person to show that this behavior is possible.

Newer Experimental Methods Regarding Just-World

As explained above (also see Hafer & Begue, 2005), some experimental scenarios do not lend themselves to the use of one particular defensive strategy or another, and in some cases a participant might employ multiple strategies simultaneously. Two methods currently exist which have the ability to parse apart whichever strategy participants utilize. First, a researcher can try to lead the majority of participants into one particular strategy in an experimental situation (so that multiple strategies cannot or will not be used). An alternative method is that a researcher may try to cast a larger net in order to observe different possible defensive strategies at once. Because both of these methods have drawbacks, there is reason to look at newer experimental designs. An example of such an improved method can be found in Callan, Ellard, and Nicol's (2006) study. They used a design akin to casting a larger net, but with an innovative modification. The experiment was designed to obtain information about the strategies participants were using in order to rationalize a causal link between two events that were very unlikely to be causally related. Researchers motivated participants to rationalize a causal connection by threatening their sense of justice. The researchers were trying to demonstrate the existence of one particular strategy – IJR. This was shown when a participant reported – using a Likert scale – that they were confident there was causal relationship between the two events.

Nevertheless, after the researchers obtained a measure of the participants' defensive strategy (i.e. IJR), they asked the participants a subsequent open-ended question. The researchers then categorized the responses to the open-ended question in order to determine which strategies participants were using to substantiate their decisions.

At first glance, it is hard to see why asking the participants the reason they chose a certain answer is a method that could not be used with any defensive strategy, but it becomes clearer when one attempts to utilize it with other defensive strategies (i.e. victim blame in the form of character degradation). For instance, IJR is observed when a participant (or anyone) causally relates two events that are not rationally causally relatable (e.g. people who win the lottery are getting payback for being good). This behavior was first observed by Piaget (1932/1965) in children. It was Callan, Ellard, and Nicol's (2006) goal to provide support that adults were susceptible to the same reasoning when provoked. When participants stated clearly that two events were causally related, there was no ambiguity in what they reported. Therefore, when an experimenter asked the participants why they believed there was a relationship, it was the participants' job to substantiate their claim, thereby providing a clue as to their defensive strategy. An example of a participant's answer might be that the recipient of misfortune "deserved" it, it was fate, or the person was unintelligent. Nonetheless, the important aspect is that participants are not likely to have a reason to rationalize a causal connection unless they are being motivated to do so.

Compare the IJR example to that of the JMB of victim blame (Lerner, 1980, pp. 76 - 77). An experimenter might ask of a participant whether they thought a recipient of misfortune was incompetent (i.e. blame worthy) at a task, for example, as a memory task performed while being shocked for wrong answers. When a participant asserts that they thought a recipient of

misfortune (i.e. the person being shocked) was indeed incompetent, the experimenter may then ask the participant the reason they think it to be the case. It then becomes clear that it is a perfectly logical answer for the participant to say, "Because the woman was getting questions wrong" which unfortunately provides no clue as to which defensive strategy is being used by the participant.

One of the examples used in Callan, Ellard, and Nicol's (2006) experiment was to induce participants to report a causal relationship between the events of a man named David in a brutal car accident, and his behavior with regards to a woman named Susanne – his travel agent. The dependent measure question asked, "To what extent do you feel David's accident was the result of his dealings with Susanne?" (p. 1649). The scale was rated from 1 – *Not at all* to 7 – *A great deal*. The scenarios they used in their experiment were valence modifications of David's character. In the first scenario, David was depicted as a hard working husband who was planning a vacation for his family with a female travel agent, Susanne. In the second scenario, David was a hard working husband who had a one night stand with a woman named Susanne. Results showed that participants were far more likely to assert that a causal relationship existed between David's accident and his dealing with Susanne, when David's dealings were of an adulterous nature. This would suggest that people are more likely to commit an IJR when a person is perceived as deserving of his/her misfortune (deservedness was also being assessed). Callan, Ellard, and Nicol, however, cited an experimental confound:

> The automobile accident scenario, although carefully crafted to not link the accident to the victim's behavior, might nonetheless have left room for participants to develop a naturalistic causal chain to his behavior by inferring, for instance in the cheating

> condition, that the cheating had induced preoccupying feelings of guilt that made it more likely he would not notice a car coming at him. (p. 1650)

In Callan, Sutton, and Dovale (2010), the authors reused their original car accident scenario for an experiment involving IJR and cognitive load. The present study utilizes the original version of the narrative, thus not attempting to prevent the rational inclination to fault stress as the cause of the accident.

Issues Concerning the Assessment of Justice Motivated Behavior

An interesting experimental quality – observed in Callan, Ellard, and Nicol (2006) and outlined above – concerns the likelihood of the participant to report any causal relationship at all. Intuitively, we would expect that not all participants would be prone to using an IJR defensive strategy, as this would require them to assume an unlikely causal relationship. In their second study, Callan, Ellard, and Nicol reported that only 41% of participants showed IJR in the experimental condition, as compared to only 7% in the control condition. This meant that only a minority of participants made any response other than '1: *no causal relationship at all*'. In Callan, Ellard, and Nicol's first study, however, 70% of participants reported a possible causal connection between the two events, compared to 50% in the control condition. This might be because the first scenario allowed for a very unlikely (but rational) possibility that the two events were linked. Both the first and second studies showed significant increases in the participants' assertions of an improbable causal relationship when the scenario's character "deserved" it. The results found by Callan, Ellard, and Nicol suggest that even though a small subset of IJR prone participants were sufficient to demonstrate IJR had occurred, there was still a smaller subset of participants who asserted a causal connection when character did not "deserve" it. This is reminiscent of the previous discussion which suggested that it is often the case that only a small

subset of predisposed participants are required to show that a particular defensive strategy had been used. These issues have been illustrated before by others (Schmitt, 1998). Lerner (1998, p. 263) also commented on the inherent positive skew of participants' reports of BJW. That is, participants with high scores of BJW are a minority in experiments.

An important point can be drawn thus far with regard to the nature of just-world research investigations of JMB defensive strategies. First, BJW measures are a useful and effective predictor of the strength of an individual's motivation to ameliorate justice-threats. Second, some unique JMB (such as IJR), require a strong justice motivation to be performed by a participant. This would then mean that when targeting more rare justice behaviors (e.g. demonization) participants who exhibit a wide variety of personality styles are needed in the sample. As Lerner (1998, p. 263) explains, these participants make up a low proportion of any sample. It is possible that this is why BJW measures have been an inconsistent predictor of behavior.

Interestingly, in Callan, Ellard, and Nicol's (2006) third study, Lupkis's (1991) General Belief in a Just-World Scale (GBJWS) was not a significant predictor of the JMB of IJR (the only study in which GBJWS was used). It is possible that if Callan, Ellard, and Nicol compared their IJR study with another version of the study that did not require as high a threshold of justice motivation, then GBJWS could be a significant predictor. Contemporary approaches to dealing with the inconsistencies of BJW measures have usually been to design self-report measures that have an improved ability to predict JMB (Dalbert, 1999; Dalbert, Montada, & Schmitt, 1987; Furnham & Procter, 1989; Lipkus, 1991; Maes & Schmitt, 1999), and to reinterpret the nature of the underlying constructs (Dalbert & Lipkus, 2001). Nevertheless, such endeavors have had mixed results (Hafer & Begue, 2005; Dalbert, 2009). It seems as though a better method could

be devised that assesses the idiosyncratic qualities of individual's propensity to select a particular defensive strategy over another, and not a "one scale fits all" approach. This "one scale fits all" approach assumes that individuals who have a strong BJW will have an equal tendency to perform high threshold JMB (i.e. IJR, demonizing). It also may be worthwhile to consider that cultural dynamics might play a strong role in the interplay between personality and situational factors.

Categorization of Defensive Strategies

As mentioned above, to assess what rationalization techniques participants were using to suggest there was a causal relationship between two (improbably related) events, Callan, Ellard, and Nicol's (2006) third study prompted an open-ended response contingent upon the participant's answer to the causal relationship question: "Please briefly describe your rationale for your rating in the space provided" (p. 1644). Responses were categorized qualitatively, the most common being *chance*, *naturalistic-incomplete* (i.e. reinterpretation), *Justice* and *Fate* (i.e. IJR or ultimate justice), and *other*. This is a clear indication that different strategies are being used by participants, and it presents a method by which an experimenter might access which class of strategy a particular participant is using. Additionally, interesting information regarding personality may be related to which reasoning strategy participants employ.

The Impact of Emotions on Behavior Regarding Just-World Theory

The array of experiments concerning the investigations of just-world theory has done much to map out the diverse circumstances in which the phenomenon of JMB takes place. Nevertheless, predicting how individuals might react under certain circumstances remains difficult. As discussed previously, the predictive ability of self-report measures remains a

relatively unreliable predictor with regards to JMB (Hafer & Begue, 2005; Callan, Ellard, and Nicol, 2006; Callan, Ferguson, & Bindemann, 2012).

It is possible that a predictor specific to the situation of JMB could be based on the emotional effect of the stimuli. In Lerner's (1980) book, he points out that the stimuli used should be impactful emotionally in order to evoke the JMB. Two experiments initially provided support for this supposition (Lerner, 1971; Simons & Piliavin, 1972). It is one of the central tenets of just-world theory that injustice is emotionally arousing, and that the effects of the perceived injustice initiates defensive strategies. It is possible that this is why just-world scenarios that utilize sexual assaults are so effective at provoking JMBs. It has been suggested that narrative depictions of sexual assaults are very negatively emotionally arousing (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). Epstein's (1990, 2003) dual process theory has been discussed in the context of social psychology and just-world hypothesis (Lerner, 1998, 2003; Lerner & Goldberg, 1999). The theory suggests that if stimuli are not sufficiently potent, rational cognitive resources (explicit processes) are more likely to be used when considering injustice. This would cause thoughtful responses from participants, which in turn would reduce the chances of non-rational JMB like blaming the victim. When emotional stimulation is sufficient, automatic heuristic processes (implicit processes) are likely to dominate cognition, while irrational defensive strategies (e.g. IJR) become a more common response to perceived injustices.

One well observed consequence of Epstein's dual process theory is the difference in time that individuals take to make a decision using either explicit or implicit processes. This difference is usually asessed by measuring the speed at which individuals answer a question – also known as question latency. When individuals are impacted emotionally, the theory suggests

that they are using a more implicit or automatic heuristic approach to decision making. The heuristic approach can have multiple effects on question latency. It could cause individuals to answer questions more quickly, because there is less thought involved in the decision. Conversely, it could cause them to take more time because their emotions actively overcomplicate what would be an easy rational cognitive process. Most recently, Temple and Geisiner (1990) found further support that response latencies are indicators of emotional arousal. Temple and Geisinger used true/false question response latencies taken from word and character paired self-report statements that had different levels of arousal. They found that arousing statements took participants significantly longer to respond to as compared to the emotionally neutral questions.

In addition to Epstein's (1990, 2003) theory, support has been presented that suggests that misattribution of emotional arousal can influence the probability of JMB to occur. In Thornton's (1984) work, he found a significant difference in the probability that a participant would blame a victim when the experimenter attributed the anxiety the participant felt to being in an experiment (i.e. general attribution), rather than to the effect of listening to the story of a sexual assault victim (i.e. specific attribution). Thornton's second experimental manipulation was to prime participants to be more self-conscious or aware of their emotions – a method used in contemporary literature (Hafer, Begue, 2005; Callan, Ellard, & Nicol, 2006; Callan, Sutton & Dovale, 2010). In doing so, Thornton found that in conditions where participant emotions were primed, there was a significant increase in defensive blaming of the victim. This suggests that designing experiments to prime the participant into a more emotionally aware state could increase the likelihood a participant would display JMB.

If the emotional intensity of injustice influences the likelihood of JMB occurring, then the question becomes how one assesses individual differences in emotional intensity with regard to injustice stimuli. One method is to use self-report measures. Dependent measures that assess affect have been used (Dalbert, 2002; Hafer & Olson, 1989). Nonetheless, substantial issues have been found with this method, and self-report measures may not be the best indicators of emotional arousal (see Olson, Hafer, Couzens, & Kramins, 2000; Olson, Hafer, & Taylor, 2001). Participants might have difficulty accessing their implicit affective states in a way that can be reported on a self-report measure explicitly – social issues also confound this process. Variables like social desirability can sometimes correlate with self-report measures of general BJW (Hafer & Bugue, 2005). This suggests that self-reporting of emotional states might be more dependent on the affective state the participant wants to portray socially to the experimenter rather than the implicit affective state induced by the stimulus in question. For example, participants might not want to report that they were "freaked out" by the account of an HIV/AIDS patient for cultural reasons.

Physiological Measures of Emotion

Physiological measures have been used in order to assess changes in physiological arousal that are thought to be a result of changes in emotional states. These physiological measures may be a better window into how a person is feeling than self-report and behavioral measures of affective states (Blascovich, 2000). Several calls have been made for physiological assessments to be used in the study of justice motivated behavior (Hafer & Bugue 2005; Tomaka & Blascovich, 1994), but as of yet, no physiological study concerning JMB has been published to the author's knowledge.

Physiological measures have been used in the area of cognitive dissonance arousal and attitude change (Elliot & Devine, 1994; Croyle & Cooper, 1983; Elkin & Leippe, 1986; Jarcho, Berkman, & Lieberman, 2010). Lerner (1980) explained that the central basis of just-world theory is founded in the theoretical basis of cognitive dissonance theory, and that just-world theory is probably a more complex phenomenon. Based on Aronson's (1969) book, Lerner suggests that:

> When a person is confronted with evidence that the world is not just in some sense, then we can reasonably expect that a state of dissonance has been created, and can rely on the body of literature on that subject to help us predict how that person will react subsequently. (pp. 36 – 37)

Nevertheless, Lerner goes on to say that dissonance theory is limited as a complete explanation. He proposes that dissonance theory does not explain why people become "strongly committed" (p. 37) to a BJW, and that the negative drive state characterized in dissonance theory is not the only dynamic behind JMB. Lerner continues by explaining that just-world theory involves the "very integrity of their conception of themselves and the nature of their world" (p. 37). It might be that a person's BJW and belief attributions are changed (or are iteratively shaped) over time in order to reduce dissonance. Similarly, a person's susceptibility/sensitivity (e.g. unique cultural dynamics, personality traits, etc.) to justice-threats influence the development of higher levels of BJW.

Based on this dissonance framework a few physiological experiments involving just-world theory have used similar physiological tools as those who previously studied dissonance. Lerner (1980, pp. 76 - 77) references an unpublished study using galvanic skin response, which he reported supported the claim that in order to obtain JMB such as victim blame, participants'

need to believe that a video of a girl being shocked was real, not staged. This was shown in the mean galvanic skin response between two groups: naïve (that did not know it was an act) and disabused (that were told it was an act). It was observed that in the naïve group, mean galvanic skin response, and negative character evaluations of the shock victim were significantly higher than in the disabused group. Lerner suggested that, ironically, participants that experience a greater empathic arousal to a victim's misfortune are more prone to engage in the JMB of victim blame. The difficult interplay, however, between the effects of just-world theory and pro-social empathy are not yet resolved (Blader & Tyler, 2002).

Measuring Physiological Arousal

Researchers took on the task of investigating whether individual difference measures of BJW could be used to predict arousal under various situations. For example, Tomaka and Blascovish (1994), found that Rubin and Peplau's (1975) individual difference measure was a significant predictor of physiological arousal pertaining to a stressful mental arithmetic task, which suggest a complex yet reliable stress moderating effect for just-world beliefs. Tomaka and Blascovish used a variety of physiological measures. A brief list consisting of cardiovascular pre-ejection period, heart rate, total peripheral resistance (a derivative of blood pressure), and electrodermal response were all significantly predicted by belief in just world. Tomaka and Blascovish made the point that multiple physiological measures might be necessary in order to understand the differences in physiological arousal. Multiple measures are also necessary because of the cultural and individual differences among research participants' physiological responses to stimuli (Levenson et al., 1992). As Levenson et al. showed, there seems to be a cultural or at least an environmental (e.g. climate, diet, elevation, etc.) effect on physiological response to psychological arousal. For example, an individual's sympathetic

nervous system might be activated as a result of emotionally arousing stimuli, but this individual might show changes in heart rate, but not in electrodermal response – or vice versa. In order to reduce the probability of Type II errors, Blascovich and Kelsey (1990) advise future researchers to use multiple measures of physiological arousal in their studies. In their article, they suggest using skin conductance and peripheral skin temperature, as well as cardiovascular measures, which do not require a pressure cuff such as heart rate, respiratory sinus arrhythmia, pre-ejection period, and pulse transit time.

These studies establish that, at least to some extent, the construct of BJW is linked to factors that influence emotional arousal. This does not tell us much about the relationships that do exist, and even less about the possible causal implications that a BJW might have. Several studies have indicated that such a relationship exists and that physiological measures may be an invaluable tool to assess, on a more granular level, how individuals are responding to justice-threats.

Non-Emotion Based Factors Influencing Justice Motivated Behaviors

There are experimental complications in the study of emotion-based theories. In Dion and Dion (1987), just-world individual difference scores predicted that the participant's social character ratings and expected life outcomes of females and males would be positively correlated with their level of physical attractiveness. This phenomenon is otherwise known as the *halo effect*, by which one's judgments of another person's character can be influenced by one's overall impression of him or her (Kaplan, 1978). The effect of physical attractiveness on one's formation of immediate positive impressions has been well documented. Dion and Dion's research specifically addressed whether individuals with BJW were more susceptible to this cognitive bias. They hypothesized that individuals with more BJW would view persons with

more attractive faces as being more virtuous in character and would have better life prospects. What they had not anticipated in their hypotheses was that participants with high BJW scores predicted better character and life outcomes from attractive male stimulus faces, but not for female faces. Part of Dion and Dion's explanation for this is that in conditions of relatively low just-world threat (i.e. low emotional arousal), decision making stereotyped heuristics (which were thought to be developed from BJW in the first place) might dominate social decisions/perceptions such as character ratings. Yet female stimulus faces seemed to garner greater consideration from participants than male faces. This may have ultimately lead to participants devising more complex stereotyped status characteristics than ought to be devised from genderless physical attributes. Moreover, when individuals are in situations of low arousal, these social schemas are dominant and potentially difficult to predict.

Lerner (1978) suggested a similar explanation for another study that showed a greater likelihood of participants with high scores of BJW as more likely to denigrate minorities of low social standing. This would suggest that, like Dion and Dion (1987), an individual's stereotype biases can play an obscuring role when discerning how much effect a BJW has upon blaming victims. It should be noted, though, that BJW measures reliably correlate with measurements of individual's religiosity, authoritarianism, and conservatism and that these constructs of are often offered up as an explanation for low social standing decimation (Hafer & Begue, 2005). Additionally, these constructs were not being observed nor controlled for by partial correlation analyses in Lerner's (1978) low social standing study. These points aside, the justice theory explanation for this behavior was that stereotypically impoverished minority groups were more likely to be stereotyped negatively by individuals with high BJW as a defensive strategy in order to account for their perceived impoverished state (e.g., they are unemployed because they are

lazy). Lerner suggested that these schemas then become an ingrained stereotype that manifests even in the absence of just-world threat emotional arousal. This would suggest that there are many situations in which just-world schema have become developmentally entrenched throughout a person's life, and that these just-world schemas need little provocation to activate during tasks such as social assessments (Lerner, 2003). It seems as though there is great diversity in the ways by which just-world coping mechanisms might ameliorate just-world threats in high and low justice motivated individuals, all the while advancing little emotional or physiological clues as verification (Kay & Jost, 2003; Maes, 1998c). It might be likely that emotionally based influences can go undetected because of the high number of non-emotion based psychological influences in existence (i.e. schemas, stereotypes, etc.). Nevertheless, because of suggestions to the contrary, an investigation of emotionally based influences should be conducted.

Hypotheses

Belief in a Just-World Measures

The first class of hypotheses addressed the question of what role self-report assessments of belief in just-world (BJW) play in predicting justice motivated behaviors (JMB). Did BJW self-report assessments predict JMBs like immanent justice reasoning (IJR)? In addition, if BJW measures were significant predictors of IJR, how much predictive power was added by observations of emotional arousal – through means of physiological measures – when induced by justice-threat provoking stimuli? Lastly, was there a connection between individuals' scores on BJW assessments, and how emotionally arousing they found justice-threats?

1) Do BJW measures correlate with IJR?
2) When BJW measures are combined with participants' physiological arousal measures, how much predictive power does each variable add when predicting IJR?
3) Do BJW measures correlate with the amount of physiological arousal experienced by individuals exposed to justice-threat provoking stimuli?

These hypotheses were designed to explore the ways in which emotions might be related to an individual's development of a BJW. Moreover, they attempt to gather information concerning the predictive power that BJW measures and physiological arousal measures possess with regard to how individuals respond to justice-threats.

Investigation of Callan, Ellard, and Nicol's (2006) and Tomaka and Blascovich's (1994) Experiments

The next hypotheses were formulated to test Callan, Ellard, and Nicol's (2006), and Tomaka, and Blascovich's (1994) original findings. If an outcome is perceived as deserved,

were individuals more likely to exhibit IJR when provoked to do so by justice-threat provoking stimuli? Additionally, could levels of physiological arousal experienced in individuals under stressful situations be predicted by measures of BJW?

1) When the outcome is perceived as deserved, there is a greater chance that individuals will exhibit IJR when provoked by justice-threat provoking stimuli.
2) Individuals who experience greater stress during the arithmetic stress task are more likely to score higher on BJW measures.

These hypotheses were designed to explore the replication of Callan, Ellard, and Nicol's (2006), and Tomaka and Blascovich's (1994) experiments.

Emotional Arousal and Just-World Research

The third group of hypotheses dealt with the usefulness of physiological measures in the paradigm of just-world theory research. Were measures of physiological arousal a significant predictor of IJR? Was the emotional arousal caused by justice-threats assessed using physiological arousal indicators?

1) Does an individual's physiological arousal have predictive power towards his/her likelihood of exhibiting IJR?
2) Does a significant difference exist between the amount of physiological arousal individuals exhibit when the outcome is or is not perceived as deserved?

These hypotheses were designed to ask directly whether measures of physiological arousal could predict IJR.

The Utility of Open-Ended Responses

The fourth set of questions addressed the usefulness of obtaining participants' open-ended explanations for their behavior. Open-ended comments were categorized into defensive

strategy classes. When individuals were grouped into defensive strategy classes using their open-ended explanations, were there any differences in the amount of emotional arousal exhibited between groups? In addition, when grouped by defensive strategy class, were there any differences in a group's BJW measures and IJR when compared to other groups? When comparing justice-threat provoking – adulterous and non-adulterous – conditions were there differences in the frequencies of defensive strategy classes reported between conditions?

1) Once participants are grouped by defensive strategy class, does the presence of justice-threat provoking stimuli elicit significantly different physiological arousal responses between groups?
2) Once participants are grouped by defensive strategy class, are there significant differences regarding self-report BJW scores between groups?
3) When comparing adulterous and non-adulterous conditions, do defensive strategy class frequency distributions differ significantly?

These hypotheses were designed to provide insight as to the usefulness of individuals' explanations for their behaviors. We endeavored to discern if any particular defensive strategy class chosen by participants could be predicted using experimental variables.

Method

Participants

109 undergraduate students enrolled in one or more psychology courses at Eastern Michigan University (31 men, 65 women; M_{age} = 32.0, SD_{age} = 8.16 years, age range: 18 - 60 years) participated in this study. Eight of the participants were married, 80 were single, 7 were in a domestic partnership, and 1 was divorced. The ethnicity of the sample included 58 Caucasian, 24 African-American, 4 Asian, 5 Hispanic, and 5 Other individuals. The economic status of the participants included 21 lower class, 69 middle class, and 6 upper class individuals. Out of the 109 participants, 5 pilot participants had experimental data which was removed, and 2 additional participants' data had been lost – one because of a fire alarm and the other because of a computer crash. Out of the 109 participants, 12 participants had survey results that were not retrieved because of inexact matching of age and/or survey participation reported time for retrieval.

Apparatus

The participants' electrodermal conductivity and heart rate were obtained with the use of an IOM Model HR001.1 physiological monitor. Raw measurements of Galvanic skin response (GSR) and pulse pressure were taken throughout the experiment at 31.25 Hz, and then text files were saved using open-source Lightstone software v0.7. Participants' raw data was then encoded a using physiological grading algorithm as shown in Appendix H. Time intervals were sectioned and scored with regard to E-Prime condition event time-stamps in order to obtain base rate physiological average responses over the critical experimental stimuli.

A computer with 21-inch flat screen monitor and mouse was used for stimuli presentation. E-Prime was used to record response behaviors/answers. Each participant had a

blank piece of paper with numbered boxes taped to the table in front of them. They were also provided with a pen connected to the monitor by a string. All experimentation was conducted in the same climate and sound controlled room, isolated from interferences.

Procedure

Recruitment and pre-assessment. Participants were recruited from general psychology laboratory courses using the online Sona systems signup web application, and public psychology billboard announcements. Participants were offered extra credit for their participation. Participants were contacted through email to setup an appointment for the experiment. Participants were instructed to take a short preliminary survey online through Survey Monkey prior to their experiment appointment. This survey consisted of Lipkus's (1991) Global Belief in a Just-world Scale (GBJWS) as well as demographic questions. A brief informed consent was administered before Lipkus's measure. In addition, a variation on the Wilson-Patterson c-scale method (Wilson, Patterson, 1968) was used, implementing Henningham's (1995) 12-item scale modification. No private identifying information was obtained, and survey results were linked to experimental data by the participants' report of their age and time/data of survey participation.

Initial briefing and setup. When participants arrived for their scheduled appointment they completed another informed consent. This version included subsequent details regarding the physiological aspects of the experiment. Participants were told that they were participating in an experiment designed to investigate the "emotional arousal of media sources." They were briefed that different forms of media articles (e.g. News article, Advertisements, Science Blog) were to be shown to them through a computer medium, and that they would be asked their opinions about the information contained in the articles. In addition to their survey answers, they were told that we were obtaining their physiological measures in order to gain a sense of their

emotions. Participants were told that two response methods would be used. First, by mouse clicked selections of answer boxes. Second, by written answers on the piece of paper taped in front of them. The participants were told that the whole survey should take less than a half hour (this was a correct estimate).

The physiological apparatus was connected to participants. This consisted of a hand apparatus, which measured fluctuations in electrodermal response and heart rate (connected to the non-dominate hand). Once participants verified that they did not have an allergy or sensitivity to alcohol swabs, they were asked to use disposable alcohol swabs to clean the surfaces of their fingertips in order to confirm a good connection to the device. The finger connectors were placed on the participants' fingertips by the experimenter. These finger connectors were held fast by snug spring loaded shutters. Once the device was connected to the participants' hand, participants were instructed to rest their arm upon a pre-made cushion in the most comfortable means possible, and instructed to keep their hand and fingers as still as possible throughout the entirety of the experiment. The apparatus was then checked for functionality, calibrated, and set to record continually through the experiment. As prescribed by Blascovish and Kelsey (1990), a brief inventory of yes/no questions was asked through the computer medium with regard to caffeine consumption, and possible mood stabilizing and cardiac drugs that stabilize heart rate currently being used by participants. Participants could refuse to participate in the experiment by declining that any particular physiological assessment apparatus be attached to their bodies, or if participants could not participate in the experiment as a result of being blind or missing a hand, a participant would have been thanked for their participation and awarded their extra credit, however, none declined.

Baseline phase. The next phase was designed to replicate Callan, Ellard, and Nicol's (2006) experiment. As per Callan, Ellard, and Nicol, a "filler task" was used to facilitate the believability of the cover story. This consisted of a replication magazine aid, which reported the recent medical information about coffee consumption. Contrary to Callan, Ellard, and Nicol, the magazine article was presented though a computer screen medium as if the magazine material were scanned from paper copies. The Callan, Ellard, and Nicol, baseline stimulus has been provided in Appendix B. The magazine clippings had a time paced advancement at 180 words per minute, and periodically showed pictures associated with the scanned clippings adjacent to the text of the articles. The filler task phase served as the first physiological baseline measure as suggested by Blascovish and Kelsey (1990), and Tomaka and Blascovich (1994). Therefore, the first media filler task took participants about 6 minutes to complete. At the end of the filler task, filler questions were asked about the material such as, "How informative was this article?" (Rated from 1 *strongly disagree* to 7 *strongly agree*) and, "Did you understand what this article was talking about?" (Rated from 1 *strongly disagree* to 7 *strongly agree*). These questions were designed to support the cover story, and to habituate participants to responding to questions. In addition to information type questions, questions involving the emotionality of the articles were asked, such as, "To what extent did you find this article emotionally involving?" (Callan, Sutton, & Dovale, 2010). This was done in order to prime emotional processes, and support the cover story. Answers were made with the participants' free dominant hand using a mouse-click interface. Short answer questions were also asked which required participants to use a pen to answer. An example of a short answer question was, "How might this article change the way you use caffeine?" Participants were then prompted to write their answers on numbered lines on the sheet in front of them. In order to obtain a stable baseline, multiple filler tasks were

implemented such as a “Find Findrick” (similar to “Where’s Waldo?”) screen game during which the participants were asked to relax, take their time, and browse the page for Findrick for a few minutes. The date and time of each stimulus slide was continually recorded in order to track parallel physiological events.

Experimental phase. Next, the experimental phase began. Participants were randomly assigned to one of two conditions. A cover story was presented under the guise of a newspaper article. Stimuli were presented in the form of clippings of a scanned newspaper and presented to participants. As in Callan, Ellard, and Nicol (2006), the stimulus was an article entitled “David’s story” and consisted of the events pertaining to David (as described in the literature review section of this thesis). As in Callan, Ellard, and Nicol, participants were exposed to the events pertaining to David. In addition to Callan, Ellard, and Nicol’s narrative of David’s misfortune, pictures were added for participants to view, which directly pertained to the story at hand. These pictures were of emergency medical technicians on the scene. No pictures of graphic injuries were shown, but the pictures implied that a person was very badly harmed. As they continued on, participants read narrative information that supported the two different character representations of David. One condition was of an adulterous husband who was hit by a car (i.e. adulterous, justice valance condition) and the other condition was of a non-adulterous husband who was hit by a car (i.e. non-adulterous, unjust valance condition). Participants then answered a few filler questions that pertained to facts presented in the article, and the main dependent justice related questions. An example of a filler question is, “How likely is it that you could be

in the same accident as David?"[2] (rated from 1 *Not likely at all* to 7 *A great deal likely*). Exact stimuli are present in Appendices C and D.

Immanent justice reasoning just valence condition: adulterous condition. The first condition consisted of a replication of the experiment described in Callan, Ellard, and Nicol's (2006) study (Study 1), although stimulus introduction was shifted from a paper medium to a computer medium. This scenario was designed in order to elicit the JMB of immanent justice reasoning (IJR). In both conditions, participants were exposed to the standard article information that detailed the events of David's car accident. The second part of the stimulus detailed testimony from the people who knew David personally. In these testimonials, David was reported to be a morally repugnant individual who was engaging in an adulterous affair with a woman named Susanne – his travel agent. Callan, Ellard, and Nicol's adulterous condition stimulus has been provided in Appendix C. In Callan, Ellard, and Nicol, participants were more likely to endorse an IJR response by responding to the question "To what extent do you feel David's accident was the result of his dealings with Susanne?" (rated from 1 - *not at all* to 7 - *a great deal*) with answers other than one. Participants in the 2006 study were more likely to assert that there was a causal relationship between David's accident and his dealings with Susanne than in the non-adulterous condition.

Immanent justice reasoning unjust valence condition: non-adulterous condition. The second condition consisted of a nearly exact replication of the condition described in Callan, Ellard, and Nicol's (2006) study, although stimulus introduction was shifted from a paper

[2] While many filler questions are interesting in their own right, because of time and space limitations, their investigations are not contained by the scope of this document.

medium to a computer medium. This scenario was not designed to elicit the JMB of IJR, but participants were still able to endorse a causal relationship between the two events because of justice-threat provoking arousal. The participants were exposed to the standardized article information that detailed the events of David's car accident. The second part of the stimulus detailed testimony from the people who knew David personally. In these testimonials, David was reported to be a morally virtuous individual who was planning a vacation for his family with a woman named Susanne – his travel agent. Callan, Ellard, and Nicol's non-adulterous condition stimulus has been provided in Appendix D. In the Callan, Ellard, and Nicol study, experimental participants were less likely to provide an immanent justice response by responding to the question "To what extent do you feel David's accident was the result of his dealings with Susanne?" (rated from 1- *not at all*, to 7 - *a great deal*) with the usual answer of one. In the 2006 study participants were less likely to assert that there was a causal relationship between David's accident and his dealings with Susanne than in the adulterous condition.

Secondary questions. Secondary questions were mixed into the dependent measure questions. For example, "To what extent did you find this article emotionally involving?" rated from 1 (*not at all emotionally involving*) to 7 (*a great deal emotionally involving*). These were an assortment of questions selected to determine the explicit effect of the stimulus on self-reported affect.[3] Additionally, other questions were asked as to David's deservedness of his

[3] The author also acknowledges that the integrity of the explicit affective self-report assessment is in some way psychometrically compromised because of the temporal distance between the actual affect-inducing stimuli and the affect assessment itself. Nevertheless, techniques of explicit affective self-report measures may still be used. The

misfortune, and global questions pertaining to the likelihood that misfortune befalls individuals like David (Details in Appendix I).

Open-ended question. Following the exposure of the affective questions and Likert IJR questions, an open-ended question was administered in order to determine participants' beliefs about the nature of the causal linkage between the two events. The open-ended question was identical for both the adulterous and non-adulterous conditions. Because the galvanic skin device immobilized one of participants' hands, participants were asked to use their free dominant hand to write an answer. The question was, "Do you think there is a relationship between David's car accident, and his dealings with Susanne, and why? Please explain your thoughts in detail." as per Callan, Ellard, and Nicol's (2006) experiment. When the participants wrote their statement, the action was mechanically identical to the filler task in the baseline condition. All participants' answers were categorized using Callan, Ellard, and Nicol's (2006) qualitative rubric by division of all answers into classes of answers outlined as follows:

> (a) *chance*, coincidence, fluke, random; (b) *fate*, predestined but no mention of justice, punishment, or reward; (c) *justice*, punishment, reward, karma, justice maxims (e.g., "what goes around comes around"); (d) *naturalistic-incomplete*: mention of naturally occurring processes, including psychological states (e.g., victim was distracted) but that do not connect initial deeds to the final good or bad outcome; (e) *naturalistic complete*: any explanatory account relying on naturalistic processes (nonsupernatural) that connect

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> reader may note that emotional affective questions pertaining to the stimuli should be expected by the participant, due in part, by the emphasis of the cover story and to emotional affective questions pertaining to the first baseline (or filler) activity.

> the initial deeds with the final good or bad outcome; and (f) *other*. (Callan, Ellard, & Nicol, 2006, p. 1654)

For example, if participants stated that they felt David's accident was completely due to chance, and that there was no way to predict such an incident, the participants' response would be categorized as (a) *chance*. If participants stated that they think David was fated to be hit by the car, or that God put the events of David's accident in motion this would be categorized as (b) *fate* or *ultimate justice*. If participants stated that David "deserved" it and justice was served, this would be categorized as (c) *justice*. If participants stated that something about David's dealings with Susanne caused that accident, but they were not sure exactly how or were vague, this would be categorized as (d) *naturalistic incomplete*. If participants stated that David's lack of attention was because of stress in his life and caused his inattention, this would result in a categorization of (e) *naturalistic complete,* or (*naturalistic causal rationalization*). Interestingly, only DSCs (a), (b), and (e) were ever selected by participants in the present study.

Once participants completed the experiment, the responses were coded by two research assistants. The second research assistant was recruited in order to reassess all qualitative categorizations independently, in order to control for grammatical misinterpretation, and ambiguity of some participant responses. Results were compared in order to maintain inter-rater reliability and to assess the systematic viability of the coding process.

Cognitive load condition. A second rest period with a "Find Findrick" screen was presented. Then, as in Tomaka and Blascovich's (1994) study, all participants underwent a 4-minute difficult task that was implemented after the main condition questions. In keeping with Tomaka and Blascovich (1994), participants were instructed to perform serial subtraction as rapidly as possible from the number 2,549 by intervals of seven as quickly and as accurately as

they were able for 4 minutes. Answers were typed using a number pad, and a readout display was shown to participants as they progressed. In addition, participants were prompted to speed up (by text box) randomly during the 4 minutes. Moreover, information was displayed with regard to whether participants were slowing down or speeding up their calculation pace (by text box). As in Tomaka and Blascovich's (1994), participants were asked a few questions about how difficult they felt the counting task was.

This condition was designed to induce a mildly stressful situation. This served two purposes: (1) Emotional arousal has been shown to be expressed differently through physiological measures per individual (Levenson et al., 1992). By measuring how participants reacted on a task that was designed to raise heart rate (HR) and skin conductance (SC), individual response profiles were determined. This gave the experimenter a more acute assessment of physiological arousal. (2) In addition, overall physiological responses at a peak level were combined with baseline values in order to give the experimenter a percentage value (i.e. between low baseline, and peak cognitive load) for participants' emotional response throughout the experiment. This particular type of assessment could only be performed, however, if peak physiological measures were not correlated with IJR scores. This created a statistical confound that neutralized any observable physiological response due to justice-threat arousal. Unfortunately, participants' peak levels were correlated with their IJR score, thus creating this confound.

Measures

Preliminary individual difference assessments. All participants were instructed to take a preliminary survey. First, Lipkus (1991) Global Belief in a Just-world Scale (GBJWS) was completed (Appendix F), followed by demographic information. Demographics obtained were

participants' age, relationship status, ethnicity, and economic status of the rearing household. In addition, a variation on the Wilson-Patterson C-scale method (Wilson, Patterson, 1968) was solicited, implementing Henningham's (1995) 12-item scale measurement (Appendix E).

Dependent measure questions. Please see Appendix I for a complete table of all dependent measure questions. Each question was introduced individually in accordance with the order presented in Appendix I. Beneath each question, seven labeled buttons were presented. If the participants failed to respond to an item in fifteen seconds of the question's initial exposure, a prompt requested participants to make a selection.

Two baseline measures and five experimental measures were computed. In the baseline condition, causal judgment was the sum composite of questions 3, 4, and 7, and affect was the sum composite of questions 2, 6, and 8. In the experimental condition, the IJR score was based on question 2, which was the principle dependent measure of Callan, Ellard, and Nicol (2006, Study 1). Continuing in the experimental condition, the composite affect was based on the sum composite questions 1, 3 and reverse 6. Composite deserved was a sum composite of questions 4 and reverse 5, whereas Composite causal was a sum composite of 2, 8, 9, and 13. Lastly, a principal component emotionality factor was derived from a direct Oblimin rotation of questions 1, 3, and 6. All variable correlations, coefficients, and Cronbach's αs have been reported in Table 1 (across adulterous and non-adulterous conditions), Table 2 (adulterous condition), and Table 3 (non-adulterous condition).

Physiological Measures

Physiological measures were taken continually throughout the experiment. Physiological measures were primarily a reflection of sympathetic nervous system (SNS), and parasympathetic nervous system (PNS) activity. All physiological measures were compared to baseline values,

and were understood to be physiological difference measures between baseline averages and experimental condition averages. SNS and PNS have been generally believed to be close indicators of physiological arousal (Blascovich & Kelsey, 1990; Blascovich, 2000):

- Skin Conductance (SC) is primarily a measure of SNS activation. SC is also known as galvanic skin response (GSR). This was detected by the voltage level change across two finger leads while constant undetectable electric current was passed though the fingers.
- Heart rate (HR) is primarily a measure of PNS activation, but is also effected by SNS activation. It was measured by the frequency of ventricular contraction peaks and is typically represented in the form of ventricular contractions per minute or beats per minute (BPM).

Results

Regarding Belief in a Just-World Measures

Using the global belief in a just-world scale to predict immanent justice reasoning.

The first class of hypotheses dealt with the question of what role self-report assessments of belief in just-world (BJW) play in predicting different justice motivated behaviors (JMB). These analyses focused on whether BJW self-report assessments have predictive power with regard to JMBs like immanent justice reasoning (IJR). In order to answer the question, "Do BJW measures correlate with the JMBs?" three Pearson product-moment correlation comparisons were conducted (see Tables 1, 2, and 3 for full details). These compare participants' dependent measures IJR question score (See Appendix I, Experimental Condition, Question 2) with their Global Belief in a Just-World Scale (GBJWS) score for conditions IJR adulterous and IJR non-adulterous individually, and across both conditions. The GBJWS assessment and JMB of IJR score for the adulterous David condition were not found to correlate ($r(61) = -0.004$, $p > 0.05$; see Table 2). The GBJWS assessment and JMB of IJR score for the non-adulterous David condition were not found to correlate ($r(35) = -0.229$, $p > 0.05$; see Table 3). The GBJWS assessment and JMB of IJR score across the adulterous and non-adulterous conditions were not found to correlate either ($r(96) = -0.033$, $p > 0.05$; see Table 1). This data suggests that GBJWS scores are a poor predictor of IJR score. Additionally, the measure composite IJR was investigated. Composite IJR was calculated as having a Cronbach's α equal to 0.60, which is inadequate and therefore led to its rejection as a useful measure. Regardless, no significant correlations between GBJWS assessment and the composite IJR were found.

Table 1

Across conditions Pearson correlation matrix, means, standard deviations, and reliability analyses for study variables

		N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Age (years)	95	23.02	8.17														
2.	SES	96	4.54	1.65	-.21*													
3.	GJWBS	96	22.18	4.4	.04	-.20	[.73]											
4.	SCS:Total	96	5.31	2.8	-.18	.08	-.12	[.71]										
5.	SCS:Sex	96	2.10	1.4	-.19	.06	-.08	.83**	[.47]									
6.	Emotion PCR	109	0.00	1.00	-.10	-.10	.05	.14	.17									
7.	Affective	109	15.28	3.4	-.24*	.22*	-.09	.27**	.36**	.42**	[.65]							
8.	IJR Score	109	2.87	2.0	.00	-.01	-.03	.16	.17	.37**	.42**							
9.	Causal	109	12.06	4.7	-.12	-.07	-.09	.22*	.24*	.42**	.43**	.71**	[.60]					
10.	Deserved	109	7.04	3.3	-.12	-.08	.01	.18	.21*	.98**	.49**	.47**	.51**	[.76]				
11.	AT Perform.	108	28.62	16.4	.02	.23*	-.11	-.06	.10	.04	.03	-.12	-.12	.02				
12.	IJR:GSR	102	0.59	0.64	-.03	.09	-.12	-.02	.02	-.06	-.05	.12	.07	-.04	.16			
13.	IJR:BPM	102	-3.16	3.1	.23*	-.35**	.00	-.23*	-.21*	.11	-.10	-.08	-.04	.08	.00	.16		
14.	AT:GSR	102	0.56	0.50	-.13	.15	.15	-.12	-.01	-.05	-.03	-.17	-.09	-.06	.11	.02	-.01	
15.	AT:BPM	102	1.46	4.5	-.07	-.08	.28**	-.01	-.03	.00	-.04	-.04	-.08	-.02	.05	-.07	.05	.22*

*. Correlation is significant at the 0.05 level – 2-tailed. **. Correlation is significant at the 0.01 level – 2-tailed. [ ]. Cronbach's α reliability score.

SES = socio-economic status; GJWBS = Global Just World Belief Scale; SCS:Total = Total Social Conservatism Scale; SCS:Sex = Sex Social Conservatism Scale; Emotion PCR = principle component reduction of the affective emotionality questions; Affective = composite score of affective questions (items 1, 3, and reverse 6); IJR score = immanent justice reasoning question (item 2); Causal = composite score of causal questions (items 2, 8, 9, and 13);Deserved = composite score of deserved questions (items 4, and Reverse 5); AT Perform. = completed subtraction trials during arithmetic task performance; IJR:GSR = galvanic skin response during immanent justice reasoning phase (changed from baseline); IJR:BPM = beats per minute during immanent justice reasoning phase (changed from baseline); AT:GRS = galvanic skin response during arithmetic task phase (changed from baseline); AT:BPM = beats per minute during arithmetic Task phase (changed from baseline);

Table 2

Adulterous condition Pearson correlation matrix, means, standard deviations, and reliability analyses for study variables

		N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Age (years)	60	22.87	7.8														
2.	SES	61	4.43	1.7	-.10													
3.	GJWBS	61	22.64	4.0	-.05	-.23	[.69]											
4.	SCS:Total	61	5.44	3.0	-.13	-.01	-.05	[.76]										
5.	SCS:Sex	61	2.25	1.4	-.12	.00	-.05	.86**	[.62]									
6.	Emotion PCR	69	0.60	0.69	-.22	.05	-.25	.25	.18									
7.	Affective	69	16.07	3.4	-.16	.32*	.00	.25*	.33*	.42**	[.71]							
8.	IJR Score	69	3.28	2.0	.13	.01	.00	.20	.09	.36**	.36**							
9.	Causal	69	12.93	4.9	-.09	-.13	-.11	.23	.15	.47**	.37**	.73**	[.62]					
10.	Deserved	69	8.91	2.6	-.20	.05	-.22	.28*	.21	.98**	.48**	.47**	.57**	[.58]				
11.	AT Perform.	68	30.06	13	.03	.31*	-.12	-.05	.03	-.10	-.09	-.20	-.22	-.12				
12.	IJR:GSR	64	0.60	0.63	-.09	.11	-.04	.13	.10	-.14	-.18	-.03	.02	-.12	.10			
13.	IJR:BPM	64	-2.88	2.9	.07	-.25	.08	-.17	-.13	.00	-.16	-.17	-.03	-.04	.05	.13		
14.	AT:GSR	64	0.52	0.45	-.02	.23	.06	-.04	.11	.02	.11	-.22	-.16	.01	.19	.11	.18	
15.	AT:BPM	64	1.64	4.9	-.05	-.11	.32*	-.01	-.02	-.12	-.04	-.01	-.07	-.11	.13	.07	.03	.28*

*. Correlation is significant at the 0.05 level – 2-tailed. **. Correlation is significant at the 0.01 level – 2-tailed. [ ]. Cronbach's α reliability score.

SES = socio-economic status; GJWBS = Global Just World Belief Scale; SCS:Total = Total Social Conservatism Scale; SCS:Sex = Sex Social Conservatism Scale; Emotion PCR = principle component reduction of the affective emotionality questions; Affective = composite score of affective questions (items 1, 3, and reverse 6); IJR score = immanent justice reasoning question (item 2); Causal = composite score of causal questions (items 2, 8, 9, and 13);Deserved = composite score of deserved questions (items 4, and Reverse 5); AT Perform. = completed subtraction trials during arithmetic task performance; IJR:GSR = galvanic skin response during immanent justice reasoning phase (changed from baseline); IJR:BPM = beats per minute during immanent justice reasoning phase (changed from baseline); AT:GRS = galvanic skin response during arithmetic task phase (changed from baseline); AT:BPM = beats per minute during arithmetic Task phase (changed from baseline);

Table 3

Non-adulterous condition Pearson correlation matrix, means, standard deviations, and reliability analyses for study variables

		N	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Age (years)	95	23.02	8.17														
2.	SES	96	4.54	1.65	-.21*													
3.	GJWBS	96	22.18	4.4	.04	-.20	[.73]											
4.	SCS:Total	96	5.31	2.8	-.18	.08	-.12	[.71]										
5.	SCS:Sex	96	2.10	1.4	-.19	.06	-.08	.83**	[.47]									
6.	Emotion PCR	109	0.00	1.00	-.10	-.10	.05	.14	.17									
7.	Affective	109	15.28	3.4	-.24*	.22*	-.09	.27**	.36**	.42**	[.65]							
8.	IJR Score	109	2.87	2.0	.00	-.01	-.03	.16	.17	.37**	.42**							
9.	Causal	109	12.06	4.7	-.12	-.07	-.09	.22*	.24*	.42**	.43**	.71**	[.60]					
10.	Deserved	109	7.04	3.3	-.12	-.08	.01	.18	.21*	.98**	.49**	.47**	.51**	[.76]				
11.	AT Perform.	108	28.62	16.4	.02	.23*	-.11	-.06	.10	.04	.03	-.12	-.12	.02				
12.	IJR:GSR	102	0.59	0.64	-.03	.09	-.12	-.02	.02	-.06	-.05	.12	.07	-.04	.16			
13.	IJR:BPM	102	-3.16	3.1	.23*	-.35**	.00	-.23*	-.21*	.11	-.10	-.08	-.04	.08	.00	.16		
14.	AT:GSR	102	0.56	0.50	-.13	.15	.15	-.12	-.01	-.05	-.03	-.17	-.09	-.06	.11	.02	-.01	
15.	AT:BPM	102	1.46	4.5	-.07	-.08	.28**	-.01	-.03	.00	-.04	-.04	-.08	-.02	.05	-.07	.05	.22*

*. Correlation is significant at the 0.05 level – 2-tailed. **. Correlation is significant at the 0.01 level – 2-tailed. [ ]. Cronbach's α reliability score.

SES = socio-economic status; GJWBS = Global Just World Belief Scale; SCS:Total = Total Social Conservatism Scale; SCS:Sex = Sex Social Conservatism Scale; Emotion PCR = principle component reduction of the affective emotionality questions; Affective = composite score of affective questions (items 1, 3, and reverse 6); IJR score = immanent justice reasoning question (item 2); Causal = composite score of causal questions (items 2, 8, 9, and 13);Deserved = composite score of deserved questions (items 4, and Reverse 5); AT Perform. = completed subtraction trials during arithmetic task performance; IJR:GSR = galvanic skin response during immanent justice reasoning phase (changed from baseline); IJR:BPM = beats per minute during immanent justice reasoning phase (changed from baseline); AT:GRS = galvanic skin response during arithmetic task phase (changed from baseline); AT:BPM = beats per minute during arithmetic Task phase (changed from baseline);

Using the global belief in a just-world scale and physiological arousal to predict immanent justice reasoning. The next set of analyses focused on whether the GBJWS measure was a significant predictor of JMBs like IJR when emotional arousal was added as a predictor. How much predictive power was added by physiological indicators of emotional arousal (possibly induced by justice-threat provoking stimuli)? When BJW measures were combined with individuals' measures of physiological arousal, how much predictive power did each add in predicting JMBs?

In order to answer these questions, a hierarchical linear regression was used for each condition: IJR adulterous, IJR non-adulterous. Each condition's hierarchical linear regression consists of a regression analysis comparing the JMB and GBJWS for each condition as the first level of the analysis. The second level of the analysis consists of a comparison between the JMB and GBJWS for each condition, but with the addition of the physiological measures of skin conductance (SC) and heart rate (HR) change, compared to baseline response. A hierarchical regression analysis was conducted on the adulterous condition to test if physiological measures of SC and HR were significant predictors of IJR in addition to the GBJWS measure. Results of our hierarchical regression indicate that the GBJWS is not a significant predictor of IJR ($F(1,54) = 0.225$, $p > 0.05$, $R^2 = 0.004$). Furthermore, the addition of physiological measures of SC and HR were not significant predictors ($F(3,52) = 0.596$, $p > 0.05$, $R^2 = 0.033$) and did not add anything significant to the model (see Table 4). There was not a significant increase in variance accounted for by the addition of physiological measures ($\Delta F(2,52) = 0.782$, $p > 0.05$, $\Delta R^2 = 0.029$; see Table 4).

Additionally, a hierarchical regression analysis was conducted on the non-adulterous condition to test if physiological measures of SC and HR were significant predictors of IJR in

addition to the GBJWS measure. The results of our hierarchical regression indicate that the GBJWS alone is not a significant predictor of IJR ($F(1,31) = 0.989$, $p > 0.05$, $R^2 = 0.031$). After adding the physiological measures of SC and HR then full model is significant, predicting 34.6% of the variance ($F(3,29) = 5.119$, $p < 0.05$, $R^2 = 0.346$). There is also a significant increase in variance accounted for by the addition of physiological measures ($\Delta F(2,29) = 6.993$, $p < 0.01$, $\Delta R^2 = 0.315$; see Table 4).

Table 4
Hierarchical Regression Analysis: Predicting Immanent Justice Reasoning Scores from GBJWS and Physiological Measures

Condition	Predictor	*Std.Beta*	*p*	*R*	*Adj. R^2*	*ΔR^2*	*ΔF*	*p*
Adulterous	Step 1: GBJWS	-0.064	0.64	0.064	-0.014	0.00	0.225	>.05
	Step 2: GBJWS	-0.052	0.71	0.182	-0.023	0.03	0.782	>.05
	GSR.C.BL	-0.011	0.94					
	BPM.C.BL	-0.169	0.23					
Non-Adulterous	Step 1: GBJWS	-0.176	0.33	0.176	0.000	0.03	0.989	>.05
	Step 2: GBJWS	-0.086	0.59	0.588	0.279	0.32	6.993	<.01
	GSR.C.BL	0.536	<.01					
	BPM.C.BL	-0.310	0.05					

GBJWS = Global Belief Just World Scale; GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Using the global belief in a just-world scale to predict physiological arousal. The next set of analyses focused on whether there was a relationship with regard to an individual's scores on the GBJWS assessment, and how emotionally arousing individuals found justice-threats. Did BJW measures correlate with the amount of physiological arousal experienced by individuals exposed to justice-threat provoking stimuli? In order to answer this question, a multiple linear regression was performed for each of the two conditions: adulterous and non-adulterous (see Table 5). Both multiple linear regressions compared individuals' GBJWS and their changed average physiological measure of skin conductance (SC) and heart rate (HR) from baseline, in response to justice-threat provoking stimuli. A multiple linear regression analysis

was conducted to test if the changed physiological measures of SC and HR, induced by justice-threat provoking stimuli, were significant predictors of an individual's score on a GBJWS assessment (see Table 5). In the adulterous condition, physiological measures are not significant predictors of GBJWS scores ($F(2,53) = 0.226$, $p > 0.05$, $R^2 = 0.008$). Additionally, in the non-adulterous condition, physiological measures are not significant predictors of a GBJWS scores ($F(2,30) = 1.026$, $p > 0.05$, $R^2 = 0.064$).

Table 5
Multiple Regression Analysis: Predicting Global Belief in a Just World from Physiological Measures due to Arousal During Experimental Phase

Condition	Predictor	*Std.Beta*	*p*	*R*	R^2	*Adj.* R^2	*F*	*p*
Adulterous	Full Model		0.64	0.064	-0.014	0.00	0.225	>.05
	Var 1: GSR.C.BL	-0.011	0.94					
	Var 2: BPM.C.BL	-0.169	0.23					
Non-Adulterous	Full Model		0.33	0.176	0.000	0.03	0.989	>.05
	Var 1: GSR.C.BL	0.536	<.01					
	Var 2: BPM.C.BL	-0.310	0.05					

GBJWS = Global Belief Just World Scale; GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Investigation of Previous Experiments

Support for Callan, Ellard, and Nicol (2006). The next analysis confirmed the hypotheses of Callan, Ellard, and Nicol's (2006) original study, and Blascovich and Kelsey's (1994) BJW cognitive load study. Following Callan, Ellard, and Nicol's original study, this analysis investigated whether individuals were more likely to use IJR when presented with justice-threat provoking stimuli. Was there a greater chance that individuals would use IJR when provoked by justice-threat provoking stimuli? A Student's *t*-test mean comparison was used to compare JMB in the experimental conditions: adulterous and non-adulterous. Individuals who were exposed to David's adulterous condition ($M = 2.18$, $SD = 1.66$, $n = 40$) are significantly

more likely (Welch's $t(95.29) = -3.057$, $p < 0$ .01, Welch's $r^2 = 0.089$) to report a causal relationship between the events of David's accident and his dealings with Susanne than non-adulterous condition participants ($M = 3.28$, $SD = 2.043$, $n = 69$; see Figure 1). Levene's test for equality of variances was found to be violated for the present analysis ($F(1,107) = 6.142$, $p < 0.05$). Because of this violated assumption, and the unevenness of the sample sizes, a t statistic – that did not assume homogeneity of variance – was computed. The results of our analysis repeat Callan, Ellard, and Nicol's original findings.

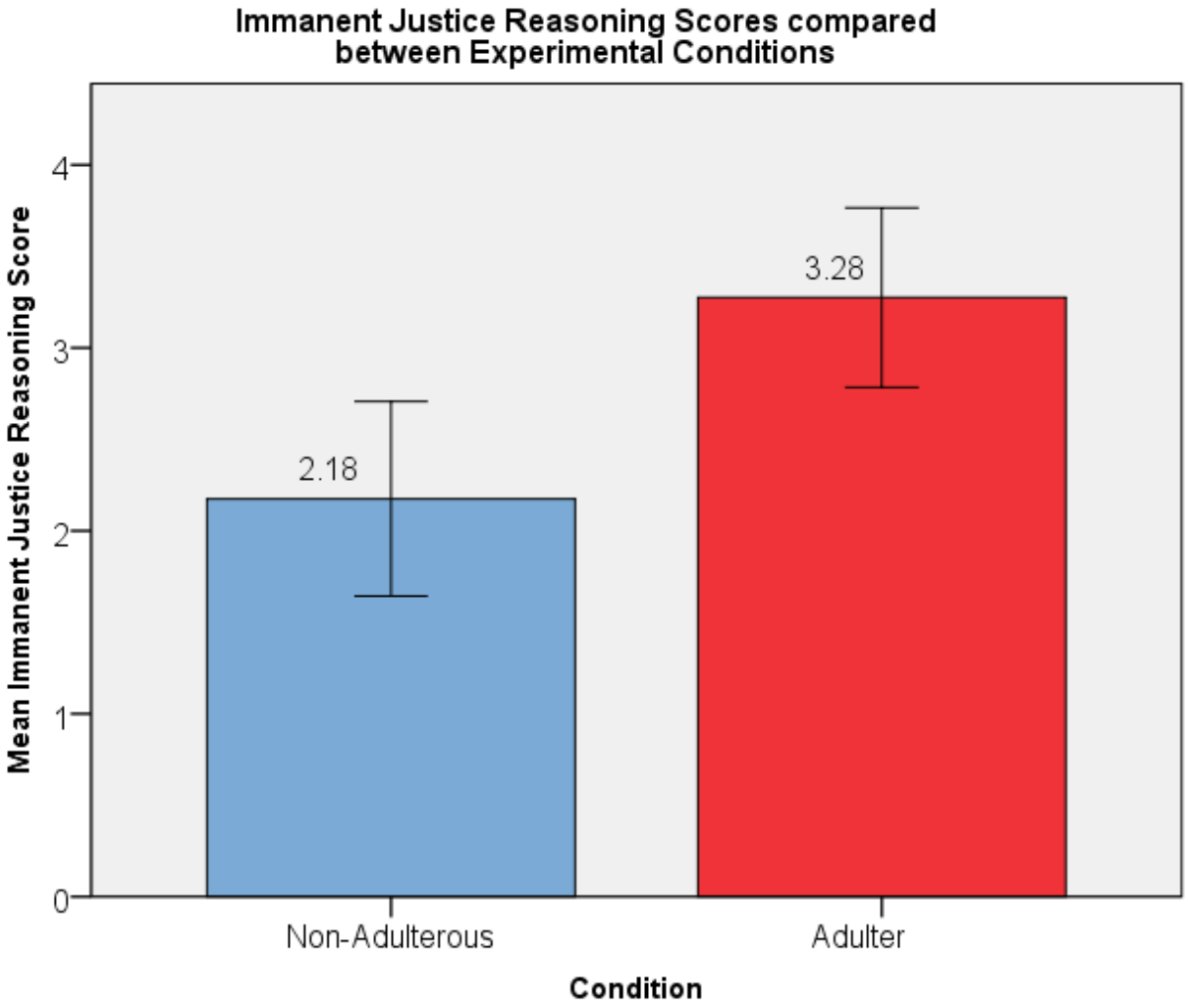

Figure 1. Immanent Justice Reasoning Scores compared between Experimental Conditions. 95% confidence intervals are represented in the figure by the error bars attached to each column.

Support for Tomaka and Blascovich (1994). The next analysis confirmed Tomaka and Blascovich's (1994) belief in a just world cognitive load study. Tomaka and Blascovich's original experiment asked the question, "Is there a relationship between the levels of reported just-world belief an individual purports, and the level of stress they experience in a stressful situation?" (i.e. mathematical stress task). A multiple linear regression analysis was used. The analysis compares participants' ratings on the GBJWS measure and their physiological arousal, induced by a repetitive subtraction task, as changed from game 2 baseline. The full model using both physiological predictors is statistically significant, but only accounts for 8.5% of the variance in the GBJWS measure ($F(2,86) = 4.002$, $p < 0.05$, $R^2 = 0.085$; see Table 6).

Table 6
Multiple Regression Analysis: Predicting Global Belief in a Just World from Physiological Measures due to Arithmetic Stress Task

Condition	Predictor	*Std.Beta*	*p*	*R*	R^2	*Adj.* R^2	*F*	*p*
Arithmetic	Full Model		0.022	0.292	0.085	0.064	4.002	<.05
Stress	Var 1: BPM.C.BL	0.259	0.017	0.279				
	Var 2: GSR.C.BL	0.087	0.417	0.147				

GBJWS = Global Belief Just World Scale; GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Results show that only the change in HR was a significant predictor of GBJWS ($p < 0.05$; see Table 1). These results support the original findings of Tomaka and Blascovich (1994), even though this experiment's baseline task period was dropped to be approximately one-third the original experiment's 15-minute baseline period.

Emotional Arousal and Just-World Research

The third hypothesis group dealt with the usefulness of physiological measures in the paradigm of just-world theory research. These analyses address whether physiological measures alone were a significant predictor of JMBs. That is, did an individual's physiological arousal

have predictive power towards their likelihood of exhibiting JMBs? In order to answer this inquiry, a multiple linear regression was used in the non-adulterous and adulterous experimental condition. This was to test if the change from baseline physiological measures, SC and HR induced by justice-threat provoking stimuli, were significant predictors of individuals JMB of IJR scores.

Using physiological arousal to predict immanent justice reasoning. A multiple linear regression analysis was used to develop a model for predicting participants' use of IJR based on participants' physiological responses of HR and SC during justice-threat arousal stimuli compared to baseline measurements. Basic descriptive statistics and regression coefficients are shown in Table 7 for both the adulterous and non-adulterous conditions, respectively. In the adulterous condition, neither SC nor HR are significant predictors of IJR. The full model using both physiological predictors are also not significant predictors of IJR scores ($F(2,61) = 0.950$, $p > 0.05$, $R^2 = 0.030$). In the non-adulterous condition, however, SC is a significant predictor of IJR ($p < 0.05$). Additionally, the full model using both physiological predictors is statistically significant and accounts for 16% of the variance ($F(2,35) = 3.42$, $p < 0.05$, $R^2 = 0.163$). These results suggest that emotional arousal, as shown though physiological measures, is a predictive component of individual likelihood to endorse an IJR causal relationship between two events only during the presence of justice-threat provoking stimuli.

Table 7
Multiple Regression Analysis: Predicting Immanent Justice Reasoning Scores from Physiological Measures

Condition	Predictor	*Std.Beta*	*p*	*R*	R^2	*Adj.* R^2	*F*	*p*
Adulterous	Full Model		0.392	0.174	0.030	-0.002	0.950	>.05
	Var 1: BPM.C.BL	-0.173	0.178	-0.174				
	Var 2: GSR.C.BL	-0.004	0.977	-0.025				
Non-Adulterous	Full Model		0.044	0.404	0.163	0.116	3.416	<.05
	Var 1: BPM.C.BL	-0.101	0.527	0.020				
	Var 2: GSR.C.BL	0.412	0.013	0.392				

GBJWS = Global Belief Just World Scale;
GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline;
BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Physiological arousal between experimental conditions. The next set of analyses focused on whether the emotional arousal caused by justice-threats can be assessed using physiological arousal indicators between the two different valance conditions, adulterous and non-adulterous David. Does the existence of a significant difference between the amounts of physiological arousal exhibited by individuals depend upon whether they are exposed to justice-threat provoking stimuli compared to non-threat provoking stimuli? In order to answer this inquiry, a multivariate analysis of variance (MANOVA) was used. This test compares the change from baseline physiological measures, SC and HR, between the adulterous and non-adulterous conditions during the justice-threat arousal condition (see details in Tables 8 and 9). A statistically significant MANOVA effect was not obtained (Wilks' $\Lambda = 0.997$, $F(2, 99) = 0.147$, $p > 0.05$). Additionally, the Box's *M* value of 2.403 is associated with a *p*-value of .504, which is interpreted as non-significant. Thus, the covariance matrices between the groups are assumed equal for the purposes of the MANOVA. This suggests that even though both conditions had different narratives before David's car accident, neither condition had a

perceptible difference in how emotionally aroused participants became. That is, the conditions seem to be equally emotionally arousing.

Table 8
MANOVA: Difference of Physiological Arousal between the Adulterous and Non-Adulterous Conditions

Predictor	df	*MSQ*	*p*	*Part.* η^2	*F*	Wilks'*Λ*	*p*
Full Model			0.86	0.003	0.147	0.997	>.05
Var 1: BPM.C.BL	1	0.318	0.68				
Var 2: GSR.C.BL	1	0.004	0.64				

GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Table 9
Estimated Marginal Means: Physiological Measures between the Adulterous and Non-Adulterous Conditions

Physiological Measure	Condition	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
GSR.C.BL	Adulterous	0.044	0.018	0.009	0.079
	Non-Adulterous	0.031	0.023	-0.015	0.076
BPM.C.BL	Adulterous	0.020	0.170	-0.319	0.358
	Non-Adulterous	-0.096	0.221	-0.535	0.343

GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

The Utility of Open-Ended Responses

Defensive strategy class frequency per experimental condition. The fourth set of questions addressed the open-ended responses provided by participants. As stated previously, the open-ended question inquired as to the ways in which the two events might be causally related, however unlikely. When comparing non-adulterous and adulterous experimental conditions, an analysis was conducted in order to investigate whether the frequency of defensive strategy class (DSC) chosen by participants differed between conditions. Two volunteer raters independently assessed each of the 106 participants' hand-written causal explanations based on the categorization criteria outlined in the procedure section of this document. No disagreement

manifested independently with regard to inter-rater selections. In the present study, only three DSCs were reported by participants. In the following discussion, they will be addressed as *chance*, *fate*, and *stress*. A χ^2 test of independence frequency comparison was performed using the two conditions' observed DSCs. In the adulterous condition, three DSCs appeared: *chance*, *fate*, and *stress* (see page 14 Number, and page 84 for additional details with regards to ultimate Justice or Fate judgments). In the non-adulterous condition, only two DSCs appeared: *chance* and *stress*. There is support that the distribution of frequencies between the adulterous and non-adulterous conditions are significantly different with respect to open-ended DSC endorsement ($\chi^2 = 7.198$, df = 2, $p < 0.05$, $\Phi = 0.261$; see Table 10).

Table 10
Independence χ^2 Frequency Analysis: Between Condition Type and Defensive Strategy Class

			Condition		Total
			Non-Adulterous	Adulterous	
DSC	*Chance*	Observed Count	28	39	67
		Expected Count	24.7	42.3	67
	Fate	Observed Count	0	11	11
		Expected Count	4	7	11
	Stress	Observed Count	11	17	28
		Expected Count	10.3	17.7	28
	Total		39	67	106

DSC = Defensive Strategy Class

Nevertheless, it is of note that none of the participants in the non-adulterous condition endorsed the DSC of *fate*. Unfortunately the χ^2 test of independence stipulates that "No more than 20% of the expected counts are less than 5 and all individual expected counts are 1 or greater" (Yates, Moore & McCabe, 1999, p. 734). This fact results in a dubious χ^2 interpretation because the DSC *fate* accounted for most of the differential effect from the expected frequency model. Because of this, a Freeman-Halton extension of the Fisher's exact probability test (Freeman & Halton, 1951) was used, as it does not have a minimum cell frequency stipulation.

This also results in a significant difference between the non-adulterous and adulterous conditions at $p < 0.05$.

Defensive strategy class and physiological arousal: adulterous condition. Once individuals were grouped into classes of strategies by their open-ended explanations, were there any differences in the amount of emotional arousal experienced by the class groups because of condition specific stimuli? That is, did the stimuli elicit significantly different emotional responses between groups? In order to report on this question, two MANOVAs were used to compare each DSC's physiological measures of SC and HR for both experimental conditions. A one-way MANOVA was conducted to test the hypothesis that there would be one or more mean difference between DSCs *chance, fate,* and *stress,* and physiological measure change induced in the adulterous condition (see Tables 11 and 12 for details). A statistically significant MANOVA effect is not present (Wilks' $\Lambda = 0.256$, $F(4, 116) = 0.252$, $p > 0.05$, partial $\eta 2 = 0.009$). Additionally, the Box's *M* value of 4.157 is associated with a *p*-value of 0.696, which is interpreted as non-significant. Thus, the covariance matrices between the groups were assumed equal for the purposes of the MANOVA. Our results agree with the previous findings, which state that physiological arousal does not predict IJR in the adulterous condition.

Table 11
MANOVA: Predicting Defensive Strategy Class chosen from Physiological Measures

Condition	Predictor	df	*MSQ*	*p*	*Part.* η^2	*F*	Wilks'Λ	*p*
Adulterous	Full Model			0.91	0.009	0.252	0.256	>.05
	Var 1: BPM.C.BL	2	1.922	0.80				
	Var 2: GSR.C.BL	2	0.148	0.70				
Non-Adulterous	Full Model			0.80	0.013	0.225	0.988	>.05
	Var 1: BPM.C.BL	1	2.057	0.67				
	Var 2: GSR.C.BL	1	0.155	0.56				

GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline;
BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Table 12
Estimated Marginal Means: Physiological Measure by Defensive Strategy Class

Condition	Physiological Measure	Open Causal Answer	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Adulterous	BPM.C.BL	*Chance*	-2.682	.483	-3.649	-1.715
		Fate	-2.955	.942	-4.840	-1.070
		Stress	-3.287	.796	-4.880	-1.694
	GSR.C.BL	*Chance*	.640	.104	.431	.849
		Fate	.489	.203	.082	.896
		Stress	.505	.172	.161	.850
Non-Adulterous	BPM.C.BL	*Chance*	-3.597	.649	-4.914	-2.280
		Stress	-3.066	1.066	-5.230	-.902
	GSR.C.BL	*Chance*	.560	.128	.299	.821
		Stress	.706	.211	.277	1.134

GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline;
BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Defensive strategy class and physiological arousal: non-adulterous condition.

Another one-way MANOVA was conducted to test the hypothesis that there would be an observable difference between the only two DSCs selected in the non-adulterous condition - *chance* and *stress* - with respect to physiological change induced by justice-threats. No statistically significant effect was obtained between DSCs (Wilks' $\Lambda = 0.988$, $F(2, 34) = 0.208$, $p > 0.05$, partial $\eta 2 = 0.013$). Additionally, the Box's M value of 5.757 is associated with a p-value of 0.155, which is interpreted as non-significant. Thus, the covariance matrices between the groups were assumed equal for the purposes of the MANOVA (see Tables 10 and 11 for details).

Immanent justice reasoning levels per defensive strategy class: adulterous condition.

The next set of analyses focused on whether there were any differences between DSC groups in regards to participants' average IJR score, in each condition. The following two ANOVAs compare the grouped DSCs and the ways in which they differ between the groups. In the adulterous condition, a one-way between subjects ANOVA was conducted to inspect whether

participants' IJR score was reflected in the three types of DSCs open-ended comment they chose to favor, DSC *chance*, *fate*, and *stress*. Levene's test for homogeneity of variance was violated for this analysis ($F(2,64) = 3.382$, $p < 0.05$). Because of the violation of the present assumption, a Welch's F statistic was used, which does not use the assumption of homogeneity of variance. There is a significant effect between the three DSCs, as pertaining to the level of IJR reported (Welch's $F(2,21.75) = 19.060$, $p < 0.01$, est. $\omega^2 = 0.35$). Post hoc comparison using the Dunnett's T3 test (which does not assume homogeneity of variance) indicates that the mean score for both DSCs *fate* ($M = 4.91$, $SD = 0.495$) and *stress* ($M = 4.71$, $SD = 0.398$) is significantly higher ($p < 0.01$) than the score for the DSC *chance* ($M = 2.18$, $SD = 0.263$; see Figure 2). Interestingly, the group means for DSCs *fate* and *stress* are nearly identical. This is reasonable considering both DSCs *fate* and *stress* are JMB strategies, whereas *chance* is not (baring penultimate defensive strategy). Taken together, these results suggest IJR scores can be reliably obtained using both Likert type and open-ended responding because of the high consistency between the self-report strategies.

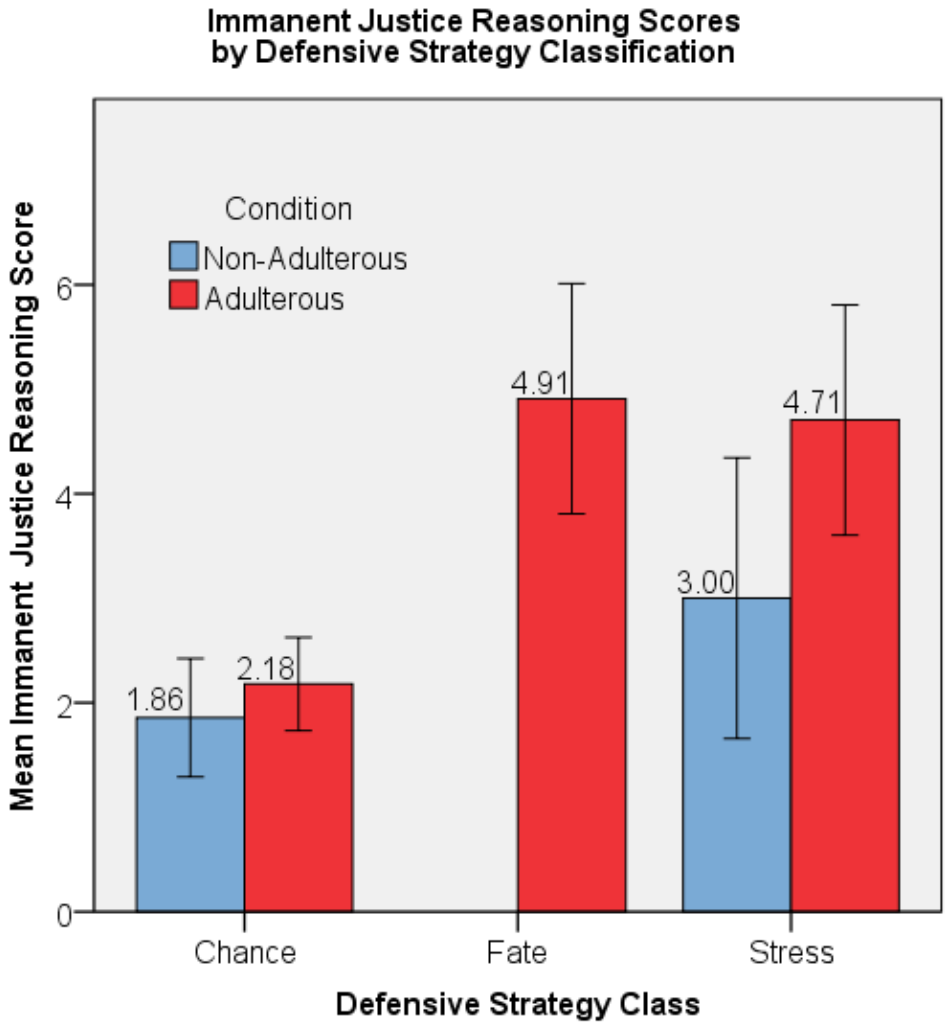

Figure 2. Immanent justice reasoning scores by defensive strategy classification. 95% confidence intervals are represented in the figure by the error bars attached to each column.

Immanent justice reasoning levels per defensive strategy class: non-adulterous condition. In the non-adulterous condition, a one-way between subjects ANOVA was conducted to determine whether participants' IJR score is reflected in the only two types of DSCs open-ended comment they chose to endorse – DSCs *chance* and *stress*. Only marginal significance was detected between the two DSCs pertaining to the level of IJR reported ($F(1,37) = 3.917$, $p = 0.055$, $R^2 = 0.096$). The means comparison indicates that the average IJR score for the DSC *chance* ($M = 1.86$, $SD = 0.31$) is only marginally lower than for that of the DSC *stress*

(M = 3.00, SD = 0.49; Figure 2). It is worth noting that the non-adulterous condition has a far weaker effect size than the adulterous condition.

Immanent justice reasoning levels per defensive strategy class between conditions. In order to determine whether rates of IJR were different between the adulterous stress and non-adulterous stress condition, a two-way ANOVA analysis was necessary. As the previous two ANOVAs show that a significant main effect exists between DSC ($F(2,101) = 17.156$, $p < 0.01$), and experimental conditions ($F(1,101) = 7.301$, $p < 0.01$). An interaction was only marginally significant ($F(1,101) = 3.397$, $p = 0.068$), and both main effects in combination account for 32.1% of the variance, regardless. Harmonic cell means comparisons were used because of unequal sample sizes, and are listed in Figure 2. As expected, mean cell comparisons for *stress* between conditions show that individuals were somewhat less confident in their IJR responses for the non-adulterous condition even though they were asserting the same open-ended DSCs. Additionally, Likert IJR score is a stronger predictor of the DSC participants chose in the adulterous condition.

Using the global belief in a just-world scale to predict chosen defensive strategy class. The next set of analyses focused on whether there were any differences between DSC groups in regards to participants' average BJW score, in each condition. In order to answer these questions, ANOVAs were used in both experimental conditions. The ANOVAs compare GBJWS scores by the three observed DSC groupings between the two conditions. In the adulterous condition, the one-way between subjects ANOVA shows no significant effect between the three DSC's methods pertaining to the level of GBJWS reported ($F(2,57) = 1.312$, $p > 0.05$). This shows that GBJWS scores are not any better at predicting a participant's likelihood to commit IJR in an open-ended DSC, than on a Likert causal rating scale. Additionally, in the

non-adulterous condition, the one-way between subjects ANOVA is not indicative of any significant effects between the three DSC methods pertaining to the level of GBJWS reported ($F(1,32) = 0.062$, $p > 0.05$). This also shows that GBJWS scores are poor predictors of both Likert IJR rating scores and open-ended DSC categorization (see Figure 3).

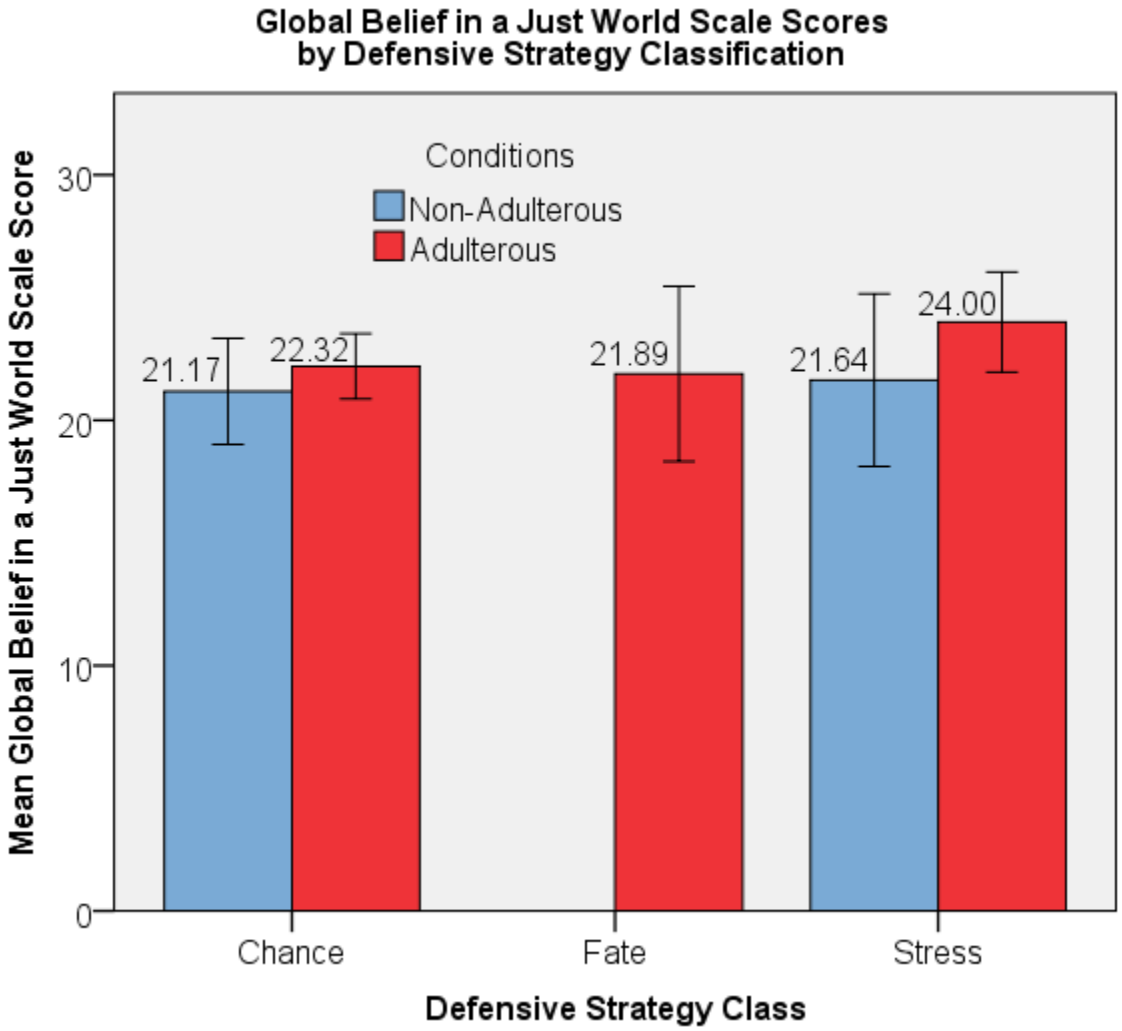

Figure 3. Global just-world belief scale by condition and defensive strategy classification. 95% confidence intervals are represented in the figure by the error bars attached to each column.

Secondary Analyses Not Incorporated in Original Hypotheses

Using affective self-report and physiological arousal to predict immanent justice reasoning. An investigation was made into how useful self-report Likert affect pronouncements

were in predicting IJR scores. In each condition, a hierarchical regression analysis was conducted. This was to see the amount of variation accounted for by self-reported affect, beyond physiological measures.

In the adulterous condition, physiological measures alone are not significant predictors of IJR ($F(2,61) = 0.950$, $p > 0.05$, $R^2 = 0.03$; see Table 13). This remains consistent with previous analyses. When the variable of self-reported affect is added into the model, the full model is found to be a significant predictor, and accounts for an additional 17.2% of the variance in IJR scores ($F(3,60) = 5.068$, $p < 0.01$, $R^2 = 0.202$). There is a significant increase in the variance accounted for by the addition of self-report affect ($\Delta F(1,60) = 12.933$, $p < 0.001$, $\Delta R^2 = 0.172$; see Table 13).

In the non-adulterous condition, physiological measures alone are again a significant predictor of IJR scores ($F(2,35) = 3.419$, $p < 0.05$, $R^2 = 0.163$), and account for 16.3% of the variance. When the variable of self-reported affect is added into the model, the full model is found to be a significant predictor, and accounts for 22.0% of the variance in IJR scores ($F(3,60) = 5.068$, $p < 0.01$, $R^2 = 0.202$). When the variable affect is added to the model, it does not add any significant predictive power ($\Delta F(1,34) = 2.829$, $p > 0.05$, $\Delta R^2 = 0.064$; see Table 13).

In the non-adulterous condition, another hierarchical regression was conducted in which affect was the initial predictor. Physiological measures were added to the model, thus creating the same analysis in the reverse order. The variable of self-reported affect is found to be a significant predictor of IJR scores ($F(1,36) = 4.720$, $p < 0.05$, $R^2 = 0.116$), and accounts for 11.6% of the variance (see Table 13). When the two physiological measures are added to self-reported affect, the full model is again found to significantly predict IJR scores ($F(3,35) = 3.341$, $p < 0.05$, $R^2 = 0.228$). Further, the addition of the physiological variables does not add any

significant predictive power ($\Delta F(2,34) = 2.460$, $p > 0.05$, $\Delta R^2 = 0.112$; see Table 13). This suggests that in the non-adulterous condition, self-reported affect and physiological measures account for similar proportions of the variance in the IJR score. It should be noted, however, that these results are very speculative because of the small sample sizes of the two conditions: $n_{ad.} = 64$, $n_{n\text{-}ad.} = 38$.

Table 13
Hierarchical Regression Analysis: Predicting Immanent Justice Reasoning Scores from Affect and Physiological Measures

Condition	Predictor	*Std.Beta*	*p*	*R*	*Adj* R^2	ΔR^2	ΔF	*p*
Adulterous	Step 1: GSR.C.BL	-0.004	0.97	0.174	-0.002	0.030	0.950	>.05
	BPM.C.BL	-0.173	0.18					
	Step 2: GSR.C.BL	0.067	0.57	0.450	0.162	0.172	12.933	<.001
	BPM.C.BL	-0.115	0.33					
	Affect	0.426	0.001					
Non-Adulterous	Step 1: GSR.C.BL	0.412	0.01	0.404	0.116	0.163	3.419	<.05
	BPM.C.BL	-0.101	0.53					
	Step 2: GSR.C.BL	0.350	0.03	0.477	0.160	0.064	2.829	<.05
	BPM.C.BL	-0.054	0.73					
	Affect	0.263	0.10					
Non-Adulterous	Step 1: Affect	0.340	0.04	0.340	0.091	0.116	4.720	<.05
	Step 2: Affect	0.263	0.10	0.477	0.160	0.112	2.460	<.05
	GSR.C.BL	0.350	0.03					
	BPM.C.BL	-0.054	0.73					

Affect = Summed Scores of Affective Items 1, 3, and Reverse 6; GSR.C.BL = Skin Conductance/Galvanic Skin Response from Change Baseline; BPM.C.BL = Heart Rate/Beats per Minute Change from Baseline

Affective self-report between conditions comparison. The next analysis focused on whether the deservedness of David's accident caused average levels of self-reported affect to change between the two conditions, adulterous and non-adulterous David. In order to answer this question an independent samples Welch's *t*-test was used. This test compares the affective self-report measure between the adulterous and non-adulterous conditions during the experimental phase. The adulterous condition affect score ($M = 16.0$, $SD = 3.401$, $n = 69$) shows

significantly higher levels of affect in comparison to the non-adulterous condition (M = 13.9, SD = 2.87, n = 40; Welch's $t(93.96) = 3.553$, $p < 0.001$; Figure 4). A Welch's t-test analysis was used because of the unbalanced design, conversely Levene's test for homogeneity of variance is not significant ($F(1,107) = 1.241$, $p > 0.05$). As a result, a Student's t-test was also conducted comparing the affective self-report measure between conditions. This also shows that the adulterous condition has significantly higher affect scores than the non-adulterous condition ($t(107) = 3.397$, $p < 0.001$). This result suggests that participants reported the adulterous condition narrative as more affect provoking than the non-adulterous condition. Given that previous results did not detect a significant difference with respect to physiological arousal between conditions (see page 50), the above might indicate that implicit and explicit indicators of emotional arousal are different constructs.

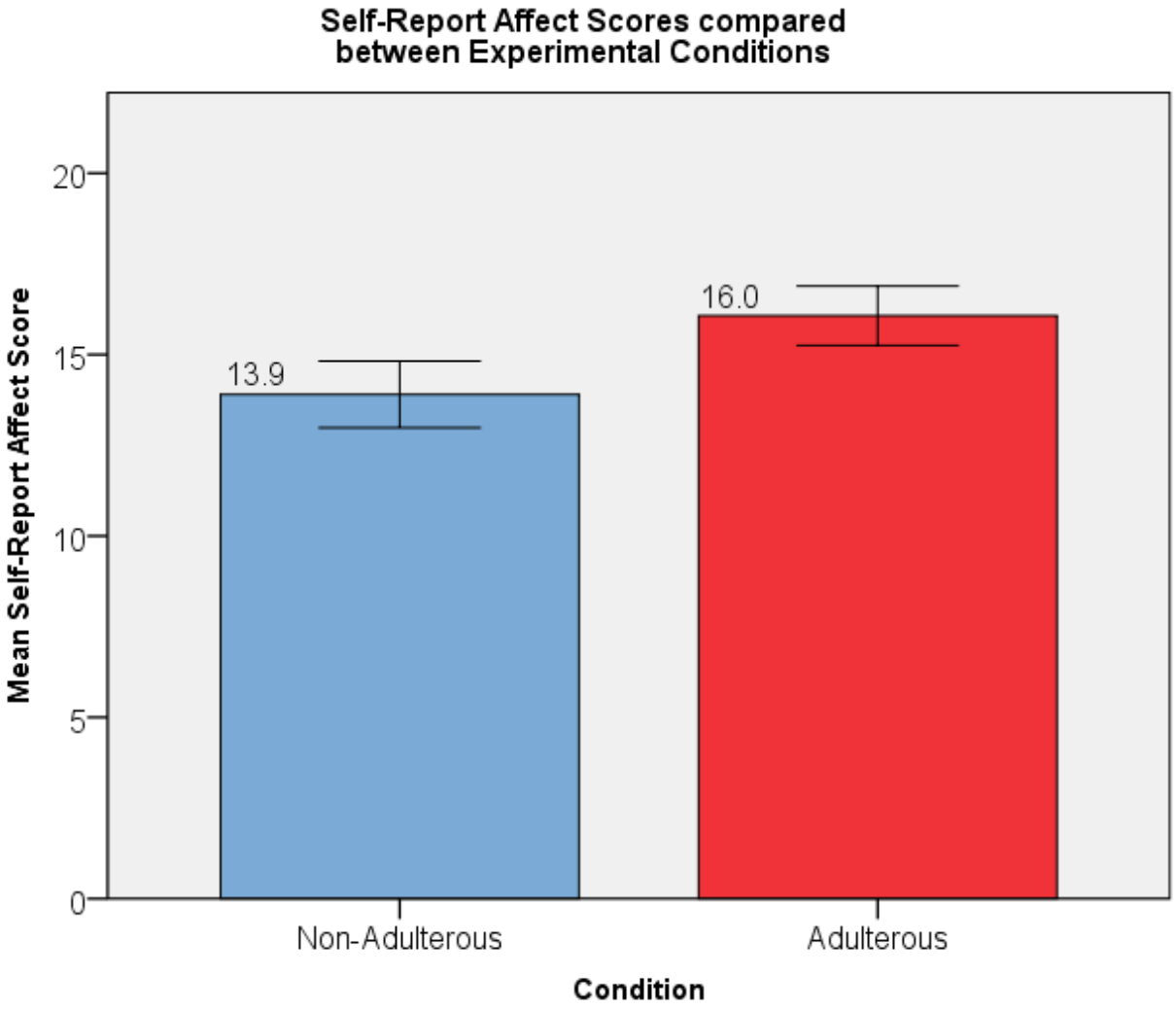

Figure 4. Self-Report Affect Scores compared between Experimental Conditions. 95% confidence intervals are represented in the figure by the error bars attached to each column.

Baseline and immanent justice reasoning phase question response latency. Question response latency, the amount of time it took participants to respond to Likert questions, was investigated as a predictor variable for IJR. In both phases (baseline condition and experimental condition), question types were grouped into two categories - judgment and affect. These variables were used to establish a measure of question response latency in order to investigate if the time it took participants to answer certain types of questions exhibited predictive power

pertaining to their IJR judgments, and if either experimental condition played a role in question response latency.

In the baseline condition, three judgment questions (i.e. Question 3, 4, and 7) were used to establish baseline question latency for judgment oriented questions. These judgment type questions prompted participants to make causal connections between narrative details, such as whether coffee causes individuals to get sick. Figure 5 describes the exact calculation.

$$\begin{matrix} Baseline\ Judgement\ Condition \\ Average\ Seconds\ per\ Word\ Latency \end{matrix} = \left(\frac{Q3\ Latency}{\#\ Q3\ Words} + \frac{Q4\ Latency}{\#\ Q4\ Words} + \frac{Q7\ Latency}{\#\ Q7\ Words}\right)/3$$

Figure 5. Baseline judgment condition seconds per word latency equation.

In the baseline condition, three affect questions (i.e. Question 2, 6, and 8) were used to establish baseline question response latency for affect oriented questions. These affect type questions prompted participants to report the affective quality of the narrative details, such as how happy the narrative information made participants feel. Figure 6 outlines the exact calculation.

$$\begin{matrix} Baseline\ Affect\ Condition \\ Average\ Seconds\ per\ Word\ Latency \end{matrix} = \left(\frac{Q2\ Latency}{\#\ Q2\ Words} + \frac{Q6\ Latency}{\#\ Q6\ Words} + \frac{Q8\ Latency}{\#\ Q8\ Words}\right)/3$$

Figure 6. Baseline affect condition seconds per word latency equation.

In the experimental condition, four judgment questions (i.e. Question 2, 8, and 9, 13) were used to establish IJR question response latency for judgment oriented questions. These judgment type questions prompted participants to make causal connections between narrative details, such as whether David's dealing with Susanne was the cause of his car accident. Figure 7 details the exact calculation.

$$Experimental\ Judgement\ Condition\ Average\ Seconds\ per\ Word\ Latency = \left(\frac{Q2\ Latency}{\#\ Q2\ Words} + \frac{Q8\ Latency}{\#\ Q8\ Words} + \frac{Q9\ Latency}{\#\ Q9\ Words} + \frac{Q13\ Latency}{\#\ Q13\ Words}\right)/4$$

Figure 7. Experimental judgment condition seconds per word latency equation.

In the experimental condition, three affect questions (i.e. Question 1, 3, and 6) were used to establish IJR question response latency for affect oriented questions. These affect type questions prompted participants to report the affective quality of the narrative details, such as how happy the narrative information made the participants feel. Figure 8 illustrates the exact calculation.

$$Experimental\ Affect\ Condition\ Average\ Seconds\ per\ Word\ Latency = \left(\frac{Q1\ Latency}{\#\ Q1\ Words} + \frac{Q3\ Latency}{\#\ Q3\ Words} + \frac{Q6\ Latency}{\#\ Q6\ Words}\right)/3$$

Figure 8. Experimental affect condition seconds per word latency equation.

Judgment question response latency between conditions. An analysis was conducted in order to investigate whether there was a difference between how long it took participants to answer judgment type questions between the two conditions: adulterous and non-adulterous. An analysis of covariance (ANCOVA) was conducted which used participants' baseline average judgment type question response latencies as a covariate, and compared the difference between experimental condition average judgment type question response latencies. Levene's test for homogeneity of variance is not significant, therefore no violation of the assumption of homogeneity of variance is detected ($F(1,107) = 2.945$, $p > 0.05$). It is notable, however, that the adulterous and non-adulterous condition sample sizes were unbalanced: $n_{ad.} = 69$, $n_{n\text{-}ad.} = 40$. Nevertheless, results suggest that there is not a significant difference between experimental conditions with regard to judgment question latency ($F(1,106) = 0.258$, $p > 0.05$, $\eta^2 = 0.02$).

Using judgment question response latency to predict immanent justice reasoning. The next set of analyses focused on whether participants' judgment question response latency has predictive power with regard to their IJR in both conditions, after controlling for participants' baseline judgment question response latency. Therefore, this calls into question whether or not the duration participants took to answer the experimental condition's causal judgment questions correlated with the level of Likert IJR they reported, in addition to whether or not the two experimental conditions differed.

In order to answer these questions, a hierarchical linear regression was used for each condition: IJR adulterous and IJR non-adulterous. Each condition's hierarchical linear regression consisted of a regression analysis that assessed the predictive power on participants' reports of IJR using participants' baseline judgment question response latency as the first level covariate and their experimental judgment question latency as the second level main predictor variable. Each regression analysis used the participants' baseline judgment question response latencies as a control variable, in order to account for random variation in participants' question answering speed. In the adulterous condition, results of the first level of hierarchical regression indicate that the baseline judgment question latencies are not a significant predictor of IJR ($F(1,67) = 0.056$, $p > 0.05$, $R^2 = 0.001$). Moreover, when combined with the experimental judgment question latency, the full model is not a significant predictor of IJR ($F(2,66) = 0.756$, $p > 0.05$, $R^2 = 0.022$). When controlling for baseline latency, there is not a significant increase in variance accounted for by the addition of the IJR question response latency variable ($\Delta F(1,66) = 1.455$, $p > 0.05$, $\Delta R^2 = 0.022$; see Table 14). This shows that in the adulterous condition, experimental judgment question latency does not have an observable amount of predictive power with regard to IJR scores.

In the non-adulterous condition, the results of our first level of hierarchical regression indicate that the baseline judgment question response latencies are only a marginally significant predictor of IJR ($F(1,38) = 3.294$, $p = 0.077$, $R^2 = 0.080$). When combined with the experimental judgment question latency, both variables are also only marginally significant predictors of IJR ($F(2,37) = 2.566$, $p = 0.090$, $R^2 = 0.122$). When controlling for baseline latency, there is not a significant increase in variance accounted for by the addition of the IJR question response latency variable ($\Delta F(1,37) = 1.772$, $p > 0.05$, $\Delta R^2 = 0.042$; see Table 14). This shows that in the non-adulterous condition, experimental judgment question latency does not have an observable amount of predictive power with regard to IJR scores.

Table 14
Hierarchical Regression Analysis: Predicting Immanent Justice Reasoning Scores from Causal Question Response Latency after controlling for Baseline

Condition	Predictor	*Std.Beta*	*p*	*R*	*Adj* R^2	ΔR^2	ΔF	*p*
Adulterous	Step 1: BL.CQ.Lat	-0.029	0.81	0.029	-0.014	0.001	0.056	>.05
	Step 2: BL.CQ.Lat	-0.149	0.35	0.150	-0.007	0.022	1.455	>.05
	IJR.CQ.Lat	0.190	0.23					
Non-Adulterous	Step 1: BL.CQ.Lat	0.282	0.08	0.282	0.056	0.080	3.294	>.05
	Step 2: BL.CQ.Lat	0.464	0.03	0.349	0.074	0.042	1.772	>.05
	IJR.CQ.Lat	-0.274	0.19					

BL.CQ.Lat = Baseline Causal Question Response Latency;
IJR.CQ.Lat = Immanent Justice Reasoning Causal Question Response Latency

Affect question response latency between conditions comparison. An analysis was conducted in order to investigate whether there was a difference between how long it took participants to answer affect type questions between the two conditions: adulterous and non-

adulterous. An analysis of covariance (ANCOVA) was conducted which used participants' baseline averages of affect type question latencies as a covariate, and compared the difference between experimental condition average of affect type question response latencies. Levene's test for homogeneity of variance was not significant, therefore no violation of the assumption of homogeneity of variance was detected ($F(1,107) = 0.158$, $p > 0.05$), however condition sample sizes were unbalanced: $n_{ad.} = 69$, $n_{n\text{-}ad.} = 40$. Results show that there is a significant difference between IJR adulterous (est. marginal $M = 591.8$, $SE = 18.43$) and non-adulterous (est. marginal $M = 539.4$, $SE = 14.036$) conditions with regards to affect question latency ($F(1,106) = 5.081$, $p < 0.05$, $\eta^2 = 0.046$), yet the between conditions effect size is weak.

Using affect question response latency to predict immanent justice reasoning. The next set of analyses focused on whether participants' affect question response latency has predictive power with regard to their IJR in both experimental conditions, after controlling for participants' baseline affect question response latency. These call into question whether the duration participants took to answer the experimental condition affect questions correlated with level of IJR they report, and whether the two experimental conditions differ.

In order to answer these questions, a hierarchical linear regression was used for each conditions: IJR adulterous, IJR non-adulterous. Each condition's hierarchical linear regression consisted of a regression analysis which assessed the predictive power on participants' report of IJR using participants' baseline affect question response latency as the first level covariate and their experimental affect question response latency as the second level main predictor variable. Each regression analysis used participants' baseline affect question response latencies as the control variable, in order to account for random variation in participants' question answering speed. In the adulterous condition, results of the first level hierarchical regression indicate that

the baseline affect question latencies were not a significant predictor of IJR ($F(1,67) = 0.051$, $p > 0.05$, $R^2 = 0.001$), and when combined with the experimental affect question response latency, both variables are not significant predictors of IJR ($F(2,66) = 0.028$, $p > 0.05$, $R^2 = 0.001$). When controlling for baseline latency, there is not a significant increase in variance accounted for by the addition of the affect question response latency variable ($\Delta F(1,66) = 0.006$, $p > 0.05$, $\Delta R^2 = 0.000$; see Table 15). This shows that in the adulterous condition, experimental affect question latency does not have an observable amount of predictive power with regard to IJR scores.

In the non-adulterous condition, results of the first level hierarchical regression indicate that the baseline judgment question latencies are not a significant predictor of IJR ($F(1,38) = 1.542$, $p > 0.05$, $R^2 = 0.04$), and when controlling for baseline latency, experimental affect question latency is also not a significant predictor of IJR ($F(2,37) = 2.270$, $p > 0.05$, $R^2 = 0.11$). When controlling for baseline latency, there is not a significant increase in variance accounted for by the addition of the affect question response latency variable ($\Delta F(1,37) = 2.921$, $p > 0.05$, $\Delta R^2 = 0.070$; see Table 15). This shows that in the non-adulterous condition, experimental affect question latency does not have an observable amount of predictive power with regard to IJR scores.

Table 15
Hierarchical Regression Analysis: Predicting Immanent Justice Reasoning Scores from Affective Question Response Latency after controlling for Baseline

Condition	Predictor	*Std.Beta*	*p*	*R*	*Adj* R^2	ΔR^2	ΔF	*p*
Adulterous	Step 1: BL.AQ.Lat	0.028	0.82	0.028	-0.014	0.001	0.051	>.05
	Step 2: BL.AQ.Lat	0.038	0.84	0.029	-0.029	0.000	0.006	>.05
	IJR.AQ.Lat	-0.014	0.94					
Non-Adulterous	Step 1: BL.AQ.Lat	0.197	0.22	0.197	0.014	0.039	1.542	>.05
	Step 2: BL.AQ.Lat	0.485	0.04	0.331	0.061	0.070	2.921	>.05
	IJR.AQ.Lat	-0.391	0.10					

BL.AQ.Lat = Baseline Affect Question Response Latency; IJR.AQ.Lat = Affect Question Response Latency During Experimental Condition

Tables 16 and 17 illustrate the correlation matrix between each of the variables under both conditions. Question latency was calculated to be heavily correlated with all latency variables, however none were correlated with IJR scores.

Table 16
Pearson Correlation Coefficients Table: Adulterous Condition Latency Specific Correlations with Immanent Justice Reasoning Scores

Adulterous Condition	IJR Scores	Baseline Causal Latency	Baseline Affect Latency	Causal Item Latency
Baseline Causal Latency	-0.029			
Baseline Affect Latency	0.028	0.516**		
Causal Item Latency	0.095	0.633**	0.599**	
Affect Item Latency	0.014	0.461**	0.741**	0.506**

**. Correlation is significant at the 0.01 level (2-tailed).

Table 17

Pearson Correlation Coefficients Table: Non-Adulterous Condition Latency Specific Correlations with Immanent Justice Reasoning Scores

Non-Adulterous Condition	IJR Scores	Baseline Causal Latency	Baseline Affect Latency	Causal Item Latency
Baseline Causal Latency	0.282			
Baseline Affect Latency	0.197	0.810**		
Causal Item Latency	0.034	0.664**	0.622**	
Affect Item Latency	-0.034	0.570**	0.735**	0.565**

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

In order to maximize clarity and ease of understanding throughout the following discussion section, the below text is an outline of some of the major themes and terms used in the present study. This study was a replication of a study done by Callan, Ellard, and Nicol (2006) with the addition of continuous measures of physiological arousal. It consisted of three phases: a survey phase, a baseline phase, and an experimental phase. In the survey phase, a number of individual difference measures were administered to participants, the most important being the Lupkis's (1991) Global Belief in a Just World Scale (GBJWS) assessment. In the baseline phase, participants were introduced to a neutral narrative about caffeine. This baseline phase was used to acclimate participants to the process of answering questions about a narrative. In the experimental phase, participants were introduced to one of two conditions: a narrative where the main character (David) has a rendezvous with a female coworker in either a virtuous or adulterous manner. These narratives were designed to induce in the participants a particular form of cognitive attribution by which they modify their attitudes or beliefs about events in order to make themselves feel as if they live in a just world. This is called a justice-motivated behavior (JMB). Specifically, participants were being induced to commit a JMB through which they drew a causal relationship between two events which were unlikely to be related – David's dealings with his colleague Susanne (either virtuous or not) and his rendezvous with her. The possible causal influence on David being brutally struck in a motor vehicle accident was in regards to the nature of David's interactions with Susanne. When participants reported they believed there to be a causal relationship, it was classified as a JMB known as immanent justice reasoning (IJR): the idea that a "fault will automatically bring about its own punishment" (Piaget, 1932/1965, p. 256).

A number of dependent measure variables were assessed, the most important of which were the presence, magnitude, and the method of participants' IJR behavior. These were measured using self-report questions using a Likert scale and open-ended responses. The open-ended answers were categorized by defensive strategy class (DSC) pertaining to what method or logic the participant used to causally relate the two events. In the present study, only three DSCs were reported by participants. In the following discussion, they will be addressed as *chance*, *fate*, and *stress*. The following is predominately a discussion regarding how participants' individual difference measures, physiological responding, and dependent measure responses relate to their IJR scores. Contained in Appendix A is a key of all acronyms used throughout this document for the reader's convenience.

Belief in a Just-World Measures

Belief in a just-world measures have received the bulk of the attention in just-world hypothesis research, and no measure has generated more research than Lupkis's (1991) GBJWS assessment. The GBJWS has been used in the prediction of a diverse array of JMB, and the scale's predictive power has been unreliable or underwhelming at best (Hafer & Begue, 2005). In the present study, GBJWS had little power in predicting either of the experimentally observed JMBs – Likert reported IJR and DSC open-ended responses. This is consistent with Callan, Ellard, and Nicol's (2006) original findings. Additionally, the GBJWS did not add any predictive value when used in conjunction with variables that have predictive power, such as stimulus-induced physiological arousal. Perhaps the reason that interest in the belief in a just world (BJW) measures have endured is because they correlate with other variables and assessments that have shown predictive power with regard to JMBs (Rubin & Peplau, 1975; see correlation Tables 1, 2 and 3 for examples in this experiment).

It should be noted, however, that the present study gathered nearly all individual difference measures, including BJW, hours or days before the actual experiment took place. This method was chosen for two reasons. First, for practical reasons, the experiment's in-lab time requirements were kept under an hour for participants. Secondly, by separating the survey questions from the in-house experiment, it was hoped that such temporal distance would limit the priming and clueing effects of assessments upon participants' in-lab behavior. It is possible that some of the significant results found historically in BJW assessments were because of the temporal proximity to other portions of the experiment. We sought to limit such effects, and recognize that it would be useful to investigate this in future research.

Replications

Callan, Ellard, and Nicol's (2006) findings. This thesis experiment had several components that acted as full or partial replications of previous experiments. The first replication was of Callan, Ellard, and Nicol's (2006) first scenario study during which they investigated whether sufficient motivation led individuals to be more likely to assert a causal relationship between two events that are unlikely to have been causally related. The motivation, in this case, was whether the main character (David) was an adulterous or virtuous individual. Our results suggest that when David was an adulterous individual, participants were significantly more likely to believe that the events of his affair were causally related to his subsequent car accident (i.e. IJR). This remains consistent with Callan, Ellard, and Nicol's original finding. It was necessary for this experiment to replicate the previous results not only in order to validate its design and implementation, but also because it was important to verify that the adulterous condition – in which David was more "deserving" of the outcome – had significantly higher levels of IJR. The significant difference in the levels of IJR between conditions set the

groundwork work for investigating the possibility that cognitive dissonance might be differentially influencing participants' judgments under conditions with and without a "deserved" outcome.

Tomaka and Blascovich's (1994) findings. This thesis also incorporated a replication of Tomaka and Blascovich's (1994) original study. Tomaka and Blascovich's study was designed to determine whether a BJW measure was able to predict how an individual reacts emotionally to a stressful situation (i.e. serial subtraction task). Their experiment was designed to support the hypothesis that individuals who had a high BJW were better adapted to manage environmental stressors. Moreover, it is through this belief that individuals are able to ameliorate the perceived injustices in the world, and gain more confidence in his/her own endeavors. This thesis was not designed to determine whether individuals with higher levels of BJW are better suited to handle stressful situations, but sought to replicate Tomaka and Blascovich's physiological results. In reproducing their previous findings – GBJWS scores can predict the cardiovascular activity of participants while preforming a serial subtraction task – the working order of our physiological measurement apparatus was established.

Our results are consistent with Tomaka and Blascovich's (1994) findings in which GBJWS scores were a significant predictor of stress induced emotional arousal as shown by physiological measures. Even though this thesis study did not find GBJWS scores to be predictive of IJR, it demonstrated the scores as a weak predictor of participants' cardiovascular functioning during an arithmetic task. This does not necessarily mean, however, that the BJW construct should be thought of as generalizable to other stressful activities. In Tomaka and Blascovich's study, the arithmetic stress task was thought to be a generalizable, challenging activity. While this is possibly the case, previous theorists had discussed that individuals with a

higher BJW might be better adapted to perform certain specific tasks (Rubin & Peplau, 1975). BJW assessments are often correlated with additional variables that are more predictive of task performance such as education quality/level, economic status, locus of control, social desirability, and personality facets (Hafer & Bugue, 2005). This makes it difficult to interpret the relationship between the level of stress induced by the arithmetic task, task performance, and individuals' BJW. Regardless, the physiological data gathered suggests that our apparatus is functioning properly because of the observation of a similar relationship between the GBJWS scores and cardiovascular output.

Lastly, an interesting note is that the serial subtraction task's baseline in this thesis had a duration of only four minutes, which was nine minutes shorter than Tomaka and Blascovich's (1994) original baseline. This suggests that obtaining notable physiological results may not require as long a duration as previously believed.

Emotional Arousal and Just-World Research

Unique to this experiment was the inclusion of the emotional arousal assessment. The investigation of physiological indicators of emotional arousal, as well as emotional arousal's possible influence over JMBs has not typically been included in the just-world literature. Implicit in this investigation was the inference that if elevated levels of emotional arousal were assessed in conjunction with JMBs, this would be support that individuals' emotional arousal played some role in their judgments. The present experiment gave some indication that this was the case.

Although many investigators have suggested a relationship between emotionality and decision/judgments (Lerner, 1980; Blader & Tyler, 2002), it was rare for just-world hypothesis researchers to externally manipulate participants' emotional arousal by means other than

reducing the justice-threat provoking quality of one of the conditions. A notable exception to this was Thorton's (1984) work where it was shown that priming participants to be sensitive to their emotions prior to the exposure of justice-threat stimuli increased the likelihood that participants blamed the victim. While this experiment did not provide confirmation that emotional arousal was causing JMBs, it revealed an interesting situation in which emotional arousal and IJR were correlated.

Using the global belief in a just-world scale to predict physiological arousal. An investigation was conducted in order to determine whether the GBJWS assessment was a reliable predictor of an individual's emotional arousal induced by justice-threat provoking stimuli as a replication of Tomaka and Blascovich's (1994) study. In Theory, BJW assessments are indicative of an individual's global sensitivity to justice-threats. That is to say, according to Learner (1980), individuals who developed such strong beliefs in a just world did so in order to ameliorate the stress induced by perceived injustices. In this thesis, participants were exposed to the injustice that David was hit by a car despite testimony that he was a virtuous person. This is not to say that participants did not perceive *any* injustice in the outcome when David was adulterous. A more precise explanation is that participants are *less likely* to perceive injustice when David was behaving badly as compared to when he was virtuous, despite identical outcomes (Callan, Ellard & Nicol, 2006). As stated previously, under both the adulterous and non-adulterous conditions, the physiological arousal induced by the justice-threat provoking stimuli was not predicted by the GBJWS assessment. Yet these findings do not necessarily contradict Lerner's (1980) original theory. The challenge raised concerns whether or not the GBJWS assessment – or any BJW assessment – has the ability to determine how sensitive individuals are to justice-threats, particularly if those justice-threats are very situation dependent.

Intuitively, one would expect that response to adultery is not uniform among individuals, and that there might be even more variability in reaction to grisly car accidents. A reasonable explanation as to why BJW assessments have been inconsistent predictors of JMBs (Hafer & Bugue, 2005) is because BJW assessments might lack power in predicting behaviors when situational factors – or idiosyncratic sensitivities – are more influential than a general BJW.

Using individual difference measures and physiological arousal to predict immanent justice reasoning. One of the important questions this thesis addressed was whether the emotional arousal caused by justice-threats could be assessed using physiological arousal measures and whether physiological measures alone would be significant predictors of IJR. The answer is yes, but only during the non-adulterous condition when David was least "deserving" of the outcome.

A number of analyses were conducted to investigate which variables and variable combinations had the highest predictive power with regard to IJR. Results showed that the variables that predicted IJR in the adulterous condition were different from those in the non-adulterous condition. In the adulterous condition, the only useful predictive variables for IJR were self-reported deservedness and self-reported affect. Self-reported deservedness represented participants' belief that David "deserved" the car accident, and self-reported affect represented participants' impressions of the affective nature of the stimulus. Unsurprisingly, these two variables were moderately correlated with each other ($r = 0.48$, $p < 0.01$). This supports Callan, Ellard, and Nicol's (2006) findings that suggest deservedness is a strong mediator of IJR. None of the other self-report individual difference measures (e.g. socioeconomic status, GBJWS, conservatism, etc.) produced any significant results save one – self-reported affect. This is interesting because physiological arousal was not a reliable predictor of IJR despite it often being

considered as related to a person's affect. Although one would expect that self-reports of emotional arousal would at least be correlated with physiological arousal, they were not.

In the non-adulterous condition, only self-reported affect and physiological arousal had predictive power with regard to IJR scores. This result is remarkable for a few reasons. First, physiological arousal was only a predictor variable when participants were presented with the justice-threat stimuli in the non-adulterous condition. This suggests that only in the condition where participants were exposed to an "undeserved" outcome did their physiological arousal predict whether participants would blame David for his circumstances. Second, the variables of self-reported affect and physiological arousal were not correlated in either of the two conditions, yet in the non-adulterous conditions, both significantly predicted IJR scores.

The most interesting finding in the two conditions is not which variables predicted IJR scores, but how these variables relate to the IJR scores in different ways. To summarize, self-reported affect alone was moderately predictive of IJR scores in both conditions, yet measures of physiological arousal were only predictive under the non-adulterous condition. Additionally, physiological arousal was not significantly correlated with self-reported affect in either condition. This may lead to a number of different interpretations.

The first conclusion that can be drawn is that self-reported affect and physiological arousal are wholly different constructs. Thus, they should not be used interchangeably in an experimental sense, as they seem to address different cognitive processes. It seems that participants were poorly influenced by how emotional they felt while reading David's ordeal, as suggested by the fact that self-reported affect and physiological arousal were not correlated with each other. The two possible conclusions that can be drawn from this are that (1) participants were not attending to their bodily sensations while they were reading the stimulus information,

or (2) the way they believed they *should* answer the affective questions rendered their *actual* feelings irrelevant. Regardless, both variables predicted IJR moderately in the non-adulterous condition, and account for similar proportions of the variation.

There are a number of different hypotheses as to why physiological arousal only matters during the "undeserved" outcome condition. For example, how does empathy play into victim blame? If participants were experiencing an empathetic reaction to David's plight, then it is possible that they were employing some form of motivated reasoning to explain the perceived injustice. This is in contrast to the adulterous condition where participants potentially drew an immediate judgment (e.g., he was an adulterer and "deserved" to be hit) resulting in less motivation to explain David's outcome. This reduced motivation might explain why physiological arousal lost its ability to predict IJR. Perhaps participants were not concerned enough to get upset in an attempt to rationalize away the injustice (e.g. "bad things happen to bad people"). It has been suspected that in the realm of victim blame, empathy might be the conduit by which our feelings are brought to the surface (Blader & Tyler, 2002). The more brutal the punishment an individual witnesses released upon a helpless bystander, the more empathy they feel. When an individual has increased feelings of empathy in a painful or negative situation it leads to stress. Therefore, the more empathy they feel, the more powerful the drive to ameliorate their stress. One way to do so is by blaming the victim. This suggests that it does not matter how much emotional arousal or stress an individual felt when viewing the misfortune of another. If the misfortune was perceived to be deserved, then there is no empathy for the victim. Thus, any present emotional arousal participants may or may not have felt will not translate into a JMB. This makes emotional arousal irrelevant when David is characterized as an adulterous individual, because other judgment processes take precedence. Yet measures of the affective

quality of the stimuli are predictive of IJR. This predictability may be because the measures reflect less the emotions of the participant, but more the emotions the participant *wants* to have, thinks they *should* have, and/or *believes* him/herself to have.

Nevertheless, these remain speculations, as a result of the study's small sample size. A larger sample size and a third predictor variable of emotionality might be incorporated into future research in order to be more confident in these findings. As in Thornton's (1984) study, this thesis assessed the affective nature of the stimuli using Likert questions in order to prime participants' emotional awareness. The self-report affect items were dispersed randomly among the IJR items. Because of this, both assessments may have unintentionally suffered a loss of independence and therefore have been subject to response bias. Such bias would render the affective nature of the stimuli difficult to interpret. Yet, it should be noted that, the physiological arousal that participants exhibited could not have been influenced by the affective assessment because it came after all key physiological measures were obtained. Therefore, the possibility remains that participants' physiological arousal may have influenced their susceptibility to the priming effects of the affective questions. The hypothesis that physiological arousal is a moderator of the priming effect is, unfortunately, untestable in this thesis because of the study's small sample size.

Physiological arousal between Experimental conditions. One of the distinctive qualities in this experiment was that both conditions (adulterous and non-adulterous) were designed to provoke emotional arousal. This differs from Learner's (1980) unpublished SC study where the emotionality of the justice-threat stimuli was removed between conditions by informing the participants that what they were witnessing had been staged. It was the intention of the present experiment to maintain an equal level of emotionality in both conditions. This was

necessary in order to isolate justice-threat provoking stimuli as the effective condition manipulation. There were no significant differences between the two experimental conditions with respect to physiological arousal, yet a significant difference was detected between both conditions with respect to the self-reported affect. This variable represented the explicit emotionality of the stimulus, and this emotionality was found to be higher in the adulterous condition. As mentioned previously, the fact that these two variables of emotionality (i.e. physiological arousal and self-reported affect) were in disagreement is peculiar, and further substantiates the idea that both variables reflect different psychological constructs. The lack of discernable difference of the levels of physiological arousal between conditions suggests that the change in "deservedness" of the outcome was being manipulated between conditions, not the general emotionality of stimuli.

This study was designed to answer a very specific question: what part do emotions play with regard to IJR? Our results suggest that emotions play an important predictive part with respect to IJR. Subsequently, the question became: which emotions – the emotions felt or the ones expressed? Whether conscious of their feelings or not, a large amount of literature suggests that the motivating factor in an individual's reasoning is the emotional quality of what one perceives (Forgas, 1995). The present study found support for the idea that individuals' emotional arousal has the potential to illicit IJR when a perceived injustice is undeserved. Relatedly, self-reported affect is predictive of IJR. Additionally, this study's data support that when a perceived injustice is more deserved, the self-reported affective quality of the injustice is a reliable predictor of IJR, but not of emotional arousal. That is, the way participants *thought* they felt about David's adulterous behavior and subsequent accident bears more weight in making a causal connection than any of the assessed physiological measures. This is assuming

the participants actually *thought* they were upset, and did not merely respond in a biased way for social desirability reasons – an assumption that perhaps should not be made. Either way, it seems that the feelings participants reported about the stimuli were overarching and important in both conditions when predicting IJR.

Another way of explaining these findings is to illustrate with an example. It might be the case that feeling aghast at David's adulterous behavior makes individuals feel good about themselves. In a sense, this may potentially satisfy some perspective of social desirability in the participant. Once this social perspective is established, all other perspectives might stem from it. As already reported in this study, IJR is predicted solely by self-reported affect in the adulterous condition, whereas it is predicted by both self-reported affect and physiological data in the non-adulterous condition. This divergence in the predictive power of the two emotional measures might be because participants expressed themselves in a socially desirable manner – rather than expressing how they truly felt – regarding David's adulterous behavior. Whether participants were conscious of such personal deception is unknown, however, this behavior has many features akin to a cognitive dissonance drive state. That is, behaviors driven by the state of experiencing inconsistent thoughts, beliefs, or attitudes, especially as related to behavioral decisions and attitude change (Festinger, 1957).

The Utility of Open-Ended Responses

One of the interesting manipulations in Callan, Ellard, and Nicol's (2006) experiment was to utilize an open-ended response in addition to Likert type self-report measures when assessing JMBs. The open-ended responses were coded into specific DSCs. This coding was based on how participants chose to explain David's car accident, and whether it had anything do to with his prior dealings with Susanne: either as a travel agent helping David plan a trip for his

family, or as a women with whom David was engaging in an unrepentant affair (depending on condition). A number of analyses were carried out comparing these DSCs to Likert self-report measures, the GBJWS assessment, and physiological measures of arousal induced by justice-threats in the stimuli.

Contrary to Callan, Ellard, and Nicol's prolonged suffering experiment, only three different types of DSC explanations were observed in this study's two conditions. In this discussion, the three categories will be addressed as *chance*, *fate*, and *stress*. The *chance* category includes the ideas of chance, chaos, a lack of cause/effect, and a general lack of explanation for events. *Chance* is not a JMB; a sample participant response might be, "there is no relationship – that happened completely by chance." The *fate* category includes the ideas of fate, karma, destiny/predestined, justice, etc. under the umbrella of an overarching/long-term ultimate justice being served, usually in the idea of an afterlife. *Fate* is a JMB; a sample participant response might be, "that was always going to happen, it was fate." Lastly, the *stress* category includes the ideas of stress, guilt, distraction, etc. under the overarching idea of natural causal rationalization (NCR). *Stress* is a JMB; a sample participant response might be, "I think the best explanation for what happened is that he must have been stressed out."

Defensive strategy class frequencies per condition. It is worth noting that the participants of the non-adulterous condition never chose *fate* as the cause of David's accident, but participants in the adulterous condition did. If, in the adulterous condition, we exclude the participants who chose *fate* as the explanation for David's misfortune, an interesting effect is observed. It is noticed that *chance* and *stress* are represented by a ratio of five to two, respectively. This is interesting because it is nearly identical to the ratio found in the non-adulterous condition, where *fate* was not chosen by a single participant.

The ratio being nearly identical in both the adulterous and non-adulterous groups is interesting because one would expect to see more participants trying to explain David's accident through rational means (e.g. vacation planning stress) in the non-adulterous condition, as no clear justified cause (i.e. adulterousness) was provided. It is possible that the virtuous nature of the non-adulterous David makes participants unlikely to choose *fate* in this condition. Individuals who attributed an adulterous, "deserving" David's accident to fate would see a virtuous, "undeserving" David's misfortune and choose an alternative JMB strategy, such as *stress*. Were this the case, the frequency distributions of the two groups (adulterous and non-adulterous) would differ – more participants would have selected *stress* as an explanation for the accident. Surprisingly, however, the ratios of the conditions were nearly identical.

Priming is one possible explanation for this outcome. Prior to the open-ended section of the assessment, one of the questions presented to the participants in both conditions, as in Callan, Ellard, and Nicol's (2006) original study, was "How possible is it that the stress David had felt previously with his travel agent affected his ability to walk across streets safely?" Therefore, it is possible that an even proportion of participants chose *stress* as an explanation under both conditions because the preceding stress question primed the idea of stress in their minds.

Using the global belief in a just-world scale to predict defensive strategy class selection. As reported earlier, our results suggest that the predictive power of Lupkus' (1996) GBJWS was poor at best with regard to Likert IJR measure. Therefore, the next question one might ask is: does the predictive power of the GBJWS assessment increase when JMBs are classified into DSCs? The answer is no. When participants' open-ended responses were categorized into DSCs, the GBJWS failed to have any predictive power over which causal

explanation they chose. None of the other individual difference measures possessed any predictive power, save IJR as discussed below.

The association between defensive strategy class selection and immanent justice reasoning reports. In order to investigate whether the method of obtaining open-ended DSC response classifications has any predictive power, it is important to first ask if there was any correlation between the DSC participants chose and the participants' Likert IJR responses. In the adulterous condition, DSCs and IJR were well correlated (adjusted $R = 0.61$, $p < 0.01$). That is, when participants were grouped by their chosen DSC, the individuals who selected *fate* and *stress* had significantly higher mean Likert IJR responses than those who chose the non-JMB *chance*.

In the non-adulterous condition, no relationship was observed. That is, when grouped by DSCs the *chance* and *stress* groups were shown to have a marginally significant difference in regards to their mean Likert IJR levels. This is strange, given that in the adulterous condition the two groups (*stress* and *chance*) showed significantly different mean IJR scores. Additionally, the IJR scores of participants who chose *stress* were compared between adulterous and non-adulterous conditions. Participants in the non-adulterous condition had significantly lower IJR scores than the participants in the adulterous condition. In other words, individuals who chose *stress* as a response in the non-adulterous condition were less certain (as exhibited by lower IJR scores) than those in the adulterous condition that a causal relationship existed. This was suggested in a significant interaction effect between conditions and DSC groupings. This suggests that the classification methodology was eliciting a different, or more complex, cognitive behavior when measured by written responses than when making a choice on a Likert scale.

Additionally, it suggests that participants were not simply repeating their immediate impressions in extended, written form.

Measures of physiological arousal and its predictive power concerning defensive strategy class selection. Much attention has been paid to the finding that physiological arousal measures were good predictors of the Likert IJR responses under conditions where the outcome was less "deserved" (i.e. non-adulterous condition). It therefore became necessary to ask whether this result would still hold true for other JMB methods such as the cognitively complex open-ended DSC classification method, as it did for Likert-type JMB. Interestingly, our results show that participants' open-ended DSC explanations were not predicted by the physiological arousal they experienced in either condition: adulterous or non-adulterous. Both conditions failed to show significant differences with respect to physiological arousal when grouped by DSC. This is rather surprising, considering that the preceding section's analysis suggests open-ended DSCs and Likert IJR were reasonably well correlated (adjusted $R = 0.61$, $p < 0.01$) under the adulterous condition.

Nevertheless, there are a few possible ways to explain this discrepancy between the JMB assessment methods of Likert IJR and classification into DSCs. First, this discrepancy could be explained by the fact that IJR is only well correlated with DSCs in the adulterous condition – the same condition that is not significantly predicted by physiological measures. In addition, it is possible that the Likert IJR methodology indicated both the existence and the severity (i.e. 1 through 7) of the IJR question. This, in turn, added information that increased the predictive power of the physiological measures. Lastly, the Likert IJR method might have assessed a more implicit emotional response from participants, especially considering the ease at which responses can be given quickly. On the other hand, the open-ended response assessed a more explicit,

rational judgment. This would mean that the Likert responses were more effected by implicit emotional sentiments, while cognitively articulated open-ended answers gave way for social desirability bias to alter the responses provided, and therefore our results as a whole.

The DSC grouping methodology has been thoroughly explored throughout this thesis. This method has been investigated between conditions, individual difference measures (e.g. GBJWS), and dependent measures (e.g. IJR scores). All of these analyses were performed in order to establish this methodology's criterion validity among other historically valid variables. It is rare to find individual difference variables that are reliably predictive of JMBs among the just-world hypothesis literature (Hafer & Begue, 2005). Unfortunately, only the dependent measure variable IJR significantly predicted which defensive strategy participants chose, and only in the adulterous condition. Nevertheless, it might be that participants' written responses are the most externally valid behavior in this study (Aronson, Wilson, & Akert, 2010).

Baseline and experimental condition question latency and its predictive power concerning immanent justice reasoning. In addition to the original hypotheses, a secondary investigation was undertaken in which question response latencies were examined as a predictor for IJR. Previous research has shown that response latencies can be indicators of emotional arousal. Historically, Temple and Geisinger (1990) used true/false question response latencies taken from word- and character-paired self-report statements that had different arousal levels. They found that the arousing statements took participants significantly longer to respond to, as compared to the emotionally neutral questions. In the present study, participants made judgments based on the narrative, and reported the affective intensity they felt. Similar affect and judgment questions were asked in the baseline and experimental conditions. When controlling for participants' response latencies in the baseline condition, causal judgment

response latencies were not reliable predictors of IJR. Neither the judgment, nor affect question response latencies show any correlation with IJR.

In this thesis, question response latencies were not predictive of IJR. This might be because of the fact that the baseline questions and experimental questions were not matched for reading duration (i.e. by balancing character, syllable, and word counts between questions). Rather, question response latencies were weighted on a word count basis. Additionally, where this thesis employed a prior narrative in order to illicit arousal, Temple and Geisinger's (1990) experiment used the questions themselves as the affect stimuli to which participants were reacting.

Study Conclusions

In recent years, social and cognitive psychologists have been investigating the interaction among beliefs, attitudes, and behavior in great detail. Just-world theory is unique because it investigates how an individual's world-view influences his/her behavior when confronted with an injustice. One of the clearest findings in this study is that when participants blamed David for his circumstances, their emotions (as shown by physiological measures) were predictors that this blame was taking place. When David "deserved" his outcome more because of his adulterous behavior, the participants' emotions were no longer an indicator that victim blame had taken place. This suggests that the deservedness of an outcome effects the nature by which emotions influence victim blame. That being said, witnessing injustice seems to be emotionally provoking, whether or not it is perceived as deserved. No difference was found between the adulterous and non-adulterous conditions with regard to physiological arousal. Yet this was not consistent with participants' reports regarding the level of emotionality provoked by the stimuli. It is also remarkable that this was accomplished using relatively low quality equipment to assess

only two physiological measures: heart rate and galvanic skin response. It appears as though the utility of physiological measures is their ability to shed light on the divergence between what was said and what was felt in testable, scientific ways. Research in just-world theory would be well served if more advanced physiological indicators were used.

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APPENDICES

Appendix A: Acronym Key

Key:
(IV) Independent Variable
(DV) Dependent Variable
(SC) Skin Conductance
(GSR) Galvanic Skin Response
(PST) Peripheral Skin temperature
(HR) Heart rate
(BPM) Beats per Minute
(RSA) Respiratory Sinus Arrhythmia
(PEP) Pre-ejection Period
(PTT) Pulse Transit Time
(BJW) Belief in a Just World
(GBJWS) Lupkus (1991) General Belief in a Just World Scale
(JMB) Justice Motivated Behavior
(IJR) Immanent Justice Reasoning
(NCR) Naturalistic Causal Rationalization
(DSC) Defensive Strategy Class: Chance, Fate, Justice, naturalistic-incomplete, naturalistic complete, and other
Adulterous Condition, Just valence, More Deserved, More Just
Non-Adulterous Condition, Unjust valence, Less Deserved, Less Just

Appendix B: Baseline Caffeine Stimulus

Canadian Living : Health : Nutrition : Coffee: Good News
http://www.canadianliving.com/coffee...

Coffee: Good News Is Filtering Through

BY JULIA SLATER

For those of us who depend on our daily dose of java, the evidence is in: Coffee, in moderation, is not bad for you after all. In fact, some studies indicate it may even have some health benefits.

For years the public was warned of the dangers of coffee, the main source of caffeine in the North American diet. In one well-publicized *New England Journal of Medicine* study released in 1981, researchers found a link between coffee and pancreatic cancer. But when at least seven other studies failed to back up that finding, those results had to be retracted.

Now, more than 19,000 dietary caffeine studies have been done, and many experts agree that moderate daily caffeine intake – 300 to 400 milligrams, about 3 to 4 cups of coffee – is not harmful. Here's more good news about coffee:

Coffee and cancer.

Fast Coffee Facts

• 81% of Canadians drink coffee at least occasionally.

• More than 63% of Canadians over the age of 18 drink coffee on a daily basis, making it the # 1 beverage choice of adult Canadians.

• Daily coffee consumption varies across the country, from a high of 70% in Quebec to a low of just over 53% in the Atlantic region.

• Canadian coffee drinkers consume an average of 2.6 cups of coffee per day. Men and women are equally likely to be coffee consumers, with men drinking slightly more coffee than women.

• 20% of Canadian like their coffee black, 7% with sugar only, 33% with cream or milk only; 40% like both dairy and a sweetener.

• Coffee is more popular in Canada than the United States, with just 49% of Americans drinking coffee on a daily basis.

• For several decades coffee has been more popular than tea, milk, beer, fruit juices and soft drinks among Canadians.

The Iowa Women's Health Study investigated caffeine intake and postmenopausal breast cancer incidence among 34,388 Iowa women aged 55 to 69. No association was found between coffee and *breast cancer*. Similarly, a Harvard study of almost 122,000 nurses found that those who drank coffee had lower rates of breast cancer than those who drank no coffee.

A recent study of 61,000 Swedish women over nine years concluded that coffee does not cause ***colorectal cancer***. Several studies have found that coffee drinkers may even have a lower risk of colorectal cancer, but results have not been consistent.

1 of 2
6:31PM

Although some studies have shown that excessive coffee drinking could cause ***bladder cancer***, others have found that it is more likely the excessive smoking along with the coffee that causes this type of cancer.

Caffeine may protect against Parkinson's disease.

Parkinson's disease is a progressive nervous disease that destroys dopamine-producing brain cells. The resulting symptoms are tremor, a slowing of movement, weakness and facial paralysis. Researchers believe that caffeine's helpful effect may be that it reduces the amount of dopamine depleted from the brain.

A Harvard School of Public Health study published last May reported that men who drank four to five cups a day of caffeinated coffee cut the risk of developing Parkinson's disease nearly **in half** compared to men who consumed little or no caffeine daily. Women who consumed between one and three cups a day also cut their risk of developing Parkinson's disease nearly when compared to women who drank less than a cup a day. But this apparent benefit was lost at higher levels of intake.

• Coffee is a morning beverage, with nearly 51% of coffee consumed at breakfast, 16% in the balance of the morning, 9% at lunch, 10% in the afternoon, 8% at dinner and 7% in the evening.

• More than half (66%) of coffee is consumed at home, 12% is consumed at work, 16% is consumed or purchased at eating places and 5% is consumed in other places such as hospitals, schools, hockey rinks. Drinking coffee in-transit rose from 2% in 1999 to 7% in 2003.

• 79% of coffee consumed at home is purchased at a grocery store/supermarket, with 7% being purchased at a gourmet/specialty coffee shop.

• Approximately 9% of coffee drinkers prefer decaffeinated coffee on a regular basis.

• The share of total coffee consumption accounted for by instant coffee is 17%.

• 37% of coffee drinkers have an awareness of organic—up from 30% in 2001. Awareness of fair-trade coffee increased from 4% in 2001 to 11% in 2003.

Source: Coffee Association of Canada

Caffeine and osteoporosis.

Although caffeine causes more calcium to be excreted in the urine, the Osteoporosis Society of Canada says that two or three cups of coffee are not harmful if you get enough calcium in your daily diet. Dieticians recommend drinking a glass of milk for every mug of coffee, or having a café au lait (preferably with skim milk to keep the fat content down).

Caffeine and athletic performance.

Researchers have found that caffeine enhances physical endurance. However, it does not appear to improve short-term high-intensity activities like sprinting. Since it can raise an athlete's metabolic level, international sports organizations limit the amount that can be found in urine.

Caffeine helps relieve headaches.

Caffeine increases the power of ASA and other pain relievers, and is often combined with them to treat headaches.

Appendix C: David's Story – Adulterous Condition

Canadian Living : Relationships : Friends & Family : David's Story
http://www.canadianliving.com/relation...

David's story

BY ALLAN WILSON

David* and Janice* were high school sweethearts. They married after university, and David got a job with a consulting firm in Toronto. David spent weekdays, weeknights and even weekends working for various projects between his firm's Toronto and Vancouver offices. "I became annoyed," says Janice, a teacher, "because I was working full-time, taking care of two children and household chores, and he wouldn't be available to do anything around the house or with the kids. So we started having arguments over, 'You're never home. Can't you cancel one of your work projects?' And he'd say, 'No. This is my work, where we get our money from.'"

Although Janice confronted David on a number of occasions about not being home enough, things got worse. David, working more than ever, was rarely home. One evening when Janice was doing laundry, she noticed a piece of paper in

David's pants that read: "David, please call me and I'll set you up with the time of your life. Susanne."

"My heart sunk," Janice said. She couldn't believe it, "Is David having an affair," she said. Janice immediately phoned David on his cell phone, as he was away in Vancouver. "I just screamed at him…'who is Susanne'…'who is Susanne' over and over again. I was crying, and I told him to come home right away." David refused, saying he had some important clients to meet in the morning and that they would talk about 'Susanne' when he got back into Toronto the following evening. He assured her there was nothing to worry about.

The truth is that David was having an extramarital affair. David met Susanne at one of his company's cocktail parties while away in Vancouver. The important "client" David met that morning was Susanne, a travel agent who often dealt with his company. David met Susanne at his hotel before boarding his flight back to Toronto.

"I realized I had been neglecting Janice and our children for the sake of my work. But my work is my work, so I had to be away the amount that I was. As a consequence, certain 'needs' of mine were not being met," said David. "I met Susanne at our last company party, and we hit it off right away. That evening I went back to Susanne's place…that was the first time we had 'relations.' We got together every night for the rest of the time I was in Vancouver. The day before I left back to Toronto I approached Robert, my company's president, and told him that I needed to be in Vancouver to better serve the needs of our clients. To my surprise, Robert was fully supportive and said we could work out the details back in Toronto the following week. What I really wanted, though, was to be with Susanne," said David.

"I was on my way to the airport when Susanne phoned me and said she had a surprise for me, but that I need to come to her travel agency to see what it was. I was short on time, so she agreed to meet me at the airport instead. Her 'surprise' was a wonderful vacation package to Mexico for her and I that she knew I was going to love," said David.

"Back in Toronto, I got off the plane…I had everything with me...my laptop, files, but most importantly, the vacation tickets. I looked straight ahead and saw my car across the street…"

"…I was walking towards my car…it happened so quickly.... the car careening out of control around the corner as I crossed the street to my car. There wasn't even a moment for me to think. They said that the elderly driver hit the gas mistakenly instead of the brake. I remember very little after that. The police said that she hit me hard enough to throw my body into the air, then as I came down my face was pinned between the windshield of the crushed car and the ground."

"I was in the hospital for three weeks after the incident. The doctors told me I had a concussion, broken ribs, cracked vertebrae, a broken leg, and needed a

number of stitches in my elbow. I hope I can get back on track in time to go on that vacation with Susanne."

Next »

- Page 1 - Losses 1-3
- Page 2 - Losses 4-6

Appendix D: David's Story – Non-Adulterous Condition

Canadian Living : Relationships : Friends & Family : David's Story
http://www.canadianliving.com/relation...

David's story

BY ALLAN WILSON

David* and Janice* were high school sweethearts. They married after university, and David got a job with a consulting firm in Toronto. David spent weekdays, weeknights and even weekends working for various projects between his firm's Toronto and Vancouver offices. "I became annoyed," says Janice, a teacher, "because I was working full-time, taking care of two children and household chores, and he wouldn't be available to do anything around the house or with the kids. So we started having arguments over, 'You're never home. Can't you cancel one of your work projects?' And he'd say, 'No. This is my work, where we get our money from.'"

Although Janice confronted David on a number of occasions about not being home enough, things got worse. David, working more than ever, was rarely home. One evening when Janice was doing laundry, she noticed a piece of paper in

David's pants that read: "David, please call me and I'll set you up with the time of your life. Susanne."

"My heart sunk," Janice said. She couldn't believe it, "Is David having an affair," she said. Janice immediately phoned David on his cell phone, as he was away in Vancouver. "I just screamed at him…'who is Susanne'…'who is Susanne' over and over again. I was crying, and I told him to come home right away." David refused, saying he had some important clients to meet in the morning and that they would talk about 'Susanne' when he got back into Toronto the following evening. He assured her there was nothing to worry about.

The truth is that David was not having an extramarital affair. David met Susanne at one of his company's cocktail parties while away in Vancouver. The important client David met that morning was Susanne, a travel agent who often dealt with his company. David met Susanne at his hotel before boarding his flight back to Toronto.

"I realized I had been neglecting Janice and our children for the sake of my work. I got so tied up with work for far too long, and realized that my wife and children needed me around much more…and I needed them too," said David. "At our last company party in Vancouver, I approached Susanne and asked her if she could think of a 'dream' vacation that I could surprise Janice and the kids with. She gave me the note that Janice found in my pants and said for me to get back to her the next time I was in town. That very same evening I approached Robert, my company's president, and told him I want to work less so I could spend more time at home, and I told him I needed to stay in Toronto. To my surprise, Robert was fully supportive and said we could work out the details back in Toronto the following week," David said.

"Susanne agreed to meet me at my hotel because I was short on time and couldn't make it to the travel agency in time before my flight. She agreed, and had in hand a wonderful vacation package to Mexico that I knew my family was going to love," said David.

"Back in Toronto, I got off the plane…I had everything with me...my laptop, files, but most importantly, the vacation tickets. I looked straight ahead and saw my car across the street…"

"…I was walking towards my car…it happened so quickly.... the car careening out of control around the corner as I crossed the street to my car. There wasn't even a moment for me to think. They said that the elderly driver hit the gas mistakenly instead of the brake. I remember very little after that. The police said that she hit me hard enough to throw my body into the air, then as I came down my face was pinned between the windshield of the crushed car and the ground."
"I was in the hospital for three weeks after the incident. The doctors told me I had a concussion, broken ribs, cracked vertebrae, a broken leg, and needed a number of

stitches in my elbow. I hope I can get back on track in time to go on that vacation with my family."

Next »

- Page 1 - Losses 1-3
- Page 2 - Losses 4-6

Appendix E: Social Conservatism Scale

Please place a check mark if you agree or are supportive of the following: (Yes, No)

Death penalty C
Multiculturalism L
Stiffer jail terms C
Sex outside of marriage L
Voluntary euthanasia L
Bible truth C
Gay rights L
Premarital virginity C
Middle East immigration L
Church authority C
Legalized abortion L
Condom vending machines L
Legalized prostitution L

(Henningham, 1996)

Appendix F: Global Belief in a Just World Scale

Please answer how much you agree or disagree with each statement in a general sense:

(1 Strongly Agree to 5 Strongly Disagree)

1 I feel that people get what they are entitled to have.
2 I feel that a person's efforts are noticed and rewarded.
3 I feel that people earn the rewards and punishments they get.
4 I feel that people who meet with misfortune have brought it on themselves.
5 I feel that people get what they deserve.
6 I feel that rewards and punishments are fairly given.
7 I basically feel that the world is a fair place.

(Lipkus, 1991)

Appendix G: Informed Consent

Consent to Participate in Research

We are conducting a study to assess how different forms of media affect you emotionally. During the experiment, you will be exposed to media source stimuli, and asked to answer a few questions about your impressions via a computer interface. We ask that you answer the questions as thoroughly and honestly as possible—there are no right or wrong answers. In addition, your physiological measures (heart rate, galvanic skin response, pulse pressure) will be taken throughout the course of the study using three finger clips. Near the end of the study, you will be asked to perform a difficult arithmetic task.

All of your responses – be they physiological or otherwise – will be kept anonymous, and your name will not be directly connected to them. This includes any response you made during the preliminary survey. Any publications or presentations based on this study will not disclose any identifying information about you or any other participants. At the conclusion of this research project, we expect to disseminate our results by publication in a professional journal or conference presentation. Again, no personally identifying information will be disclosed.

You will be exposed to minimal risk by participating in this study. It is estimated that you should be able to complete your participation within approximately 30 to 45 minutes. Most importantly, participating will allow you to gain a better understanding of how psychological research is conducted, and your responses may help to further our understanding of psychological issues.

Your decision whether or not to participate is completely voluntary and will not prejudice your future relations with Eastern Michigan University. You have the right to discontinue the study at any time during your participation, without penalty or loss of benefits of any type. If you have any questions, you can contact Reino Bruner (rbruner@emich.edu).

In the unlikely event that distressing personal concerns arise for you during or after your participation in this study, EMU students are eligible for free counseling services at:
313 Snow Health Center, Eastern Michigan University, Ypsilanti, Michigan 48197
(Telephone: 734.487.1118; Email: Counseling.Services@emich.edu).
By signing below, you agree to participate in the study:

_____

Print Name

_____ _____

Signature Date

This research protocol and informed consent document has been reviewed and approved by the Eastern Michigan University Human Subjects Review Committee for use from 3/12/12 to 3/11/13 (date). If you have questions about the approval process, please contact Dr. Deb de Laski-Smith (734.487.0042, Interim Dean of the Graduate School and Administrative Co-chair of UHSRC, human.subjects@emich.edu).

Appendix H: Physiological Scoring Algorithm

```
options(warn = 0 )
source("convert.seconds.r")
stamps = read.csv( "physiotimestamp3.csv" ,header=TRUE)
for(j in 1:109){
options(warn = -1 )
participant = stamps[j,1]
phy.data=read.table(paste(participant,sep=""), sep="\t",header=TRUE)
stamps = read.csv( "physiotimestamp3.csv" ,header=TRUE)
sindex = which( stamps[,1] == participant)
offset = ceiling( stamps[sindex,2] )
#########Step1: Remove gain, by multiplying Peak, and Gain. Rewrite clock data into readable form.
op <- options(digits.secs=3)
contain <-cbind( 0, phy.data[,2],round( phy.data[,3]*phy.data[,4], digits=5) , 0, 0, 0, 0, 0, 0, 0, 0)
for( i in {1}:{length(as.character(phy.data[,1]))+offset}    )
        {contain[i-offset,1] <- convert.seconds(as.character(phy.data[i,1]))}
#########Step2: Mark the peak time refrence between peaks.################################
last.trial=length(contain[,1])-1
for(i in 2:last.trial)
        {contain[i,4] <- if( as.numeric(contain[i-1,3]) <= as.numeric( contain[i,3]) &
                                as.numeric(contain[i+1,3]) < as.numeric(contain[i,3]) &
                                as.numeric( contain[i,3]) >= 1){as.numeric( contain[i,3])} else{0}}
######### Detect Low ###################################################################
for(i in 2:{length(contain[,1])-9})
        {index <- 0
        if(contain[i,4] != 0)
                {index <- which( contain[{i}:{i+9},3] == min( contain[{i}:{i+9},3] ))
                contain[i+index-1,5] <-  if( contain[i+index-1,3] != 0) {contain[i+index-1,3]} else{0.0001}}}
##########Step3: Mark the BPM for every peak ###########################################
##########Step4: Fill in the BPM for current peak, to last peak. ############################
for(i in {51}:{length(contain[,1])-1})
```

```
        {if(contain[i ,4] != 0 ){c=1
                repeat {if(contain[i-c ,4]==0){c = c+1}else{break} }
                p=c*0.032
                bpm <- round( (1/as.numeric(p))*60 ,digits = 2)
                z=0
                repeat {contain[i-z ,6] <- bpm
                        if(z=={c-1}){break} else {z=z+1}}}}
##########Step6: Too High ###############################################################
##########Step7: Too Low ################################################################
for(i in {1}:{124}){contain[i,6] <- 80
        contain[i,7] <- 80}
for(i in {124}:{length(contain[,1])} )
        {if(     1.25*mean( contain[{i- 62}:{i-1},7]) < contain[i,6] )
                {contain[i,7] <- 1.10*mean( contain[{i- 62}:{i-1},7])}
        else if( 0.65*mean( contain[{i-124}:{i-1},7]) > contain[i,6] )
                {contain[i,7] <- 0.95*mean( contain[{i-124}:{i-1},7] )}
        else{contain[i,7] <- contain[i,6]}}
##########Step5: Add a two second, before and after average buffer.#######################
last.trial=length(contain[,1])-63
for(i in 63:last.trial)
        {contain[i,8] <- round( mean( contain[{i-62}:{i+62},7]) , 2)}
##########Step6: Peak Pressure ###########################################################
### linear interpolation
### scrub transitions
for(i in {51}:{length(contain[,1])-1})
        {x = 0; c = 1
        repeat {x <- i-c
                if( contain[x ,4] != 0 ){break} else {c = c+1}
                z <- i-c}
        op <- options(digits.secs=3)
        spread = as.numeric(contain[i,4]) - as.numeric(contain[z,4])
        inc = spread/(i-z);k=z
        repeat {if( contain[i,4] == 0 ){break}
```

```
                contain[k,9] <- round(as.numeric(contain[z,4])+(k-z)*inc, digits=4)
                if(k==i){break}
                k=k+1}}
##########Step7: Low Pressure ############################################################
### linear interpolation
### scrub transitions
for(i in {51}:{length(contain[,1])-1})
        {x = 0; c = 1
        repeat {x <- i-c
                if( contain[x ,5] != 0 ){break} else {c = c+1}
                z <- i-c}
        op <- options(digits.secs=3)
        spread = as.numeric(contain[i,5]) - as.numeric(contain[z,5])
        inc = spread/(i-z);k=z
        repeat {if( contain[i,5] == 0 ){break}
                contain[k,10] <- round(as.numeric(contain[z,5])+(k-z)*inc, digits=5)
                if(k==i){break}
                k=k+1}}
##########Step8: Pressure Spread ##########################################################
for(i in {51}:{length(contain[,1])-1})
        {contain[i,11] <- round(as.numeric(contain[i,9]) - as.numeric(contain[i,10]), digits=4)}
##########Step9: Heart Beat Variablity ####################################################
##########Step10: H.B. Max-Min/Range ######################################################
##########Step11: Section Group ###########################################################
timeset <- cbind(rep(0,length(as.character(phy.data[,1]))))
for( i in {1}:{length(as.character(phy.data[,1]))+offset})
        {timeset[i-offset,1] <- as.character(phy.data[i,1])  }
test <- timeset
#test <- as.character(phy.data[,1])
temp <- data.frame(second=contain[,1], gsr=contain[,2], raw.p=contain[,3], peak.mark=contain[,4], trough.mark=contain[,5],
raw.bpm=contain[,6],filter.bpm=contain[,7],buffer.bpm=contain[,8],p.pressure=contain[,9],t.preasure=contain[,10],pres.sprea
d=contain[,11],time.marker=test)
write.table(temp, paste(participant, ".csv",sep=""), append=FALSE, row.names=FALSE,sep=",")
```

```
######################E-prime Time Stamp Scoring Section ################################
options(warn = 0 )
source("convert.seconds.r")
stamps = read.csv( "physiotimestamp3.csv" ,header=TRUE)
options(warn = -1 )
participant = stamps[j,1];participant
phy.data=read.table(paste(participant,sep=""), sep="\t",header=TRUE)
stamps = read.csv( "physiotimestamp3.csv" ,header=TRUE)
sindex = which( stamps[,1] == participant)
offset = ceiling( stamps[sindex,2] )
contain = read.csv(paste(participant, ".csv",sep=""), stringsAsFactors=FALSE) #trim last line, and use as.numeric
contain = contain[,-12]
contain = as.matrix(contain)
#contain[200:210,]
index4 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,4] ) )*0.989413 , 0)
index5 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,5] ) )*0.989413 , 0)
index6 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,6] ) )*0.989413 , 0)
index7 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,7] ) )*0.989413 , 0)
index8 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,8] ) )*0.989413 , 0)
index9 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,9] ) )*0.989413 , 0)
index10 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,10] ) )*0.989413 , 0)
index11 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,11] ) )*0.989413 , 0)
index12 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,12] ) )*0.989413 , 0)
index13 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,13] ) )*0.989413 , 0)
index14 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,14] ) )*0.989413 , 0)
index15 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,15] ) )*0.989413 , 0)
index16 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,16] ) )*0.989413 , 0)
index17 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,17] ) )*0.989413 , 0)
index18 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,18] ) )*0.989413 , 0)
index19 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,19] ) )*0.989413 , 0)
index20 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,20] ) )*0.989413 , 0)
index21 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,21] ) )*0.989413 , 0)
index22 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,22] ) )*0.989413 , 0)
```

```
index23 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,23] ) )*0.989413 , 0)
index24 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,24] ) )*0.989413 , 0)
index25 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,25] ) )*0.989413 , 0)
index26 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,26] ) )*0.989413 , 0)
index27 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,27] ) )*0.989413 , 0)
index28 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,28] ) )*0.989413 , 0)
index29 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,29] ) )*0.989413 , 0)
index30 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,30] ) )*0.989413 , 0)
index31 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,31] ) )*0.989413 , 0)
index32 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,32] ) )*0.989413 , 0)
index33 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,33] ) )*0.989413 , 0)
index34 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,34] ) )*0.989413 , 0)
index35 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,35] ) )*0.989413 , 0)
index36 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,36] ) )*0.989413 , 0)
index37 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,37] ) )*0.989413 , 0)
index38 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,38] ) )*0.989413 , 0)
index39 = round( which.min( abs( contain[ { 1 }:{length(contain[,1])} ] - stamps[sindex,39] ) )*0.989413 , 0)
gsr.means = cbind(  mean(contain[ {index4}:{index5},2 ]),  mean(contain[ {index6}:{index7},2 ]),  mean(contain[
{index8}:{index9},2 ]),  mean(contain[ {index10}:{index11},2 ]),  mean(contain[ {index12}:{index13},2 ]),  mean(contain[
{index14}:{index15},2 ]),  mean(contain[ {index16}:{index17},2 ]),  mean(contain[ {index18}:{index19},2 ]),  mean(contain[
{index20}:{index21},2 ]),  mean(contain[ {index22}:{index23},2 ]),  mean(contain[ {index24}:{index25},2 ]),  mean(contain[
{index26}:{index27},2 ]),  mean(contain[ {index28}:{index29},2 ]),  mean(contain[ {index30}:{index31},2 ]),  mean(contain[
{index32}:{index33},2 ]),  mean(contain[ {index34}:{index35},2 ]),  mean(contain[ {index36}:{index37},2 ]),  mean(contain[
{index38}:{index39},2 ]))
bpm.means = cbind(  mean(contain[ {index4}:{index5},8 ]),  mean(contain[ {index6}:{index7},8 ]),  mean(contain[
{index8}:{index9},8 ]),  mean(contain[ {index10}:{index11},8 ]),  mean(contain[ {index12}:{index13},8 ]),  mean(contain[
{index14}:{index15},8 ]),  mean(contain[ {index16}:{index17},8 ]),  mean(contain[ {index18}:{index19},8 ]),  mean(contain[
{index20}:{index21},8 ]),  mean(contain[ {index22}:{index23},8 ]),  mean(contain[ {index24}:{index25},8 ]),  mean(contain[
{index26}:{index27},8 ]),  mean(contain[ {index28}:{index29},8 ]),  mean(contain[ {index30}:{index31},8 ]),  mean(contain[
{index32}:{index33},8 ]),  mean(contain[ {index34}:{index35},8 ]),  mean(contain[ {index36}:{index37},8 ]),  mean(contain[
{index38}:{index39},8 ]))
ppp.means = cbind(  mean(contain[ {index4}:{index5},9 ]),  mean(contain[ {index6}:{index7},9 ]),  mean(contain[
{index8}:{index9},9 ]),  mean(contain[ {index10}:{index11},9 ]),  mean(contain[ {index12}:{index13},9 ]),  mean(contain[
```

```
{index14}:{index15},9 ]),  mean(contain[ {index16}:{index17},9 ]),  mean(contain[ {index18}:{index19},9 ]),  mean(contain[
{index20}:{index21},9 ]),  mean(contain[ {index22}:{index23},9 ]),  mean(contain[ {index24}:{index25},9 ]),  mean(contain[
{index26}:{index27},9 ]),  mean(contain[ {index28}:{index29},9 ]),  mean(contain[ {index30}:{index31},9 ]),  mean(contain[
{index32}:{index33},9 ]),  mean(contain[ {index34}:{index35},9 ]),  mean(contain[ {index36}:{index37},9 ]),  mean(contain[
{index38}:{index39},9 ]))
tpp.means = cbind(  mean(contain[ {index4}:{index5},10 ]),  mean(contain[ {index6}:{index7},10 ]),  mean(contain[
{index8}:{index9},10 ]),  mean(contain[ {index10}:{index11},10 ]),  mean(contain[ {index12}:{index13},10 ]),  mean(contain[
{index14}:{index15},10 ]),  mean(contain[ {index16}:{index17},10 ]),  mean(contain[ {index18}:{index19},10 ]),  mean(contain[
{index20}:{index21},10 ]),  mean(contain[ {index22}:{index23},10 ]),  mean(contain[ {index24}:{index25},10 ]),  mean(contain[
{index26}:{index27},10 ]),  mean(contain[ {index28}:{index29},10 ]),  mean(contain[ {index30}:{index31},10 ]),  mean(contain[
{index32}:{index33},10 ]),  mean(contain[ {index34}:{index35},10 ]),  mean(contain[ {index36}:{index37},10 ]),  mean(contain[
{index38}:{index39},10 ]))
gsr.sd = cbind(  sd(contain[ {index4}:{index5},2 ], na.rm=TRUE),  sd(contain[ {index6}:{index7},2 ], na.rm=TRUE),
sd(contain[ {index8}:{index9},2 ], na.rm=TRUE),  sd(contain[ {index10}:{index11},2 ], na.rm=TRUE),  sd(contain[
{index12}:{index13},2 ], na.rm=TRUE),  sd(contain[ {index14}:{index15},2 ], na.rm=TRUE),  sd(contain[
{index16}:{index17},2 ], na.rm=TRUE),  sd(contain[ {index18}:{index19},2 ], na.rm=TRUE),  sd(contain[
{index20}:{index21},2 ], na.rm=TRUE),  sd(contain[ {index22}:{index23},2 ], na.rm=TRUE),  sd(contain[
{index24}:{index25},2 ], na.rm=TRUE),  sd(contain[ {index26}:{index27},2 ], na.rm=TRUE),  sd(contain[
{index28}:{index29},2 ], na.rm=TRUE),  sd(contain[ {index30}:{index31},2 ], na.rm=TRUE),  sd(contain[
{index32}:{index33},2 ], na.rm=TRUE),  sd(contain[ {index34}:{index35},2 ], na.rm=TRUE),  sd(contain[
{index36}:{index37},2 ], na.rm=TRUE),  sd(contain[ {index38}:{index39},2 ], na.rm=TRUE))
bpm.sd = cbind(  sd(contain[ {index4}:{index5},8 ], na.rm=TRUE),  sd(contain[ {index6}:{index7},8 ], na.rm=TRUE),
sd(contain[ {index8}:{index9},8 ], na.rm=TRUE),  sd(contain[ {index10}:{index11},8 ], na.rm=TRUE),  sd(contain[
{index12}:{index13},8 ], na.rm=TRUE),  sd(contain[ {index14}:{index15},8 ], na.rm=TRUE),  sd(contain[
{index16}:{index17},8 ], na.rm=TRUE),  sd(contain[ {index18}:{index19},8 ], na.rm=TRUE),  sd(contain[
{index20}:{index21},8 ], na.rm=TRUE),  sd(contain[ {index22}:{index23},8 ], na.rm=TRUE),  sd(contain[
{index24}:{index25},8 ], na.rm=TRUE),  sd(contain[ {index26}:{index27},8 ], na.rm=TRUE),  sd(contain[
{index28}:{index29},8 ], na.rm=TRUE),  sd(contain[ {index30}:{index31},8 ], na.rm=TRUE),  sd(contain[
{index32}:{index33},8 ], na.rm=TRUE),  sd(contain[ {index34}:{index35},8 ], na.rm=TRUE),  sd(contain[
{index36}:{index37},8 ], na.rm=TRUE),  sd(contain[ {index38}:{index39},8 ], na.rm=TRUE))
ppp.sd = cbind(  sd(contain[ {index4}:{index5},9 ], na.rm=TRUE),  sd(contain[ {index6}:{index7},9 ], na.rm=TRUE),
sd(contain[ {index8}:{index9},9 ], na.rm=TRUE),  sd(contain[ {index10}:{index11},9 ], na.rm=TRUE),  sd(contain[
{index12}:{index13},9 ], na.rm=TRUE),  sd(contain[ {index14}:{index15},9 ], na.rm=TRUE),  sd(contain[
```

```
{index16}:{index17},9 ], na.rm=TRUE),  sd(contain[ {index18}:{index19},9 ], na.rm=TRUE),  sd(contain[
{index20}:{index21},9 ], na.rm=TRUE),  sd(contain[ {index22}:{index23},9 ], na.rm=TRUE),  sd(contain[
{index24}:{index25},9 ], na.rm=TRUE),  sd(contain[ {index26}:{index27},9 ], na.rm=TRUE),  sd(contain[
{index28}:{index29},9 ], na.rm=TRUE),  sd(contain[ {index30}:{index31},9 ], na.rm=TRUE),  sd(contain[
{index32}:{index33},9 ], na.rm=TRUE),  sd(contain[ {index34}:{index35},9 ], na.rm=TRUE),  sd(contain[
{index36}:{index37},9 ], na.rm=TRUE),  sd(contain[ {index38}:{index39},9 ], na.rm=TRUE))
tpp.sd = cbind(  sd(contain[ {index4}:{index5},10 ], na.rm=TRUE),  sd(contain[ {index6}:{index7},10 ], na.rm=TRUE),
sd(contain[ {index8}:{index9},10 ], na.rm=TRUE),  sd(contain[ {index10}:{index11},10 ], na.rm=TRUE),  sd(contain[
{index12}:{index13},10 ], na.rm=TRUE),  sd(contain[ {index14}:{index15},10 ], na.rm=TRUE),  sd(contain[
{index16}:{index17},10 ], na.rm=TRUE),  sd(contain[ {index18}:{index19},10 ], na.rm=TRUE),  sd(contain[
{index20}:{index21},10 ], na.rm=TRUE),  sd(contain[ {index22}:{index23},10 ], na.rm=TRUE),  sd(contain[
{index24}:{index25},10 ], na.rm=TRUE),  sd(contain[ {index26}:{index27},10 ], na.rm=TRUE),  sd(contain[
{index28}:{index29},10 ], na.rm=TRUE),  sd(contain[ {index30}:{index31},10 ], na.rm=TRUE),  sd(contain[
{index32}:{index33},10 ], na.rm=TRUE),  sd(contain[ {index34}:{index35},10 ], na.rm=TRUE),  sd(contain[
{index36}:{index37},10 ], na.rm=TRUE),  sd(contain[ {index38}:{index39},10 ], na.rm=TRUE))
physio.data =
data.frame(participant=participant,offset=offset,gsr.means,bpm.means,ppp.means,tpp.means,gsr.sd,bpm.sd,ppp.sd,tpp.sd)
colnames(physio.data)
=c("part","offset","bs.gm","bq.gm","bo.gm","g1.gm","ijr.010e.gm","ijr.01e.gm","ijr.11e.gm","ijr.14e.gm","ijr.13e.gm","i
jr.24e.gm","ijr.57e.gm","ijr.510e.gm","ijr.67e.gm","ijr.810e.gm","g2.gm","ai.gm","at.gm","aq.gm","bs.bm","bq.bm","bo.
bm","g1.bm","ijr.010e.bm","ijr.01e.bm","ijr.11e.bm","ijr.14e.bm","ijr.13e.bm","ijr.24e.bm","ijr.57e.bm","ijr.510e.bm","
ijr.67e.bm","ijr.810e.bm","g2.bm","ai.bm","at.bm","aq.bm","bs.pm","bq.pm","bo.pm","g1.pm","ijr.010e.pm","ijr.01e.p
m","ijr.11e.pm","ijr.14e.pm","ijr.13e.pm","ijr.24e.pm","ijr.57e.pm","ijr.510e.pm","ijr.67e.pm","ijr.810e.pm","g2.pm","ai
.pm","at.pm","aq.pm","bs.tm","bq.tm","bo.tm","g1.tm","ijr.010e.tm","ijr.01e.tm","ijr.11e.tm","ijr.14e.tm","ijr.13e.tm",
"ijr.24e.tm","ijr.57e.tm","ijr.510e.tm","ijr.67e.tm","ijr.810e.tm","g2.tm","ai.tm","at.tm","aq.tm","bs.gs","bq.gs","bo.gs"
,"g1.gs","ijr.010e.gs","ijr.01e.gs","ijr.11e.gs","ijr.14e.gs","ijr.13e.gs","ijr.24e.gs","ijr.57e.gs","ijr.510e.gs","ijr.67e.gs","ijr.
810e.gs","g2.gs","ai.gs","at.gs","aq.gs","bs.bs","bq.bs","bo.bs","g1.bs","ijr.010e.bs","ijr.01e.bs","ijr.11e.bs","ijr.14e.bs",
"ijr.13e.bs","ijr.24e.bs","ijr.57e.bs","ijr.510e.bs","ijr.67e.bs","ijr.810e.bs","g2.bs","ai.bs","at.bs","aq.bs","bs.ps","bq.ps",
"bo.ps","g1.ps","ijr.010e.ps","ijr.01e.ps","ijr.11e.ps","ijr.14e.ps","ijr.13e.ps","ijr.24e.ps","ijr.57e.ps","ijr.510e.ps","ijr.67e
.ps","ijr.810e.ps","g2.ps","ai.ps","at.ps","aq.ps","bs.ts","bq.ts","bo.ts","g1.ts","ijr.010e.ts","ijr.01e.ts","ijr.11e.ts","ijr.14
e.ts","ijr.13e.ts","ijr.24e.ts","ijr.57e.ts","ijr.510e.ts","ijr.67e.ts","ijr.810e.ts","g2.ts","ai.ts","at.ts","aq.ts")
write.table(physio.data, "physio.data3.csv" , append=TRUE, row.names=FALSE,sep=",")}
```

Appendix I: Dependent Measure Questions

Condition	Question Type	Exposure Order	Questions	Likert Scale 1 - 7
Caffeine Baseline	Personal	1	Has this article affected how you will consume coffee in the future?	1: Trivial 7: Very effective
Caffeine Baseline	Affect	2	In terms of fear, this article made me feel:	1: Not at all fearful 7: A great deal fear
Caffeine Baseline	Judgment	3	How common do you think it is for people to have medical complications due to their caffeine consumption?	1: Not at all common 7: A great deal common
Caffeine Baseline	Judgment	4	To what extent do you feel the heavy consumption of caffeine results in some form of sickness?	1: Not at all 7: A great deal
Caffeine Baseline	Personal	5	Did you find the article's "facts" (in yellow) interesting?	1: Not interesting 7: Very interesting
Caffeine Baseline	Affect	6	In terms of happiness, reading this article made me feel:	1: Not at all happy 7: A great deal happy
Caffeine Baseline	Judgment	7	Do you feel that common illnesses in this day and age, are often due to (or made worse by) the over consumption of caffeine?	1: Not effected 7: A great deal effected
Caffeine Baseline	Affect	8	To what extent did you find this article emotionally involving?	1: Not at all emotionally involving 7: Extremely emotionally involving
Caffeine Baseline	Personal	9	Do you think you drink too much caffeine?	1: Not too much at all 7: A great deal too much
Caffeine Baseline	Personal	10	Do you feel the science of caffeine research has a lot farther to go before we have a good understanding of caffeine's effects on the body?	1: Totally Understood 7: A great deal farther
Caffeine Baseline	Deserving	11	If person gets sick from consuming large amounts of caffeine habitually, do you feel s/he deserves it?	1: Totally Understood 7: A great deal farther
Caffeine Baseline	Open-Ended	12	How might you change the way you consume caffeine in the future?	Open-Ended
IJR Condition	Affect	1	In terms of anger, this article made me feel:	1: Not at all 7: A great deal
IJR Condition	Causal Judgment	2	To what extent do you feel David's accident was the result of his dealings with Susanne?	1: Not at all 7: A great deal

IJR Condition	Affect	3	To what extent did you find this article emotionally involving?	1: Not at all emotionally involving 7 :A great deal emotionally involving
IJR Condition	Deserved	4	To what extent do you believe that David deserved to be in the accident?	1: Not at all deserving 7: A great deal deserving
IJR Condition	Deserved	5	On the basis of what you read, how would you rate David as a person (please select with mouse)?	Very Bad, Fairly Bad, A little Bad, Neither Good nor Bad, A little Good, Fairly Good, Very Good
IJR Condition	Affect	6	In terms of happiness, reading this article made me feel:	1: Not at all happy 7: A great deal happy
IJR Condition	Filler	7	How common do you think the events of David's life happen in the real world?	1: Not at all common 7: A great deal common
IJR Condition	Judgment	8	To what extent do you feel that David's accident was foreseeable?	1: Not at all 7: A great deal
IJR Condition	Judgment	9	To what extent do you feel that people like David will have bad things happen to them?	1: Not at all 7: A great deal
IJR Condition	Filler	10	To what extent do you feel that David's accident was controllable?	1: Not at all 7: A great deal
IJR Condition	Filler	11	How likely is it that you could be in the same accident as David?	1: Not likely at all 7: A great deal likely
IJR Condition	Filler	12	Do you believe the events of David's life really took place as the news report describes?	1: Not at all like the news report 7: A great deal like the news report
IJR Condition	Judgment	13	How possible is it that the stress David had felt previously with his travel agent affected his ability to walk across streets safely?	1: Not at all possible 7: A great deal possible
IJR Condition	Open-Ended	14	"Do you think there is a relationship between David's car accident, and his dealings with Susanne, and why? Please explain your thoughts in detail."	Open-Ended
Arithmetic Task		1	How well did you perform the arithmetic task?	1: Horribly 7: Extremely well
Arithmetic Task		2	How difficult did you find the arithmetic task was to perform?	1: Extremely Easy 7: Extremely Difficult

Arithmetic Task		3	How much effort did you put into performing the arithmetic task?	1: No effort at all 7: Great deal of effort
Arithmetic Task		4	Do you feel you were good at the arithmetic task?	1: Very poor 7: Very good
Arithmetic Task		5	Did you have a hard time keeping the numbers straight in your mind?	1: Extremely easy 7: Extremely hard
Arithmetic Task		6	How hard did you try to keep up your speed after some time had passed?	1: Did not try at all 7: Very hard
Arithmetic Task		7	Do you think you would be better than the average person at this arithmetic task?	1: Worse than most 7: Better than most
Arithmetic Task		8	Did you find the arithmetic task to be frustrating?	1: Extremely easy 7: Extremely frustrating
Arithmetic Task		9	Did you feel that much of the time you could have gone much faster than you were going?	1: None of the time 7: All the time
Arithmetic Task		10	Do you feel that your agitation while performing the arithmetic task slowed your progress?	1: Not slowed at all 7: Slowed a great deal