

The Effects of Procedural Injustice and Outcome Favorability on Stress: An Experimental Study

by

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Abstract

In the context of the stressor, stress, strain paradigm, I examined the main and interactive relationships of procedural justice and outcome favorability on measures of affect, self-reported stress, and physiological indices of strain with a sample of 79 university students. Using a fully crossed 2 x 2 design I manipulated both procedural justice (high vs. low) and outcome favorability (favorable vs. unfavorable). I hypothesized that low vs. high procedural justice as well as low vs. high outcome favorability would be associated with more stress, poorer affect, and higher heart rate and blood pressure. I also hypothesized that the interaction between low procedural justice and low outcome favorability would result in the most stress, poorest affect and highest heart rate and blood pressure. In large part these hypotheses were not supported. Reasons for non-significance as well as limitations and directions for future research are discussed.

September 21, 2007

The Effects of Procedural Injustice and Outcome Favorability on Stress:

An Experimental Study

Stress is a damaging, costly and pervasive health problem. Stress can be defined as the process by which environmental events called stressors provoke an aversive reaction within the individual (Cropanzano, Goldman, & Benson, 2005). Researchers have acknowledged the severity of the problems that can occur as a result of stress (Barling, Kelloway, & Frone, 2005). Stress can affect the individual through manifestations of depression, increased alcohol use and heart disease (Quick, Quick, Nelson, & Hurrell, 1997), the employing organization through increased sick time and decreased job performance (Jex & Crossley, 2005), and society by increasing health care costs (Kahn & Byosiore, 1992). Due to the fact that stress has become such a widespread problem, it is important to study and understand what precipitates the onset of stress. By understanding how stress occurs it may become possible to prevent its onset or at least ameliorate its effects. I note that although the present study does not take place in an actual work setting, it is guided by the literatures on organizational justice and workplace stress and attempts to inform these bodies of work.

To date, stress researchers have focused on the impact of numerous stressors and moderators of stress including: role overload, abusive supervision (Tepper, 2000; Wager, Fieldman, Hussey, 2003), co-worker support, job demands and job control (Elovainio, Kivimaki & Helkama, 2001; Barling & Kelloway, 1996). More recently, research has turned to a newly identified stressor, that of injustice. The study of injustice stems from a broadening area of research involving organizational justice and perceptions of fairness within the organization (e.g., Kivimaki et al., 2004; Tepper, 2001; Zohar, 1995).

Although there is accumulating evidence that injustice is a stressor (e.g., Cropanzano et al., 2005; Elovainio et al., 2001; Francis & Barling, 2005) the existing literature has relied mostly on correlational designs and self-report measures of stress. The present study builds upon the existing justice and stress literature through an experimental justice manipulation in a laboratory setting. In this study I manipulated both the favorability of an outcome received as well as the fairness of the procedure by which that outcome was determined. With respect to outcome favorability, under favorable circumstances the participant received more for the same amount of time and effort than did a confederate, while under unfavorable circumstances the participant received less than a confederate for the same amount of time and effort. Ultimately, the levels of the outcome favorability variable reflect overpayment and underpayment and, according to Adams' (1965) equity theory, both of these conditions are distributively unjust. I examined the effects of the favorability of the outcome received, the fairness of the procedure used to determine the outcome and their interaction on several stress-related variables, including affect, self-reported stress, blood pressure and heart rate.

Stressor, Stress, Strain Relationship

Studies of stress have distinguished three main concepts: stressors, stress and strain (Pratt & Barling, 1988). Stressors are external, objective events that occur outside the individual. Sonnentag and Frese (2003) have grouped organizational stressors into eight main categories: physical stressors, task-related job stressors, role stressors, social stressors, work schedule-related stressors, career-related stressors, traumatic events, and stressful change processes. Stress occurs when the individual experiences an internal response to stressors and this internal response causes a condition of arousal that results in

physical, cognitive and emotional displeasure for the individual (Kristensen, 1996). Essentially, when an individual encounters a stressful situation the body responds by redistributing energy in a manner that will allow it to engage in the fight or flight response. However, in those instances where fight or flight are inadequate methods for coping with stress the same bodily responses that are designed to protect the individual can lead to health problems and the onset of strain (Lundberg, 2006). Strain occurs as a result of the prolonged experience of stress with evidence of its effects being manifested in physical, psychological and behavioural outcomes (Pratt & Barling, 1988).

Extensive research illustrates the debilitating effects that individuals likely encounter as a result of stress. Researchers generally agree that there are four categories of strain: psychological, physical, behavioral, and organizational. Psychological symptoms of strain include depression and anxiety (Billings & Moos, 1982; Tepper 2001; Zohar, 1995), while physical outcomes include the increased risk of cardiovascular and gastrointestinal problems (Kristensen, 1996; Quick, Quick, Nelson & Hurrell, 1997). Behavioural strain occurs when individuals respond negatively to stressors by causing harm to themselves (Beehr, 1995) by such actions as increased alcohol use (Frone, 1999). Lastly, an expanding body of evidence shows that stress can lead to problems affecting organizations such as increased work absenteeism, decreased productivity (Manning, & Osland, 1989), and a higher occurrence of workplace accidents (Cartwright & Cooper, 1997).

Perhaps one of the greatest incentives for organizations to prevent or reduce stress and strain is that work stress is very costly. Estimates suggest that stress and its related outcomes cost US companies \$300 billion annually (American Institute of Stress, 2002),

with Canadian figures estimated at \$12 billion annually (Duxbury, Higgins, & Johnson, 1999). Due to the fact that stress is such a pervasive problem, it becomes imperative to provide effective solutions that will offset its effects. One approach to generating solutions is to investigate further the impact of various stressors. By identifying stressors, it may be possible to remove or reduce them, resulting in improved health outcomes (e.g., less emotional and physical strain symptoms).

Although the present study invokes the stressor, stress, strain framework, the short term nature of this investigation prohibits the study of strain as it typically develops over time. Therefore, the present study represents a relationship between a stressor and an initial, and possibly low level, stress response. Accordingly, appropriate accommodations were made such as the inclusion of low level immediate measures of stress such as heart rate and self-report stress items designed to focus participants' perceptions of stress in relation to participating in the present study.

Organizational Justice

As stated previously, injustice is now classified as a stressor and thus warrants further study from a health perspective. The concept of organizational justice can be broken down into three main components; procedural justice, distributive justice, and interactional justice. The latter construct can be further subdivided into informational and interpersonal justice. Interactional justice pertains to the human side of organizational processes (Cohen-Charash & Spector, 2001) and includes the manner in which individuals are treated (interpersonal) and the adequacy of information provided (informational) (Cropanzano, Goldman & Benson, 2005). However, of particular importance to the current study are procedural and distributive justice.

Assessments of procedural justice focus on the process by which decisions and outcomes are determined (Lind & Tyler, 1988). Accordingly, perceptions of procedural justice may result in cognitive, emotional and behavioural responses that impact organizational outcomes such as organizational commitment and counterproductive behaviors (eg., Moorman, 1991; Lind & Tyler, 1988) and personal outcomes such as health (eg., Kivimaki, Elovainio, Vahtera & Ferrie, 2003; Kivimaki, Ferrie, Head, Shipley, Vahtera & Marmot, 2004). When procedures are deemed unfair these reactions tend to be negative (Martin & Bennett, 1996; Mossholder, Bennett, Kemery, & Wesolowski, 1998).

Leventhal (1980) proposed six rules that, when adhered to, reflect procedurally fair processes: (1) the consistency rule, which states that allocation procedures should be consistent across both persons and time; (2) the bias suppression rule, which states that the personal self-interests of the decision makers should be prevented from entering the allocation process; (3) the accuracy rule, which suggests that the information used in allocation decisions should be accurate; (4) the correctability rule, which affords individuals the opportunity to change decisions that are viewed as unfair; (5) the representativeness rule, that requires that the needs, values and outlooks of all involved parties are represented in the allocation process; (6) and the ethicality rule, which suggests that the allocation process must adhere to the moral and ethical values of those affected. Leventhal's work addresses the issues that individuals feel are important for protecting their rights and ensuring that the processes used in decision-making are fair.

Assessments of distributive justice reflect the perceived fairness of outcomes (Cropanzano, Goldman, & Benson, 2005). Perceptions of distributive justice result in

cognitive, emotional and behavioural reactions to the outcomes one receives, for example, wages and promotions (Cohen-Charash & Spector, 2001). To date, the majority of distributive justice research has focused on the concept of equity as it applies to fairness evaluations (Sheppard, Lewicki & Minton, 1992). According to this concept, individuals compare their outcomes (i.e. what they have received) relative to their inputs (i.e. what they have put in) with the outcome/input ratios of comparison others usually people who are similar, proximal and salient (Kulik & Ambrose, 1992; Sheppard et al., 1992; Walster, Walster, & Berscheid, 1978). When an individual determines that an outcome does not adequately reflect the input he or she has invested, the outcome will be perceived as unfair (Adams 1965; Austin & Walster, 1974). If an outcome is perceived to be unfair, the individual could experience a variety of negative emotions such as anger in the case of underpayment and guilt in the case of overpayment (Homans, 1961; Weiss, Suckow & Cropanzano, 1999).

Distributively just outcomes are not necessarily favorable ones. Moreover, situations in which an individual is unhappy with the outcome he or she receives are not necessarily unfair (Cropanzano & Greenberg, 1997). Similarly, a favorable outcome is not necessarily obtained by fair processes. In the case of over-reward, the outcome may be favorable to the recipient, but remain unjust. Therefore, outcome fairness can be defined as the degree to which an outcome is consistent with a referent standard of fairness (Kulik & Ambrose, 1992) and outcome favorability can be defined as whether or not an individual views an outcome as being personally beneficial. Research supports the distinction between these two concepts (Durepos & Francis, 2007; Francis, Desmarais, & Kelloway, 2003; Krehbiel & Cropanzano, 2000; Skitka, Winkquist & Hutchinson, 2003,

Van den Bos, Wilke, Lind, & Vermunt, 1998). For example, Francis (Durepos & Francis, 2007, Francis, et al., 2003) reported that perceived distributive injustice accounted for variance in stress-related outcomes above and beyond the nature, or favorability, of those outcomes.

In a meta-analytic review, Skitka et al., (2003) argued that outcome fairness is often incorrectly operationalized as outcome satisfaction, outcome favorability, or related measures that reflect the self-interest of the individual when a more accurate definition should reflect what truly constitutes a fair outcome. For example, research on the fair process effect, where individuals tend to accept negative outcomes if they believe the procedures used were fair (Folger, 1977; Folger, Rosenfield, Grove & Cockran, 1979; Van den Bos, et al., 1997), has typically measured or manipulated outcome favorability instead of outcome fairness based on the suggestion that the constructs are essentially equivalent (Brockner and Weisenfeld, 1996). However, meta-analytic results suggest otherwise; outcome fairness and outcome favorability appear to be two separate entities that exert influence independently (Skitka et al., 2003). Therefore, it is not appropriate to confound outcome favorability and outcome fairness, nor is it appropriate to claim one is studying or manipulating distributive justice when the variable of interest is outcome favorability. In keeping with these findings, in the present study I distinguish between distributive justice and outcome favorability and manipulate the favorability of the outcomes received by participants.

Within the framework of the justice literature there is a volume of research that suggests that although distributive and procedural justice are distinct constructs they remain highly interrelated (Cohen-Charash & Spector, 2001; Folger, 1987) and are likely

to exert an effect on one another (Lind & Tyler, 1988; Tyler, 1988; Cropanzano & Greenberg, 1997). It is likely that when evaluating the inherent fairness of any given situation, perceptions of distributive justice will be used as an indicator of procedural fairness (Lind & Lissak, 1985) and vice versa (Lind & Tyler, 1988). Research also suggests that in the absence of information that would allow individuals to assess the equity of an outcome, perceptions of procedural justice are used to judge the fairness of the outcome received (Van den Bos, Lind, Vermunt & Wilke, 1997). Considering the potential interaction between distributive and procedural justice perceptions, research has lent support to the assertion that individuals' perceptions of procedural injustice will in fact increase when he or she believes that an unfavorable outcome was the result of an unfair procedure (Cropanzano & Folger, 1989; Folger & Martin, 1986; Greenberg & Alge, 1998). The present study expands the existing literature by examining the potential interactive impact of procedural justice and outcome favorability within an experimental setting focusing on self-reported stress, affect, and physiological indicators of strain.

Injustice and Stress Relationship

Research examining the relationship between injustice and stress has emerged only recently, but existing studies provide considerable evidence that events that are perceived as unfair are potential stressors and can contribute to the onset of strain. From a theoretical perspective it is logical to study injustice as a potential stressor. Researchers have constructed models to explain why individuals place such a high value on justice, particularly procedural justice. Two models stand out within the literature: the instrumental model and the relational model (Cropanzano & Greenberg, 1997). The instrumental model represents the more self-focused tendencies of individuals and suggests that individuals

value fair procedures as they will typically result in economic gain for that individual in the long run. On the other hand the relational model suggests that while economic gain is important, fair procedures can be used as an indicator of one's place within the organization and can ultimately have an impact on an individual's self-worth and self-esteem (Cropanzano & Greenberg, 1997). Thus, a violation of justice principles might be viewed as a roadblock to economic gain or an attack on one's self-esteem, either of which can be easily construed as stress provoking.

Perceptions of distributive, procedural and interactional injustice have been linked to various symptoms of psychological strain including depression, anxiety and emotional exhaustion (e.g., Francis & Barling, 2005; Tepper, 2001; Zohar, 1995). Perceived injustice has also been consistently associated with ill health including medically certified sickness absence and poorer self-rated health status (Elovainio, Kivimaki, & Vahtera, 2002; Kivimaki, Elovainio, Vahtera, & Ferrie, 2003). In fact, one study provided evidence that low procedural justice is associated with a 2-fold risk of poorer self-rated health (Elovainio, Kivimaki, & Vahtera, 2002). Recent studies have also found that perceptions of injustice at work are associated with poor cardiovascular health (Elovainio, Kivimaki, Puttonen, Lindholm, Pohjonen, & Sinervo, 2006) and increased risk for cardiovascular death (Elovainio, Leino-Arjas, Vahtera, & Kivimaki, 2006). One study examined the relationship between perceived injustice and a physiological indicator of strain, blood pressure. Wagar et al. (2003) found that a group of employees displayed significantly higher systolic and diastolic blood pressure levels when working under a supervisor perceived to be unfair than they did when working for a supervisor perceived to be fair.

Although the literature on the relationship between injustice and stress is building, the majority of the available studies rely on self-report measures of stress and health (for an exception see Wagar et al., 2003) and correlational designs. The over reliance on self-reported, as opposed to physiological, measures is a limitation noted in the larger stress literature (Kahn & Byosiene, 1992). In the present study I seek to address this criticism by including physiological indices of strain, as well as self-reported stress, among my outcome measures. Additionally, I examine the relationship between injustice and stress within a laboratory setting using an experimental design thus permitting causal inferences regarding injustice and stress.

Present Study

To date, the existing research on injustice and stress has largely relied on self-report outcome measures. More specifically, there have been relatively few research studies examining the impact of injustice on biologically based stress responses such as blood pressure and heart rate. Fontana and McLaughlin (1998) provide evidence that responding negatively to daily stressors leads to higher diastolic blood pressure levels in young women. Similarly, high negative affect and arousal are associated with elevated heart rate and blood pressure (Kamarck et al., 1998). As high blood pressure has been medically linked to numerous cardiovascular and gastrointestinal problems (Elovainio et al., 2006; Kristensen, 1996; Quick et al., 1997) it is of great importance to study factors that have the potential to contribute to high blood pressure. The present study addresses this limitation by measuring blood pressure and heart rate as physiological responses to injustice.

Despite accumulating evidence of a link between injustice and stress there are currently no published experimental studies directly examining the causal impact of injustice on stress. Furthermore, there has been a call for more experimental research in the area of occupational health psychology (Barnes-Farrell, 2006). The experimental design in the current study will allow us to make causal conclusions about the effects of procedural justice and outcome favorability on self-report measures of stress, affect and physiological indices of strain.

Finally, there have been relatively few studies examining the relationships among justice perceptions and the favorability of outcomes received, and stress related variables. Presently we know that receiving favorable and unfavorable outcomes is laden with emotion including anger, shame, guilt, and happiness, but the influence of this factor and its interactive effects with procedural justice on stress-related variables remain unknown. The present study adds to the existing body of research on injustice and stress with the inclusion of outcome favorability.

The present study attempted to address the aforementioned limitations through the use of experimental justice and outcome favorability manipulations within a laboratory setting and the inclusion of both self-report measures of stress and physiological measures (i.e., heart rate and blood pressure) of strain as outcome variables. The experimental manipulation involved a fully crossed 2 x 2 ANOVA design manipulating both procedural justice (high vs. low) and outcome favorability (favorable vs. unfavorable). Participants entered the laboratory under the premise that they were completing a study examining student perceptions of health and safety videos. The study used a confederate based design such that participants were chosen to complete one of

two potential studies, with one being more desirable (favorable outcome) than the other (unfavorable outcome). The manner in which participants were selected to participate in each study was controlled by the experimenter, based on either biased or unbiased criteria (reflecting the procedural justice manipulation). Although the present study does not involve a distributive justice manipulation, the four conditions contain a distributively unjust component as the individual was either over rewarded (favorable) or under rewarded (unfavorable) (Adams 1965; Austin & Walster, 1974).

The present study should evoke negative reactions according to Leventhal (1980) as it violates the rules he established to ensure fair processes. Additionally, as prior research shows experiencing procedural injustice is associated with poorer self-rated health (Kivimaki et al., 2003; & Kivimaki et al., 2004) as well as various symptoms of psychological strain I hypothesize that:

Hypothesis 1: There will be significant main effects of procedural justice on all dependent variables; such that those in the low procedural justice condition will report lower perceptions of procedural justice and outcome favorability, more stress, more negative affect and less positive affect, and greater physiological indicators of strain than those in the high procedural justice condition.

Experimental studies conducted by Weiss et al. (1999) and Krehbiel and Cropanzano (2000) found that participants were happiest when they obtained the favorable outcome; feelings of guilt were highest when participants were in the favorable outcome/favorably biased condition; and anger was highest when participants were in the unfavorable outcome/unfavorably biased condition. The present study should replicate

the experimental findings of Weiss et al., (1999) and Krehbiel and Cropanzano (2000).

As such I hypothesize that:

Hypothesis 2: There will be significant main effects of outcome favorability on all dependent variables, such that those in the low outcome favorability condition will report lower perceptions of outcome favorability and procedural justice, more stress, more negative affect and less positive affect, and greater physiological indicators of strain than those in the high outcome favorability condition.

Brockner and Wisenfeld (1996) have documented over 40 studies that support the interactive nature of procedural justice and outcome favorability. People respond with less negativity to unfavorable outcomes when perceptions of procedural justice are high, and people will have fewer negative reactions to unfair procedures when they are accompanied by favorable outcomes. Barclay, Skarlicki and Pugh (2005) determined that the interactions between outcome favorability and both procedural and interactional injustice predicted such inward focused emotions as shame and guilt and such outward focused emotions such as anger and hostility. Based on these findings, the procedural justice and outcome favorability manipulations in the present study should produce similar results. Specifically, I expect to find the most negative outcomes among those participants who received an unfavorable outcome by unjust means. As such I hypothesize that:

Hypothesis 3: Procedural justice and outcome favorability will interact, such that those assigned to the low procedural justice\low outcome favorability condition will report the lowest perceptions of procedural justice and outcome favorability, highest levels of stress, highest levels of negative affect and lowest levels of

positive affect and greatest indicators of physiological strain relative to those in the other conditions.

Method

Participants

Participants were students enrolled in psychology courses at Saint Mary's University. The total sample size for the study was 80 participants (16 males and 64 females). The mean age of participants was 21.11 years ($SD = 3.57$), with the majority of participants completing their second year of university. Participants were recruited by posting the study on the Saint Mary's online psychology bonus system. Participants were informed that they would be awarded 2 bonus points for their participation. Additionally, all participants received \$2 in popular coffee shop gift certificates upon completion of the study.

Procedure

Participants arrived for the advertised study, which they thought focused on the evaluation of safety videos, at the same time as a confederate posing as a participant. They were asked to read the informed consent form describing the video study (see Appendix A). After consent for participation was obtained, participants were instructed on how to put on a heart rate chest strap and assisted with putting on heart rate and blood pressure wrist monitors.¹ Collections of baseline heart rate and blood pressure measurements, as well as baseline measurements of affect and stress were then taken. Following these measures the manipulations were conducted. I manipulated two variables: procedural justice and outcome favorability. Outcome favorability focused on the nature of the outcome participants received. I manipulated this variable by the

'study' participants were assigned to. This variable comprised two levels. The outcome was considered positive when it favored the participant (i.e., they were able to take part in a study with additional compensation) and negative when it did not favor the participant (i.e. the participant was unable to complete a study with additional compensation).

Specifically the confederate and participant were told:

There are actually two very similar safety video studies being conducted in the lab and one of you will be invited to take part in the originally advertised study while the other will be asked to complete the second study. One of the two studies is being funded by a private organization that wants the researcher to examine two safety videos that they are currently using to evaluate if the videos have the ability to affect the safety attitudes of potential employees. As part of the private sponsorship, participants who get to participate in the funded video study will receive \$2 in gift certificates to a popular coffee shop in addition to the two bonus points you automatically receive for participating. Those participating in the originally advertised study will receive only the two bonus points. Both studies take the same amount of time to complete and only differ in the videos you are required to watch. Again, I remind you that the original study involves two bonus points, but no additional compensation and so participating in the privately funded study has an added benefit.

The procedural justice variable focused on how participants were assigned to the outcome favorability conditions and comprised two levels. In the high procedural justice condition, the experimenter had participants draw slips of paper out of a cup to see who would get to participate in the funded study and thus receive the gift certificate. They

were told “the best way to choose who will get to participate in the funded study is to have participants draw slips of paper out of a cup. One of the slips of paper has ‘cash study’ written on it, while the other slip of paper has ‘no cash study’ written on it.” The high procedural justice condition uses criteria that should be viewed as unbiased as a random draw was used. Note that the draw was in fact controlled by the experimenter to ensure the desired outcome.

In the low procedural justice condition the experimenter chose which participant would complete the funded study using biased and irrelevant criteria, such as her preference for the backpack they were wearing, their t-shirt, a ball cap, jewelry or their shoes. They were told “unfortunately I have to choose between you to decide who will participate in the funded study. I really like the backpack you have so why don’t you participate in the funded study with the extra gift certificates and the other participant can participate in the originally advertised study.” The levels of the outcome favorability and procedural justice variables were fully crossed and thus participants were assigned to one of four experimental cells. In the favorable outcome/high procedural justice condition the participant completed the study with the additional compensation when his or her name was selected in a draw. In the unfavorable outcome/low procedural justice condition the confederate completed the study with the additional compensation based on biased criteria. In the favorable outcome/low procedural justice condition the participant completed the study with the additional compensation based on biased criteria. In the unfavorable outcome/high procedural justice condition the confederate completed the study with the additional compensation when the confederate’s name was selected in a

draw. In actuality all participants completed the same safety video study, and all participants received the gift certificate at the end of the study.

Although the true focus of this study was on individuals' responses to the process of assigning them to conditions, all participants did complete the video task. The safety video task involved watching and responding to two current workplace safety videos that differed in video content. One video contained the stories of young workers who suffered workplace accidents while on the job; the second video contained an adult actor talking about safety and was solely informational. The videos did not possess content that was sufficiently graphic or disturbing to cause upset to the viewers.

Self-report and/or physiological measurements were taken at four intervals throughout the course of the study. Measurements of heart rate, blood pressure and self-report measures of stress and affect were taken before participants were informed of the fact that they would be assigned to one of two studies (baseline). Measurements of heart rate and blood pressure were taken after the assignments to each experimental condition were made (after manipulation). After participants completed the video task (after task) they were asked to complete the questionnaire package that included: affect, stress, perceptions of procedural justice, perceptions of distributive justice and perceptions of outcome favorability; measurements of heart rate and blood pressure were also taken at this time. Lastly, measurements of heart rate and blood pressure were taken after participants responded to the survey about the study (after questionnaire). Self-report measures were obtained through questionnaire packages, heart rate was obtained through the use of a chest band and corresponding wristwatch and blood pressure measurements were obtained through a BP wristwatch.

To ensure that participants had not guessed, or obtained knowledge from others, about the true purpose of the study, participants were asked to complete a post-experiment survey that questioned them about their knowledge of the study (see Appendix B). Of the 80 participants surveyed; 21 believed the study was related to the allocation of rewards, and 6 believed the study was related to bias in reward allocation or perceptions of justice. However, only one participant suggested that the other participant was actually a confederate and therefore only one participant was removed from the analyses.² Once the questionnaires were completed participants were verbally debriefed about the true nature of the study (see Appendix C) and given the opportunity to ask questions or provide comments. Finally, all participants were given the gift certificate.

Measures

A subset of items were drawn from multiple established scales and items developed by the researcher for measuring perceived procedural and distributive justice with the goal of creating justice measures that were tailored to capture adequately the nature of the present study. Additionally, we chose to use blended measures to ensure that the selected items made sense in a short-term, low-grade experimental setting measuring stress outcomes.

Perceived Procedural Justice: Perceived procedural justice was measured with seven items. One item was taken from Leventhal's (1980) items to reflect whether or not the procedures used were viewed as being free of bias. The remaining six items were developed by the researcher to reflect perceptions of procedural justice as a result of participating in the present study. The items are presented in Appendix D. A sample item is "the procedure used to decide what study you would participate in was free of

bias". Responses were rated on a 7 point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). High scores indicate a high degree of perceived procedural justice. Internal reliability of this scale was excellent, with a Cronbach's alpha of $\alpha = .94$.

Perceived Distributive Justice: Perceived distributive justice was measured using nine items. One item was based on Moorman's (1991) items to reflect whether or not the participants felt fairly rewarded given the stress they experienced during the study. Three items were taken from Leventhal's (1976) items to reflect the nature of the outcome received, and five items were developed by the researcher to tap into components of distributive justice specific to the present study. The items are presented in Appendix E. A sample item is "the outcome I received was appropriate given the amount of stress I experienced in this study". Responses were rated on a 7 point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). High scores indicate a high degree of perceived distributive justice. Internal reliability of this scale was very good, with a Cronbach's alpha of $\alpha = .86$.

Perceived Outcome Favorability: Perceived outcome favorability was measured using five items developed by the researcher. The full scale is contained in Appendix F. A sample item is "based on the study I completed I received more than the other participant who arrived at the same time as I did". Responses were rated on a 7 point scale with anchors ranging from "Strongly Disagree" (1) to "Strongly Agree" (7) with higher scores reflecting more favorable perceptions. Internal reliability of the five item scale was only moderate, with a Cronbach's alpha of $\alpha = .60$. Analysis of the inter-item correlations for the five items suggested that the two reverse coded items were not

“fitting” with the other three items with correlations all falling below .30. As a result, an internal analysis was conducted on the three item scale. Internal reliability of the three item scale was substantially improved, with a Cronbach’s alpha of $\alpha = .73$. Thus, the three item measure was used in subsequent analyses.

Affect: Affect was measured using a modified version of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The original scale consists of 20 affect states (e.g., “Interested” and “Guilty”) that allow respondents to describe various feelings and emotions they have experienced in the last month. The PANAS was modified to include seven additional affect states (angry, frustrated, uncomfortable, annoyed, relieved, bothered, and happy) to reflect affect states that may be specific to participation in the present study as well as affect states found in the existing literature pertaining to injustice and stress. Additionally, the directions were modified so that participants were asked to indicate their current affect state. This modification was used to ensure that the measure assessed the participant’s immediate reaction to the task and their resulting affect. The PANAS was divided into 15 negative affect items, and 12 positive affect items. See Appendix G for the full scale. Responses are rated on a 5 point scale with anchors ranging from “Very slightly or Not at all” (1) to “Extremely” (5). Internal reliability of the positive affect scale was very good, with a Cronbach’s alpha of $\alpha = .85$. Internal reliability of the negative affect scale was very good, with a Cronbach’s alpha of $\alpha = .91$.

Perceived Stress (General): Perceived stress resulting from participation in the study was measured using a 6 item scale developed by the researcher. This measure is presented in Appendix H. Sample items include “participating in this study made me feel

overwhelmed” and “participating in the study made me feel tense”. Responses were rated on a 7 point scale with anchors ranging from “Strongly Disagree” (1) to “Strongly Agree” (7), with higher scores indicating more stress. Internal reliability of the six item perceived stress scale was moderate with a Cronbach’s alpha of $\alpha = .71$. Analysis of the item-total statistics suggested that the deletion of question five would improve the internal reliability to a Cronbach’s alpha of $\alpha = .80$, as a result question five was removed from the scale and subsequent analyses relied on the 5 item version of this measure.

Post experiment survey: The post-experiment survey was used to ensure that participants did not know the true purpose of the study and consisted of two items, “if you had to venture a guess, what do you think the purpose of the present study was” and “again, if you had to guess, what do you think are the “hypotheses” of the expected results of the study” (see Appendix B).

Blood Pressure: Blood pressure was measured using the ADC ADvantage Advanced Wrist Blood Pressure Monitor, model #6016. The unique feature of this blood pressure model is that it allows three blood pressure measurements to be taken consecutively, which provides a mean blood pressure rating of those three measurements. The ability of the blood pressure monitor chosen to obtain three consecutive blood pressure measurements should be viewed as a strength of the present study as prior research has relied on only one blood pressure measurement at each interval. To analyze the blood pressure data, we followed the method proposed by Barling and Kelloway (1996). Blood pressure ratings were converted into a single mean variable by taking one-third of the difference between the systolic and diastolic readings all divided by the diastolic pressure.

Heart Rate: Heart rate was measured using the Polar S610 Heart Rate Monitor.

Heart measurements were obtained through a chest band that transmits the heart rate of the participant directly to a wrist watch. Heart rate data was based on marked data points at exact time points throughout the experiment: baseline, after manipulation, after task, and after questionnaire.

Results

Variables were computed using listwise deletion of missing data at the individual item level. Prior to testing the hypotheses, I examined the data for violations of the assumptions of normality, linearity, homoskedasticity, and multicollinearity by condition using SPSS for Windows version 13. There were no univariate outliers greater than 4 standard deviations from the mean. The highest degree of skew was $z = -3.86$. As the violations of normality were not severe transformations were not necessary. Descriptive statistics, internal consistencies and intercorrelations for all variables are summarized in Table 1 and Table 2. The hypotheses were tested using a series of 2 x 2 between-subjects ANOVAs with Procedural Justice (high vs. low) and Outcome Favorability (favorable vs. unfavorable) as the independent variables.³

Analyses for procedural justice

A 2 x 2 between-subjects analysis of variance was performed with perceived procedural justice as the dependent measure as a manipulation check and a partial test of hypotheses 1 and 3. The analysis of variance revealed a significant main effect for procedural justice condition, $F(1, 79) = 60.37, p < .001, \eta^2 = .446$, suggesting that those in the high procedural justice condition reported greater perceptions of procedural justice ($M = 6.18, SD = .80$) than those in the low procedural justice condition ($M = 4.18, SD =$

1.39). The procedural justice condition explained 45% of the variance in perceptions of procedural justice. The analysis of variance revealed a non-significant main effect for the outcome favorability condition, $F(1, 79) = .12, p > .05, \eta = .002$ indicating that the outcome favorability manipulation had no effect on perceptions of procedural justice. Contrary to hypothesis 3 there was no procedural justice by outcome favorability interaction, $F(1, 79) = .13, p > .05, \eta = .002$.

Analyses for outcome favorability

A 2 x 2 between-subjects analysis of variance was performed with perceived outcome favorability as the dependent measure as a manipulation check and partial test of hypotheses 2 and 3. In support of the manipulation, the analysis revealed a significant main effect of outcome favorability, $F(1, 79) = 22.61, p < .001, \eta = .232$, indicating that those in the high outcome favorability condition reported greater perceptions of outcome favorability ($M = 3.77, SD = 1.36$) than those in the low outcome favorability condition ($M = 2.57, SD = .92$). The outcome favorability manipulation explained 23% of the variance in perceptions of outcome favorability. There was also a significant main effect for the procedural justice condition, $F(1, 79) = 4.62, p < .05, \eta = .058$, contrary to what I expected, those in the high procedural justice condition reported lower perceptions of outcome favorability ($M = 2.90, SD = 1.22$) than those in the low procedural justice condition ($M = 3.46, SD = 1.33$). The analysis of variance also revealed a significant procedural justice by outcome favorability interaction, $F(1, 79) = 4.41, p < .05, \eta = .056$, in partial support of hypothesis 3. The procedural justice by outcome favorability interaction explained 5% of the variance in perceived outcome favorability. A post-hoc, independent sample t-test was conducted to pinpoint where the mean differences lie

within the procedural justice and outcome favorability interaction. When considering the high procedural justice condition there was no significant difference between the means of the high ($M=3.23$, $SD = 1.34$) and low ($M=2.57$, $SD = 1.03$) outcome favorability condition on perceptions of outcome favorability, $t(38) = 1.76$, $p>.05$. However, when considering the low procedural justice condition there was a significant difference between the means of the high ($M=4.30$, $SD = 1.18$) and low ($M=2.58$, $SD = .82$) outcome favorability condition on perceptions of outcome favorability, $t(37) = 5.24$, $p<.001$. When participants were assigned to the low procedural justice condition they had greater perceptions of outcome favorability when they were in the high outcome favorability condition compared to those in the low outcome favorability condition.

Analyses for positive and negative affect

As a partial test of hypotheses 1, 2, and 3, 2 x 2 between-subjects ANOVAs were conducted on the negative affect scale and the positive affect scale. Analysis of the positive affect scale revealed a non-significant main effect of procedural justice, $F(1, 79) = .17$, $p>.05$, $\eta = .002$ and a non-significant procedural justice by outcome favorability interaction, $F(1, 79) = .44$, $p>.05$, $\eta = .006$. However, the analysis revealed a significant main effect of outcome favorability, $F(1, 79) = 7.78$, $p<.05$, $\eta = .094$; those in the favorable outcome condition reported more positive affect ($M=2.63$, $SD = .54$) than those in the unfavorable outcome condition ($M=2.24$, $SD = .68$). The analysis of the negative affect scale found a non-significant main effect for procedural justice, $F(1, 79) = .06$, $p>.05$, $\eta = .001$, a non-significant main effect for outcome favorability $F(1, 79) = .30$, $p>.05$, $\eta = .004$, and a non-significant interaction $F(1, 79) = .21$, $p>.05$, $\eta = .003$.⁴

As prior research (Bies & Tripp, 2001; Mikula, Scherer, & Athenstaedt, 1998; Weiss et al., 1999) shows that individual affect states such as happiness and anger are predicted by perceptions of procedural justice and outcome favorability, additional 2 x 2 between-subjects ANOVAs were conducted on four of the individual affect states assessed with the PANAS, happy, angry, proud and guilty. Contrary to prior research there were no effects for anger, pride and guilt. In support of prior research there was a significant main effect of outcome favorability on feelings of happiness, $F(1, 79)=13.67$, $p<.001$, $\eta=.154$, indicating those in the high outcome favorability condition reported higher feelings of happiness ($M=2.68$, $SD=1.19$) than those in the low outcome favorability condition ($M=1.79$, $SD=.89$). There was a non-significant main effect for procedural justice, $F(1, 79)=.57$, $p>.05$, $\eta=.008$, and a non-significant interaction $F(1, 79)=.51$, $p>.05$, $\eta=.007$ for happiness.

Analyses for self-reported stress

To test hypotheses 1, 2, and 3 that there would be main effect of outcome favorability, a main effect of procedural justice and a interaction of outcome favorability and procedural justice on participants' self-reported stress a 2 x 2 between-subjects analysis of variance was performed on the stress scale. Contrary to the hypotheses, there was a non-significant main effect for procedural justice, $F(1, 79) = .03$, $p>.05$, $\eta=.000$, a non-significant main effect of outcome favorability, $F(1, 79) = .102$, $p>.05$, $\eta=.001$, as well as a non-significant procedural justice condition by outcome favorability interaction, $F(1, 79) = 1.81$, $p>.05$, $\eta=.011$. A power analysis for this analysis later revealed that the power to detect an interaction was low at .144 suggesting that a lack of significant findings for the interaction may be the result of a lack of power.⁵

Analyses for physiological measures of blood pressure

As a partial hypothesis test of hypotheses 1, 2, and 3 that there would be main effect of outcome favorability, a main effect of procedural justice and a interaction of outcome favorability and procedural justice on physiological measures of strain, a series of 2 x 2 between-subjects was ANOVAs were performed on blood pressure measurements taken after manipulation, after task and after questionnaire.⁶ For the after manipulation measurements, contrary to the hypotheses there was a non-significant main effect for procedural justice, $F(1, 79)=1.87, p>.05, \eta =.025$, a non-significant main effect for outcome favorability, $F(1, 79)=.74, p>.05, \eta =.010$, and no procedural justice by outcome favorability interaction, $F(1, 79)=3.02, p>.05, \eta =.039$. Contrary to the hypotheses, the results from the analysis of the after task blood pressure showed a non-significant main effect for procedural justice $F(1, 79)=.47, p>.05, \eta =.006$, a non-significant main effect for outcome favorability, $F(1, 79)=.80, p>.05, \eta =.011$, and a non-significant main effect for the outcome favorability by procedural justice interaction, $F(1, 79)=.50, p>.05, \eta =.011$. Lastly, when considering blood pressure measurements after the completion of the questionnaires there was a non-significant main effect for procedural justice, $F(1, 79)=.07, p>.05, \eta =.001$, a non-significant main effect for outcome favorability, $F(1, 79)=.34, p>.05, \eta =.005$, and a non-significant procedural justice by outcome favorability interaction, $F(1, 79)=.61, p>.05, \eta =.008$.

Analyses for physiological measures of heart rate

As a partial test of test hypotheses 1, 2, and 3, that there would be main effect of outcome favorability, a main effect of procedural justice and an interaction of outcome favorability and procedural justice on physiological measures of strain, a series of 2 x 2

between-subjects analysis ANOVAs was performed on heart rate measurements taken throughout the course of the study. Analysis of the after manipulation heart rate found a non-significant main effect for procedural justice, $F(1, 79)=.33, p>.05, \eta=.004$, and a non-significant main effect for outcome favorability, $F(1, 79)=.20, p>.05, \eta=.003$. There was a significant procedural justice by outcome favorability interaction, $F(1, 79)=7.52, p<.05, \eta=.091$. Similarly, analysis of the after task heart rate found a non-significant main effect for procedural justice, $F(1, 79)=.00, p>.05, \eta=.000$, and a non-significant main effect for outcome favorability, $F(1, 79)=.06, p>.05, \eta=.001$. There was a significant procedural justice by outcome favorability interaction, $F(1, 79)=5.53, p<.05, \eta=.069$. Analysis of the after questionnaire heart rate found a non-significant main effect for procedural justice, $F(1, 79)=.00, p>.05, \eta=.000$, a non-significant main effect for outcome favorability, $F(1, 79)=1.0, p>.05, \eta=.013$, and a non-significant interaction, $F(1, 79)=.85, p>.05, \eta=.011$. The profile plots for the significant interactions were examined to determine the nature of the relationships and to see if there were any differences in the obtained pattern at different measurement times. The pattern of profile plots was the same for the after manipulation and after task measurement periods. Analysis of the interaction of procedural justice and outcome favorability on the after manipulation and after task profile plots suggest that those in the low procedural justice/low outcome favorability had higher heart rate than those in the low procedural justice/high outcome favorability condition. Such a finding is not unexpected; however, contrary to the hypothesis those in the high procedural justice/high outcome favorability condition had higher heart rates than those in the high procedural justice/low outcome favorability condition.

Because the significant interactions did not reflect the predicted pattern, I conducted an additional 2 x 2 ANOVA with baseline heart rate as the dependent measure to examine the possibility that the interaction reflected pre-existing group differences rather than the experimental manipulations. There was a significant procedural justice by outcome favorability interaction, $F(1, 79)=6.28, p<.05, \eta=.077$, with the profile plot exhibiting the same pattern of results obtained with after manipulation and after task heart rate suggesting that the interaction was a result of pre-existing group differences and not the result of the manipulations themselves.

Regression Analyses

Because the hypothesis pertaining to the procedural justice and outcome favorability manipulations were not supported, I conducted exploratory analyses using perceived procedural justice and perceived outcome favorability as predictors to determine if those who perceived a high degree of procedural injustice or low outcome favorability during the experiment experienced negative health outcomes. In a series of hierarchical moderated multiple regressions, perceived procedural justice and perceived outcome favorability were used as predictors with self-reported stress, positive affect, negative affect and distributive justice as outcomes. To avoid problems with multicollinearity among the individual predictors and the interaction term, I used the centering procedure outlined by Aiken & West (1991). Perceptions of procedural justice and perceptions of outcome favorability were centered before being entered on a first step. The centered variables were used to calculate the interaction term, which was entered on a second step. Results from the regression analyses are contained in Table 3. Examination of the regression weights indicates that the only significant relationship was

perceived outcome favorability predicting positive affect, $\beta = .30$, $t(76) = 2.64$, $p < .05$, with greater perceptions of outcome favorability associated with greater perceptions of positive affect.

Table 1

Means and standard deviations for procedural justice, outcome favorability and the procedural justice by outcome favorability interaction.

Outcome Measure	Outcome Favorability Condition	Procedural Justice Condition					
		High		Low		Total	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Perceived PJ	High	6.17	.79	4.26	1.35	5.22	1.46
	Low	6.18	.83	4.08	1.46	5.16	1.58
	Total	6.18	.80	4.18	1.39		
2. Perceived OF	High	3.23	1.34	4.30	1.18	3.77	1.36
	Low	2.57	1.03	2.58	.82	2.57	.92
	Total	2.90	1.23	3.46	1.33		
3. Perceived DJ	High	5.34	.70	5.28	.47	5.31	.59
	Low	5.38	1.08	5.32	.96	5.35	1.01
	Total	5.36	.90	5.30	.74		
4. Self-Report Stress	High	2.72	1.26	3.03	1.26	2.88	1.25
	Low	3.07	1.38	2.86	1.19	2.97	1.28
	Total	2.90	1.31	2.95	1.21		
5. Positive Affect	High	2.55	.52	2.70	.56	2.62	.54
	Low	2.26	.78	2.22	.58	2.24	.68
	Total	2.41	.67	2.47	.61		
6. Negative Affect	High	1.89	.77	2.01	.59	1.95	.68
	Low	2.06	.85	2.03	.75	2.05	.79
	Total	1.98	.81	2.02	.67		

Table 1

Means and standard deviations for procedural justice, outcome favorability and the procedural justice by outcome favorability interaction (continued).

Outcome Measure	Outcome Favorability Condition	Procedural Justice Condition					
		High		Low		Total	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
7. Resting Rate HR	High	85.30	11.38	80.55	10.01	82.93	10.85
	Low	78.00	12.97	85.79	9.74	81.79	12.02
	Total	81.65	12.60	83.10	10.10		
8. After Manipulation HR	High	85.75	8.67	80.75	11.97	83.25	10.62
	Low	78.40	11.31	86.05	8.77	82.13	10.64
	Total	82.08	10.62	83.33	10.63		
9. After Task HR	High	79.20	7.53	72.75	19.72	75.98	15.09
	Low	73.25	10.03	80.05	8.77	76.56	9.93
	Total	76.23	9.26	76.31	15.64		
10. After Questionnaire HR	High	81.60	6.85	78.85	9.70	80.23	8.40
	Low	76.25	9.04	78.68	20.33	77.44	15.43
	Total	78.93	8.37	78.77	15.58		
11. Resting Rate BP	High	.22	.06	.19	.04	.21	.05
	Low	.20	.05	.21	.04	.21	.05
	Total	.21	.05	.20	.04		
12. After Manipulation BP	High	.22	.06	.18	.03	.20	.05
	Low	.19	.05	.19	.04	.19	.05
	Total	.20	.06	.19	.04		
13. After Task BP	High	.20	.06	.20	.05	.20	.05
	Low	.22	.08	.20	.07	.21	.07
	Total	.21	.07	.20	.06		
14. After Questionnaire BP	High	.21	.07	.22	.17	.22	.13
	Low	.22	.09	.20	.05	.21	.07
	Total	.21	.08	.22	.13		

Note: PJ = procedural justice, OF = outcome favorability, DJ = distributive justice, HR = heart rate, BP = blood Pressure

Table 2

Correlations among study variables. Reliability coefficients for each of the measures are shown in parentheses along the diagonal.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Perceived Procedural Justice	5.19	1.51	(.94)					
2. Perceived Outcome Favorability	3.18	1.31	.22*	(.73)				
3. Perceived Distributive Justice	5.33	.82	.11	-.18	(.86)			
4. Self-Report Stress	2.92	1.26	-.13	.08	-.32*	(.80)		
5. Positive Affect	2.44	.64	-.04	.29*	.09	.33*	(.85)	
6. Negative Affect	2.00	.74	-.11	-.02	-.15	.69**	.42**	(.91)

Note: * $p < .05$, ** $p < .001$, Listwise $N = 50$

Table 3

Summary of hierarchical, moderated multiple regression analyses for procedural justice and outcome favorability (N=79).

	<i>Stress</i>			<i>Positive Affect</i>			<i>Negative Affect</i>			<i>Distributive Justice</i>		
	<i>B</i>	β	R^2	<i>B</i>	β	R^2	<i>B</i>	β	R^2	<i>B</i>	β	R^2
			<i>change</i>			<i>change</i>			<i>change</i>			<i>change</i>
<i>Step 1: Main Effects</i>			.02			.09*			.01			.04
Procedural Justice	-.10	-.12		.01	.03		-.06	-.12		.04	.07	
Outcome Favorability	.05	.05		.15*	.30*		-.03	-.05		-.10	-.16	
<i>Step 2:</i>			.01			.01			.00			.00
Procedural Justice	-.11	-.13		.01	.01		-.06	-.12		.04	.07	
Outcome Favorability	.04	.04		.14	.29		-.03	-.05		-.10	-.17	
Procedural Justice *	-.05	-.08		-.03	-.10		-.02	-.05		-.03	-.06	
Outcome Favorability												

* $p < .05$

Discussion

The goal of the present study was to expand our knowledge of the relationship between injustice and stress through the use of an experimental manipulation of procedural justice and outcome favorability in a laboratory setting. I hypothesized that the procedural justice and outcome favorability manipulations would affect self-reported and physiological measures of strain; in large part these hypotheses were not supported. The procedural justice by outcome favorability experimental manipulation had no effect on self-reported stress or physiological (blood pressure and heart rate) measures of strain.

Additionally, I hypothesized that the experimental manipulations would affect participants' affect. Prior research shows that the experience of injustice is laden with negative emotion (Bies & Tripp, 2001; Mikula, Scherer, & Athenstaedt, 1998) and that manipulations of outcome favorability and procedural justice lead to the experience of such emotions as anger, happiness, and guilt (Barclay et al., 2005; Weiss et al., 1999). In the present study I found partial support for this hypothesis. Those who received a favorable outcome reported more positive affect than those who received an unfavorable outcome. Looking at individual affect states, those in the favorable outcome condition reported more happiness than those in the unfavorable outcome condition. Support for an effect of justice perceptions and outcome favorability on negative affect states such as anger and hostility was not reproduced in the current study.

One peculiar finding within the study was that those in the high procedural justice condition reported lower perceptions of outcome favorability than those in the low procedural justice condition. An inspection of the cell means illustrates that this effect appears to reflect the mean difference across the two justice conditions for those in the

favorable outcome conditions. Those who received a favorable outcome by an unfair process reported somewhat higher perceptions of outcome favorability ($M = 4.3$) than those who obtained that outcome by a fair process ($M = 3.2$). It is possible that those who received the favorable outcome via a biased procedure value that outcome more than those who were awarded it by an unbiased procedure.

Potential Reasons for non-significance

Although the vast majority of the proposed hypotheses were not supported, manipulation checks on both procedural justice and outcome favorability indicate that the manipulations were working to a degree. Analysis of the procedural justice manipulation provided evidence for a main effect of procedural justice, such that those in the high procedural justice condition reported greater perceptions of procedural justice compared to those in the low procedural justice condition, similar results were obtained for outcome favorability. Although there was a difference between the mean perceived procedural justice ratings for the high and low procedural justice conditions, the two means were in the range of 4 and 6 (on a 7 point scale) suggesting that the low procedural justice condition was not viewed as unfair, but was actually considered neutral. As a result, it is likely that these feelings of neutrality towards the procedural justice manipulation were not sufficient enough to warrant any type of stress (self-report or physiological) or negative affect reaction. Perhaps a more unjust treatment would have produced more promising results.

With respect to outcome favorability, the allure of gift certificates to a popular coffee shop may not have been substantial enough to elicit a response from the participants when they were chosen or not chosen to receive them. This prospect is

supported by the fact that mean perceived outcome favorability rating for those in the favorable outcome condition was 3.77, below the neutral on the 7 point rating scale. In fact, when participants were assigned to the experimental conditions the greatest concern with the majority of participants was whether or not they would still receive their 2 bonus points. It is therefore also plausible that receiving gift certificates was only secondary to ensuring they would receive their bonus points, the more valued outcome. This likely can be viewed as a limiting factor when manipulating outcome favorability. This problem may be overcome by providing additional compensation to participants that is viewed more favorably, such as tickets to a movie or a draw for a cash prize.

Additionally, research has suggested that individuals will respond to a situation more strongly when they believe something has been taken away rather than when they perceive something has failed to occur (Levin, Schneider & Gaeth, 1998). Perhaps if I had advertised the gift certificates in the original advertisement and subsequently taken them away participants may have responded more strongly to the manipulations.

There are also a number of additional explanations for the lack of significant results in the present work. Research has suggested that the social side of procedures such as providing an adequate explanation for an outcome (informational justice) and treating individuals with respectful treatment (interpersonal justice) (Colquitt, 2001) interacts with outcome fairness or favorability to influence reactions (Brockner & Wiesenfeld, 1996; Folger, 1993). Folger (Folger 1977; Folger et al., 1979) has found across a number of studies that individuals are likely to accept negative outcomes when the procedure used to arrive at them is viewed as fair, a pattern that has become known as the fair process effect. Research by Skarlicki and Folger (1997) has shown that when

perceptions of interactional justice are high individuals are more likely to accept unfair procedures and unfair outcomes that would otherwise cause retaliatory behavior. It is plausible that individuals who participated in the study felt that they were treated fairly in an interpersonal sense by the researcher. A high degree of perceived interpersonal justice may have buffered the impact of the outcome favorability and procedural justice manipulations on the outcome variables. Additionally, as the manipulation was explained in terms of the addition of an organizationally sponsored study participants may have viewed this explanation as adequate, thus experiencing a high degree of informational justice, and accepting the unjust aspects of the procedure. For example, participants may have understood that it was not possible for both participants to complete the sponsored study and since they were unaware that there was a sponsored study when they agreed to participate it was not viewed as upsetting or violating any expectations when they were not chosen to complete it. It may also be likely that the participants viewed the biased selection process (choosing based on an item of clothing) as in line with how they would have handled the situation, perhaps it was viewed as random and therefore not classified as biased or unjust, a point that is supported by the fact that the mean perceived procedural justice rating for those in the low procedural justice condition was 4.17, very near the neutral point on a 7 point scale. The strength of the manipulation could be increased by failing to provide participants with information that justifies the reason for the additional study/additional compensation.

It is also likely that the video task that participants were required to complete may have impacted the results. Since the questionnaire package was completed after the video task it is plausible that if participants were initially upset by the allocation process,

concerns about unfair procedures and outcomes may have become less important after witnessing the stories of young adults who have suffered as a result of poor workplace safety. It may have been beneficial to obtain perceptions of injustice prior to the video task to ensure the nature of the videos did not exert an unwanted influence.

The concept of equity theory may also provide an explanation for the lack of support for the hypotheses. The main assumption of equity theory is that an individual will evaluate their outcomes relative to their inputs using a comparison person as a point of reference (Adams, 1965). Individuals are thought to feel angry and resentful when their ratio of outcomes to inputs is lower than those of a referent other, and as a result they may seek to restore what they constitute to be equity. In their attempt to restore equity individuals may respond by decreasing their effort (VanYperen, Hagedoorn, Zweers, & Postma, 1996). Perhaps participants within the study who felt they were treated unfairly responded by reducing their motivation or effort throughout the course of the study and in this manner alleviated any negative affect or stress responses to the injustice.

There are also a number of additional explanations for the lack of findings concerning the blood pressure and heart rate measurements in particular, beyond the factors noted above. First, it may be possible that injustice perceptions do not directly lead to the experience of physiological strain. It may be that injustice perceptions over time lead to the development of stress and that it is the onset of stress that will predict increases in outcomes such as blood pressure. If this is the case, the null results pertaining to self reported stress would account for the lack of significant effects of procedural justice and outcome favorability on blood pressure and heart rate. Second, the

short time frame over which the current study was conducted may not have been sufficient enough to measure adequately increases in blood pressure or heart rate, as increases in physiological measures tend to be obtained over time and are more indicative of strain. The laboratory setting itself may have also contributed to the lack of significant physiological findings. Participants completed the study while sitting in a comfortable chair and were left alone while they completed the questionnaires as well as the video task. The relaxed environment may have been sufficient enough to reduce blood pressure and heart rate ratings. The researcher believed that measurements of heart rate may be subject to greater sensitivity, particularly over short time frames, when it comes to the experience of stress and perceptions of injustice, however, this finding was not supported by the present research and likely provides further proof of a weak experimental manipulation.

Limitations

As with any study that utilizes self-report measures there is always a risk that participants may not have responded truthfully to the sensitive nature of some of the questions. For example, participants may not have truthfully reported their affect state or how stressed they felt as a result of participating in the study; this may be particularly true with issues of negative affect or stress. Participants may have avoided hurting the feelings of the researcher by choosing not to report that they were upset or angry by how they were assigned to the experimental condition or felt embarrassed to admit that they were upset over or pleased about a small gift certificate to a coffee shop.

Although studies conducted within a laboratory setting allow the researcher to control extraneous variables, it is highly likely that this control comes at the expense of

other issues associated with demand characteristics and the artificiality of a laboratory setting (Gordon, Slade, & Schmitt, 1986, 1987). Though the experimental design will maximize internal validity, the level of external validity may be compromised, as it may fail to represent an accurate picture of behavior outside the laboratory setting. This may particularly be true when utilizing a student population and a task not likely to be seen outside of a controlled experiment. Within everyday life or a working environment it is highly unlikely that participants are attached to heart rate and blood pressure monitors and the injustice they experience is not likely based on what color clothing they are wearing. Furthermore, the student population may be inherently different from the older, employed samples used in prior research on the topic of injustice and stress, thus accounting for the lack of significant findings in the present study. Additionally, within the present study participants stated that they felt some of the questions on the questionnaire primed them to examine more closely the experimental procedure. In real life, individuals will not likely be asked whether or not they were treated unfairly nor given the opportunity to voice their concerns.

There also might have been inherent problems with the procedural justice manipulation. In the low procedural justice condition the researcher was required to select participants based on biased criteria. The researcher ultimately ended up using five items as biased criteria: backpack, shoes, sweatshirt, hat or earrings. The variability within the low procedural justice condition may have affected the results. It would have been beneficial to use a standard line such as “you look like a nice person” to strengthen the bias aspect within the procedural manipulation. A line such as this would be

considered by most as a compliment to the person being chosen and a universal insult to the other individual.

The results of the present study also suffered from a lack of observed power for some analyses. Perhaps if time allowed for additional participants to be tested more significant results would have emerged. However, it is more likely that the lack of statistically significant results was in fact a result of a weak experimental manipulation rather than a failure to detect a small effect. Again, this logic can be supported by the manipulation checks that showed group differences across the conditions. Although the checks showed that the manipulations were sufficient for the procedural justice condition to predict perceptions of procedural justice and for the outcome condition to predict perceptions of outcome favorability, they were clearly not strong enough to affect measurements of stress and perceptions of negative affect.

The use of two confederates may also have posed a problem. Although both of the confederates were equally assigned to each condition and were trained on how to respond within the experimental setting, it was not possible to control for the behavior of the confederates as they interacted with the participant while waiting to participate in the experiment. The confederates were encouraged to act as naturally as possible and it may be the case that idle conversations that occurred in the hall and in the lab while waiting to participate created a sense of camaraderie such that it was not necessarily upsetting to see the confederate be chosen to receive the additional gift certificates.⁷

Additionally, the fact that both confederates were female may also be considered a limitation. In order to take heart rate measurements participants were required to go to the washroom to put the chest strap on. When the participant was a female, both the

participant and the confederate would go to the bathroom together, and in some instances the confederate assisted the participant in putting on the chest strap. Some form of female bonding may have occurred, which may have impacted the results. In a related vein, the small sample of males in the study precluded the researcher's ability to test for any gender differences. It is possible that men and women interpret and respond to situations differently and being unable to test for these differences poses a problem that should be addressed in future investigations.

Some of the participants that entered the laboratory setting had prior knowledge of and interaction with the researcher either through prior experimental studies or through teaching assistant positions. It is therefore plausible that in those conditions that they were treated unfairly participants may not have viewed the treatment as unfair since they had personal knowledge of the researcher. Based on this, failing to measure interactional injustice could be viewed as a research limitation in this study. As there was a substantial amount of researcher/participant interaction throughout the course of the experiment the researcher may have inadvertently impacted perceptions of fair interpersonal treatment which may have diluted the effects of the manipulations.

Lastly, the outcome favorability scale itself may pose a limitation to the present study. The scale was created by the researchers and an examination of the items that were retained, as well as an examination of the statistical findings, suggests that the construct of outcome favorability as measured by our study was failing to tap into the individual's satisfaction with the outcome received. The outcome favorability items included: "the rewards for participating in this study were biased in favor of me", "I feel as if I was "the winner" in this study" and "based on the study I completed I received

more than the other participant who arrived at the same time as I did". More specifically, inspection of the means suggest that participants neither viewed the outcome as favorable or unfavorable, it was viewed with neutrality. This may suggest an underlying problem with the scale items themselves.

Directions for future research

Future research should attempt to address some of the limitations presented above including the use of an employee population, the provision of less information when assigning participants to the experimental conditions as well providing less information concerning the reasons for the additional study by attempting to keep the level of interactional justice more neutral. A potential avenue for expansion could possibly be the removal of a reward as opposed to the provision of a reward as research shows that the removal of a reward is viewed more negatively than when something has failed to occur (Levin, Schneider & Gaeth, 1998). Future research should also obtain a measurement of interactional justice in relation to the researcher as well as the confederate if a confederate based design is chosen. It may then be possible to control for perceptions of interactional justice that may allow for a more accurate picture of justice perceptions within the current experimental manipulation.

It may be beneficial to determine what might be considered favorable compensation by the student population to ensure that the additional compensation is in fact desirable. It may also be interesting to attempt this manipulation with a larger group of participants, providing them with the opportunity to discuss the fact that they were not chosen to receive a desirable outcome based on biased criteria. It would be interesting to determine if perceptions of injustice increased as a result of group membership compared

to individual perceptions within an experimental setting. Future research should also investigate the presence of a mediation model such that injustice affects self-reported stress and that self-reported stress in turn mediates increases in blood pressure. Lastly, attempts should be made to conduct a quasi-experimental study using a longitudinal design so that measurements, particularly blood pressure and heart rate, can be measured over time. By utilizing a longitudinal design it may be possible to detect changes in physiological indices of strain that develop over time as a result of experiencing injustice.

Conclusions

The present study examined the effects of procedural injustice and outcome favorability on self-report and physiological measures of strain. Results of the analyses provided a lack of support for the proposed hypotheses; the procedural justice by outcome favorability manipulation had no effect on self-report or physiological indices of strain. However, manipulation checks suggested that although the manipulations were exerting effects, these were not strong. Thus it is highly plausible and the view of the researcher that the lack of significant results can be attributed to weak experimental manipulations. Though the study failed to find support for the majority of the hypotheses it should be viewed as a starting point in understanding the causal impact of outcome favorability and procedural justice on perceptions of stress and affect. This is particularly the case as the present study is the first experimental study that has attempted to tackle the issues of procedural justice and outcome favorability on self-report and physiological measures of strain. Continuing to conduct research of this nature will allow us to elucidate further the relationship between injustice and stress outcomes and may allow us to help improve physical, mental, and emotional well-being of the employee population.

If an enhanced understanding of the impact of injustice is achieved, work place interventions can be implemented to alleviate its effects. It should be noted that work place interventions need to be implemented at the system level in order to ensure success, as the organizational system as a whole is responsible for ensuring fair processes and outcomes. A greater understanding of the effects of injustice has the potential to lead to reductions in such things as work place absenteeism, health care costs, alcohol consumption, and increases in general health and well-being.

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Appendix A

INFORMED CONSENT FORM

Please read the following information. If you agree to participate, please sign the form and return it to the researcher. Please keep one copy for your records.

We are conducting a study evaluating the effect of various workplace safety videos amongst the student population. The study will be used to determine what aspects of workplace safety videos are most salient to students who comprise a large portion of the current and future working population. Ultimately, we intend the results of the current study to help design actual workplace safety programs that will increase adherence to workplace safety guidelines and reduce accidents within the workplace. You will be asked to watch two safety videos, complete a short survey regarding your perceptions of the videos and have your blood pressure and heart rate monitored during the experiment. To give you an idea of what to expect the procedure that will be used is summarized below.

- 1) Using instructions from the researcher, you will put on the heart rate monitor yourself (one strap around your chest and one around your wrist). The blood pressure cuff looks like a wrist watch and the researcher will help you put it on.
- 2) You will be asked to watch two workplace safety videos and answer a brief questionnaire regarding your perceptions of the video content.
- 3) You will receive two bonus points for your participation.

Your participation in this study is greatly appreciated. It is important to remind you that your survey responses and your physiological data will be kept strictly confidential. Only the research team will have access to the information collected in this study. Individual responses will not be shared with anyone. Results will be reported as group totals only.

If your physiological data show higher rates than what would normally be expected, the researcher will suggest you consult a physician. This should not be a cause for alarm, sometimes heart rate and blood pressure naturally elevate, however as a precaution to ensure your health and wellbeing the researcher will let you know if your physiological measures are high.

One of the videos you will be asked to watch will involve the recreations of four workplace accidents that occurred to young adults while on the job. While these recreations are portrayed by actors and do not contain actual footage of the accidents that occurred they may be considered graphic or disturbing to some viewers. Please be assured that you may discontinue the study at anytime should the material presented in the video cause you discomfort.

If you find yourself upset or bothered by some of the things you are asked to think about when responding to the survey items, you may wish to contact Saint Mary's University counseling services. You can contact the counseling centre at 420-5615 or by dropping into the counseling office on the 4th Floor of the Student Centre at SMU. Additionally, should you experience negative outcomes in response to this study you may choose to contact your family physician. Furthermore, we encourage participants to report any adverse effects of participation to the researchers.

Please note that your participation in this study is completely voluntary. You can withdraw from this study at any time. Although we encourage you to answer all of the questions, please feel free to disregard items you do not wish to answer. By signing this consent form and returning it

along with your completed survey, you are giving your full consent to participate in this research project.

Your participation in the project is very important to us. Should you require further information or have concerns about the study please feel free to contact Dr. Lori Francis at (902) 496-8150 or Lori.Francis@smu.ca or Danielle Durepos (902) 425-4134 or ddurepos@nbnet.nb.ca.

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have questions or concerns about the study you may contact Dr. Veronica Stinson at ethics@stmarys.ca, Chair, Research Ethics Board.

We would like to thank you in advance for your participation. Your contribution is sincerely appreciated.

Name (please print) _____

Signature: _____

Date: _____

Please provide the following information that will allow the researcher to communicate with you about the study should you wish to receive a copy of the study results:

Email Address: _____

Would you like to receive a copy of the results? Yes _____ No _____
(If yes, a copy of the results will be emailed to you).

Appendix B

Post-Experimental Survey

As a participant we are interested in your perceptions of the experiment. We would appreciate if you would please take a few moments to consider the following questions. Please give your honest response. Once you have completed the survey we will debrief you about the goals of the present research. Remember that your responses will be confidential and they will be stored anonymously.

1. If you had to venture a guess, what do you think the purpose of the present study was?

2. Again, if you had to guess, what do you think are the “hypotheses” or the expected results of the study?

Appendix C

Verbal Feedback Debriefing

Dear Participant,

Thank you for participating in our study examining the affect of various workplace safety videos amongst the student population. Your responses will be invaluable in determining what aspects of workplace safety videos are most salient to the student population. Although we are very much interested people's responses to safety materials, there was also another purpose for this study. In partaking in the study you have been deceived. The goal of the present study was two fold. Our primary area of interest is related to the perceived fairness of your participation and its affect on stress (including physiological indicators like blood pressure and heart rate) and affect. The other participant who arrived to participate in the same study was actually a confederate of the researcher, and the manner in which you were assigned to the safety video study was controlled by the experimenter. In actuality there is only one study being conducted and I as the researcher was responsible for determining what experimental condition you ultimately participated in. Our main hypothesis in this study is that those who feel they were treated unfairly while participating in this study will experience more stress and negative affect than those who felt they experienced a fair process and outcome.

However, while our primary interest is related to your perceptions of injustice, the data we obtain in relation to the workplace safety videos will be used as pilot data for a future study and therefore remains valuable to the researchers. We are currently still collecting and analyzing data associated with this study. The results of this study will be shared with participants, by email, no later than April 2007.

I will take this time to address any questions or concerns you may have in response to your participation in the study. Again we wish to assure you that actors were used to recreate the workplace accidents that were portrayed in the young worker video and did not contain actual footage of the workplace accidents that the young adults occurred while on the job. Additionally, please be aware that all participants will participate in the same study and all participants will receive the Tim Hortons gift certificates. As the integrity of the experiment relies on the believability of the manipulations we will ask that as a participant you not discuss the true nature of the study with other potential participants. For this reason we will not give you a copy of the feedback letter, however your copy of the informed consent contains the contact information for the researchers should you have any questions about the study or would like to discuss further the nature of the study at a future point. If you have any additional concerns or have experienced negative emotional reactions in response to this study Saint Mary's provides free counseling services to all students. To schedule an appointment call: 420-5615 or drop by the counseling office on the 4th Floor of the Student Centre. If you have experienced negative outcomes in response to this study you may also choose to contact your family physician. We also encourage you to report any adverse effects of participation to the researchers. I will take this time to remind you that this information is included on your informed consent form that you can keep for your records.

Once again thank you for your participation in this study. If you have any additional questions please feel free to contact either Dr. Lori Francis or Danielle Durepos at the contact information given on your copy of the informed consent form.

Appendix D
Procedural Justice Items

These next items refer to the process that the experimenter used to determine who would participate in each of the two studies. Please indicate to what extent you agree or disagree with the following items. Please circle the most appropriate response.

- 1= Strongly Disagree**
2= Disagree
3= Slightly Disagree
4= Neither Disagree or Agree
5= Slightly Agree
6= Agree
7= Strongly Agree

-
1. The procedure used to decide what study you would participate in was free of bias.

 2. I feel I had a fair shot at getting to participate in the study with the prize attached.

 3. The researcher was justified in how she assigned participants to the two different studies.

 4. The researcher seemed biased when assigning participants to the two different studies.

 5. Each participant had an equal chance to participate in the study with the prize attached.

 6. The procedure used to determine who would participate in the study with the prize was fair.

 7. I dislike the procedure that was used to decide who would participate in the study with the prize.

Appendix E
Distributive Justice Items

The following items ask about your feelings toward the rewards you received for participating in this research (i.e. your bonus points OR your bonus points and the prize). Please indicate to what extent you agree or disagree with the following items. Please circle the most appropriate response.

- 1= Strongly Disagree**
2= Disagree
3= Slightly Disagree
4= Neither Disagree or Agree
5= Slightly Agree
6= Agree
7= Strongly Agree

- | |
|---|
| 1. The outcome I received was appropriate given the amount of stress I experienced in this study. |
| 2. The outcome I received was appropriate given the amount of time I spent in this study. |
| 3. The outcome I received was appropriate given the nature of the study I completed. |
| 4. I think I deserved a larger reward for participating in this study. |
| 5. The outcome I received reflected the effort I put into the study. |
| 6. The outcome I received was appropriate for the work I completed. |
| 7. The outcome I received was justified given how I performed in the study. |
| 8. The outcome I received was fair. |
| 9. I do NOT feel as though I deserved the outcome that I received. |

Appendix F

Outcome Favorability Items

The following items ask about your feelings toward the rewards you received for participating in this research (i.e. your bonus points OR your bonus points and the prize). Please indicate to what extent you agree or disagree with the following items. Please circle the most appropriate response.

- 1= Strongly Disagree**
2= Disagree
3= Slightly Disagree
4= Neither Disagree or Agree
5= Slightly Agree
6= Agree
7= Strongly Agree

-
1. The rewards for participating in this study were biased in favour of me.

 2. The rewards for participating in this study were biased in favour of the other participant.

 3. I feel as if I was "the winner" in this study

 4. Based on the study I completed I received more than the other participant who arrived at the same time as I did.

 5. Based on the study I completed I received less than the other participant who arrived at the same time as I did.

Appendix G
Positive and Negative Affect Items

Indicate to what extent, during the course of participating in this experiment you have felt this way. Please circle the most appropriate response.

1 = Very slightly or Not at all

2 = A little

3 = Moderately

4 = Quite a bit

5 = Extremely

Positive Affect Items

Interested	1	2	3	4	5
Excited	1	2	3	4	5
Strong	1	2	3	4	5
Enthusiastic	1	2	3	4	5
Proud	1	2	3	4	5
Alert	1	2	3	4	5
Happy	1	2	3	4	5
Inspired	1	2	3	4	5
Determined	1	2	3	4	5
Attentive	1	2	3	4	5
Active	1	2	3	4	5
Relieved	1	2	3	4	5

Negative Affect Items

Distressed	1	2	3	4	5
Upset	1	2	3	4	5
Guilty	1	2	3	4	5
Scared	1	2	3	4	5
Hostile	1	2	3	4	5
Irritable	1	2	3	4	5
Ashamed	1	2	3	4	5
Nervous	1	2	3	4	5
Jittery	1	2	3	4	5
Afraid	1	2	3	4	5
Angry	1	2	3	4	5
Frustrated	1	2	3	4	5
Uncomfortable	1	2	3	4	5
Annoyed	1	2	3	4	5
Bothered	1	2	3	4	5

Appendix H
Perceived Stress (General)

Again please indicate to what extent, during the course of participating in this experiment you have felt this way. Please circle the most appropriate response.

- 1= Strongly Disagree**
2= Disagree
3= Slightly Disagree
4= Neither Disagree or Agree
5= Slightly Agree
6= Agree
7= Strongly Agree

-
1. Participating in this study made me feel overwhelmed.
-
2. Participating in the study made me feel tense.
-
3. Participating in the study made me feel stressed.
-
4. Participating in this study was a source of stress for me.
-
5. I enjoyed participating in this study.
-
6. I found it stressful that both participants did not get to take part in the study with the prize attached.
-

Notes

¹ Participants were not provided with any real information as to why heart rate and blood pressure measurements were taken.

² Additional analyses were conducted based on three datasets: 1) with the 21 participants who believed the study was related to the allocation of rewards removed, 2) with the 6 participants who believed the study was related to bias in reward allocation or perceptions of injustice removed, 3) with all 27 participants who partially guessed the true nature of the study removed. The results obtained in these analyses did not differ from those obtained by removing only the one participant who correctly identified the confederate.

³ Given the presence of baseline measures, repeated measures ANOVAs were also an option for the analysis of the data. As this study used an experimental design, random assignment should have mitigated any pre-existing group differences and thus I deemed that repeated measures analyses including baseline measures were not necessary. Baseline measurements were taken under the premise that, should peculiar findings emerge, the researcher would be able to examine the possibility of randomization errors. That said, for the sake of completeness the between subjects ANOVAs presented below were all rerun using 2 (procedural justice: high vs. low) by 2 (outcome favorability: favorable vs. unfavorable) by 2 (time: baseline vs after task) repeated measures ANOVAs for the self-reported outcome measures and 2 (procedural justice: high vs. low) by 2 (outcome favorability: favorable vs. unfavorable) by 4 (time: baseline vs after manipulation vs after task vs after questionnaire) repeated measures ANOVAs for the physiological measures. Except where noted, there were no repeated measures effects and no differences in the pattern of results were detected.

⁴ A post-hoc analysis using repeated measures ANOVA was conducted to determine if differences exist over time using baseline negative affect measurements and negative affect measures taken after the task. A significant within-subjects effect was found for the time factor, $F(1, 75) = 76.00, p < .001$. Analysis of the means suggest that negative affect was greater at the end of the study ($M=2.0, SD=.74$) compared to baseline measurements of negative affect ($M=1.18, SD=.44$), therefore perceptions of negative affect increased during the course of the study.

⁵ A post-hoc repeated measures ANOVA was conducted to determine if group differences exist over time analyzing baseline self-reported stress and stress. A significant within-subjects effect was found for the time factor, $F(1, 75) = 40.62, p < .001$. Analysis of the means suggest that self-reported stress was higher at the end of the study ($M=2.92, SD=1.26$) compared to baseline measurements of self-reported stress ($M=1.94, SD=.84$), therefore perceptions of self-reported stress increased over the course of the study.

⁶ To ensure that caffeine consumption within the past hour had no impact on the blood pressure measurements the analyses were also conducted co-varying for caffeine consumption in the past hour. The results did not show a caffeine effect for after manipulation, after task or after questionnaire measurements, nor did it impact or alter the statistical results for the other independent variables.

⁷ Exploratory analyses were conducted to determine if the confederates had impacted the nature of the results. First, the analyses were conducted separately for each confederate; these analyses did not alter the results. Secondly, the analyses were conducted co-varying for both confederates; these analyses also did not alter the results. Lastly, the analyses were conducted co-varying for each confederate separately. Again, these analyses also did not alter the results. However, it should be noted there were differences in the level of significance for each confederate; these differences were mixed with some being stronger for one confederate and others stronger for the other confederate. Lastly, interactions tended to emerge for one confederate suggesting that the choice of confederates may have impacted the results to a small degree.



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