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The Role of Leader Support for Safety Within the Leader Justice-Safety Performance Relationship

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THE ROLE OF LEADER SUPPORT FOR SAFETY WITHIN THE

LEADER JUSTICE - SAFETY PERFORMANCE RELATIONSHIP

by

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ABSTRACT

THE ROLE OF LEADER SUPPORT FOR SAFETY WITHIN THE LEADER JUSTICE - SAFETY PERFORMANCE RELATIONSHIP

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Research indicates that leadership is a potent antecedent of safety performance and outcomes. Specifically, quality of leadership has been identified as a critical target for occupational safety research. The current studies focused on employee perceptions of leader justice, operationalized in general (Study 1) and safety-specific contexts (Study 2), and leader support for safety, and investigated their interactions in predicting safety performance. Only one published study has explored the direct impact of leader justice on safety and no previous research has contextualized leader justice in safety-specific terms. It was postulated that general and safety-specific leader justices and support for safety would exhibit positive main effects on workers' safety performance. Empirical works have also demonstrated that facet-free and facet-specific leadership variables may interact in predicting employee safety outcomes. Following this line of work, leader support for safety was expected to interact with general leader justice such that general leader justice would have its strongest relationship with safety performance when leader support for safety was high. Conversely, no interaction was expected between safety-specific leader justice and leader support for safety when predicting safety performance.

The above hypotheses were examined using data from two independent samples across two studies. Data were derived from a larger project entitled, "Enhancing Safety

through Leadership" and were collected via in-person and mailed surveys from unionized journeymen and apprentices in the pipefitting and plumbing trades from three regions of the United States. Surveys were completed by 249 participants for Study 1 and 257 participants for Study 2.

Confirmatory factor analyses supported the dimensionality of leader justice as well as safety performance. Correlations and hierarchical linear multiple regressions were conducted to analyze the proposed direct and interactive effects. Results generally supported hypotheses and indicated that general leader justice, safety-specific leader justice, and leader support for safety were significantly and positively related to safety performance. As predicted, leader support for safety was found to moderate the effect of general leader justice on safety performance. Unexpectedly, leader support for safety also moderated the effect of safety-specific leader justice on safety participation. These results indicated that the effect of leader fair treatment on employee safety was contingent on the extent to which employees perceived their leader to support safety. The findings emphasize the importance of employee perceptions of leader fair treatment and leader support for safety as key predictors of employee safety behaviors. Theoretical and practical implications of the findings are discussed.

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NOMENCLATURE

GLJ   General Leader Justice

SSLJ   Safety-Specific Leader Justice

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure   Page

CHAPTER I

INTRODUCTION

Each year thousands of workers are killed at their workplace and millions of others suffer injuries and illnesses suggesting that occupational safety remains a major concern across industries throughout the world (Haslam, Haefeli, & Haslam, 2010; Waehrer, Dong, Miller, Haile, & Men, 2007; World Health Organization, 2008). The Bureau of Labor Statistics (BLS, 2012a; 2012b) reported that in 2011 alone there were over 4 million nonfatal injuries and 4,693 fatalities at workplaces in the United States (U.S.). The economic and human costs associated with these negative safety outcomes are significant. Liberty Mutual Workplace Safety Index (Liberty Mutual Research Institute for Safety, 2012) reported that the most disabling injuries, which required an employee to miss six or more days of work, cost an estimated $51.1 billion dollars in U.S. workers compensation claims in 2010. At the same time, these staggering figures fail to capture the additional costs associated with the pain and suffering experienced by the victims and their families (Waehrer et al., 2007).

In response to the substantial toll that occupational injuries and illnesses take on individuals, organizations, and societies, researchers have invested significant efforts to improve workers' safety performance (Christian, Bradley, Wallace, & Burke, 2009; Griffin & Neal, 2000; Nahrgang, Morgeson, & Hofmann, 2011). Safety performance refers to "actions or behaviors that individuals exhibit in almost all jobs to promote the health and safety of workers, clients, the public, and the environment" (Burke, Sarpy, Tesluk, & Smith-Crowe, 2002, p. 432). Safety performance has been considered a direct predictor of occupational accidents and injuries (Neal & Griffin, 2004), and two recent

meta-analytic studies have supported this assertion. Christian et al. (2009) reported a significant negative correlation (r_c = -.31) between safety performance and accidents/injuries, whereas Nahrgang et al.'s (2011) meta-analysis found a significant positive relationship (r_c = .24) between unsafe behaviors and accidents/injuries. Because of its central role in predicting safety outcomes, safety performance has become a key target for interventions aimed to reduce and prevent adverse safety events.

Although traditional accident prevention interventions have focused on improving workplace safety through industry regulations and technology (Komaki, Barwick, & Scott, 1978; Wiegmann, Zhang, von Thaden, Sharma, & Gibbons, 2009), recent research indicates that organizational factors such as climate and leadership are also potent antecedents of safety performance and outcomes (Christian et al., 2009; Nahrgang et al., 2011; Zohar, 2002a; Zohar, 2002b). Although leadership has been identified as a critical target for occupational safety research (Neal & Griffin, 2004; Zohar, 2011), there is little understanding of the dynamics within the leadership-safety relationship. More specifically, there is a need to elucidate the factors and behaviors that facilitate leader influence on workers' safety performance. Thus, the current study extends the safety performance literature by focusing on two such factors, leader justice (Gatien, 2010) and leader support for safety (Hofmann & Morgeson, 1999), and their main and interactive effects on safety performance.

Leader justice refers to employee perceptions of leaders' fair implementation of organizational policies and procedures, accurate provision of performance relevant information, and sensitive or respectful treatment of employees when enforcing organizational policy (Colquitt, 2001). In other words, leaders engender perceptions of

justice in their employees when they enforce organizational policy justly and consistently, treat employees kindly and respectfully, and provide them with sufficient information for achieving performance goals. Results from several meta-analytic studies have demonstrated significant, positive effects of leader justice on both task and contextual job performance (Cohen-Charash & Spector, 2001; Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Fassina, Jones, & Uggerslev, 2008; Greenberg, 1993). However, despite the extensive study of the effects of leader justice on employee job performance in the extant literature, only two studies, thus far, have investigated the relationship between leader justice and employee safety (e.g., Gatien, 2010; Thompson, Hilton, & Witt, 1998), which is considered a critical aspect of job performance in many occupations and industries (Griffin & Neal, 2000). Although the initial evidence from these studies suggests that leader justice may be positively related to safety performance (Gatien, 2010), this relationship remains relatively unexplored and in need of further theoretical and empirical analysis. Furthermore, no study to date has examined the effects of safety-specific leader justice on employee safety performance. This is an important oversight considering that fairness is a key issue in occupational safety (Gatien, 2010), and employees' safety behaviors are likely to be affected by how fairly leaders implement safety policies and procedures in addressing safety issues at work (Thompson et al., 1998).

Leader support for safety represents employee perceptions of whether their leader (i.e., immediate supervisor) values safety, gives priority to safety over competing interests, and corroborates these attitudes with proactive and reactive safety-related actions (Neal & Griffin, 2006; Simard & Marchand, 1995). Empirical investigations

have demonstrated that leaders who support safety have positive effects on employees'

safety behaviors and outcomes (Christian et al., 2009; Hayes, Perandan, Smecko, &

Trask, 1998; Janssens, Brett, & Smith, 1995; Thompson et al., 1998). It has also been

suggested that effective leaders, who also prioritize safety, may have a stronger effect on

safety outcomes than effective leaders with low safety priority (Zohar, 2002a; Zohar,

2002b). Consequently, when safety goals clash with other performance goals such as

speed or productivity, the positive effects of general (i.e., non-safety-specific) leader

justice on employee safety performance may be further strengthened when leaders are

explicitly supportive of safety. However, this enhancing, moderation effect of leader

support for safety may not be as pronounced with regards to safety-specific leader justice.

Although leader justice and leader support for safety have garnered research attention in

their respective niches of the organizational and occupational safety literatures, their

interactive effects on safety performance have yet to be explored. Illuminating these

effects may spawn additional research on leader justice in the safety strata as well as

provide researchers and practitioners alike with additional avenues for improving worker

safety through leadership interventions.

To address the above gaps and extend the current occupational safety literature, I

conducted two studies using archival data from two representative samples of

construction workers. These samples were from a larger study investigating the role of

leadership in occupational safety in the construction industry. This study was supported

by The Center for Construction Research and Training (CPWR) together with the

National Institute of Occupational Safety and Health (NIOSH). In Study 1, I examined

the effect of general (or facet-free) leader justice on employee safety performance and the

moderating role of leader support for safety. In Study 2, I investigated how changing the operationalization of leader justice from "general" to "safety-specific" affected its relationship with employee safety performance. Specifically, Study 2 examined the effect of safety-specific leader justice on employee safety performance and the moderating role of leader support for safety. To my knowledge, Study 2 represents the first attempt to operationalize leader justice in the safety context and explore its main and interactive effects on employee safety performance.

To explicate the above relationships, I draw upon several theoretical works, including attribution theory (Weiner, 1985), fairness theory (Folger, 1993), leader-member exchange theory (Graen & Uhl-Bien, 1995), reinforcement-based learning theory (Erev, 1998), and social exchange theory (Blau, 1964), which are reviewed in the following sections. More specifically, I start with defining and discussing below the outcome variable of interest - safety performance. This is followed by a review of theory and research supporting the relationships of general leader justice, safety-specific leader justice, and leader support for safety with employee safety performance. Finally, theoretical and empirical rationales are presented in support of the moderating effect of leader support for safety on the relationship between leader justice (general and safety-specific) and employee safety performance.

In sum, this thesis contributes to the existing literature in three ways: (a) it adds to the scant literature investigating the relationship between general leader justice and safety performance; (b) it represents a first attempt to operationalize leader justice in safety-specific terms and examine its effect on employee safety performance; and (c) it explores the interactive effects of general leader justice (Figure 1) and safety-specific leader

justice (Figure 2) with leader support for safety on employee safety performance.

Additionally, the representativeness of the two samples is aptly suited for evaluating

relation dynamics between leaders and employees in the construction industry and will

serve to strengthen the generalizability of the findings.

CHAPTER II

SAFETY PERFORMANCE

Although safety behaviors (or safety performance) have long been acknowledged as key predictors of safety outcomes (Andreissen, 1978; Cooper, Phillips, Robertson, & Duff, 1993; Hofmann & Stetzer, 1996), their formal induction into the occupational safety "hall of fame" did not occur until the early 2000s when seminal work in this area was published by two groups of researchers (Burke et al., 2002; Griffin & Neal, 2000).

In their pivotal article, Griffin and Neal (2000) made three main contributions to the advancement of the study of safety performance. First, the authors recognized that work safety behaviors and general work behaviors can be conceptualized in a similar manner rendering theories of job performance directly applicable to safety performance (Griffin & Neal, 2000). Second, following Borman and Motowidlo's (1993) distinction between task performance and contextual performance, Griffin and Neal defined and distinguished between safety compliance and safety participation as two main dimensions comprising the safety performance construct. *Safety compliance* refers to mandated safety behaviors such as obeying safety regulations, following procedures correctly, and using designated equipment properly, whereas *safety participation* represents voluntary safety behaviors that do not directly enhance personal safety but instead support and improve general safety in the workplace. Examples of safety participation behaviors include volunteering for safety activities, helping coworkers, promoting the safety program within the workplace, demonstrating initiative, and putting effort into improving safety in the workplace (Griffin & Neal, 2000). Third, they proposed a full mediation safety model based upon Borman and Motowidlo's and Campbell, McCloy, Oppler, and

Sager's (1993) theories of job performance in which safety knowledge, safety skills, and safety motivation mediated the relationship between safety climate (with components of management values, safety inspections, personnel training, and safety communication) and safety compliance and participation. The researchers found support for the distinction of the two safety performance dimensions as discrete constructs and for the effects of safety climate on safety performance as mediated by safety knowledge and motivation (Griffin & Neal, 2000; Neal, Griffin, & Hart, 2000).

Similar to Griffin, Neal, and colleagues, Burke et al. (2002) drew upon the general job performance literature (Campbell, 1990; Campbell, McHenry, & Wise, 1990; Hunt, 1996) to explore the factor structure of a conceptual model of general safety performance. They conducted two studies to test their theoretical model: study one proposed and tested a four-factor structure of a general safety performance measure; study two evaluated the construct validity of the general safety performance measure. Using data from 550 hazardous waste workers, their results supported the four theoretical dimensions (i.e., using personal protective equipment, engaging in work practice to reduce risk, communicating health and safety information, and exercising employee rights and responsibilities); however, high correlations between the four factors led Burke et al. (2002) to conjecture that these dimensions may be indicators of a single higher order safety performance factor.

In their paper, Burke et al. (2002) presented three critical assumptions that underlie the conceptual nature and measurement of safety performance: (a) safety behaviors can be measured based on the frequency with which individuals engage in the behaviors; (b) safety performance factors covary in a meaningful way allowing for an

interpretable, multidimensional factor structure; and (c) safety performance factors exhibit unique relationships with determinants (e.g., knowledge and skill) and other variables. These assumptions aided Burke et al. (2002) in creating a general definition of safety performance construct (presented above; Burke, et al., 2002), and, in conjunction with Neal, Griffin, and colleagues' work, enabled subsequent research to systematically evaluate the antecedents, determinants, and outcomes of safety performance (e.g., Neal & Griffin, 2002; Neal & Griffin, 2006).

For employees, especially those in industries in which safety behaviors are normative for completing job tasks (e.g. firefighters in the public sector, chemical processors, miners, construction workers, etc.), adhering to safety rules and procedures and actively participating in safety behaviors are imperative to fulfilling general job duties because safety performance is often nested within job performance (Burke et al., 2002; Griffin & Neal, 2000). Conceptually, partaking in safety behaviors should minimize workplace injury because employees will be following safe work processes prescribed by safety policies and procedures, be wearing and using protective equipment properly, and be conscientious and proactive about safety in their workspace.

The actions outlined above are all indicative of high safety performance, the importance of which hinges on its well-documented link to accidents and injuries experienced by workers on the job. More specifically, several meta-analytic studies have consistently demonstrated that high safety performance was related to fewer accidents and injuries (Clarke, 2010; Christian et al., 2009; Nahrgang et al., 2011). Clarke found safety behaviors to be significantly related to accidents ($r_c = .17$), and safety behaviors partially mediated the relationship between perceived safety climate and occupational

accidents. Christian et al., in their meta-analysis evaluating the roles of person- and situation-related factors in workplace safety, found that safety performance, operationalized as a combination of safety compliance and participation, significantly and negatively predicted accidents and injuries (r_c = -.31). Finally, Nahrgang et al. revealed a significant positive relationship between unsafe behaviors and accidents and injuries (r_c = .24). Furthermore, evidence from a meta-analysis conducted by Krause, Seymore, and Sloat (1999) aimed at evaluating the longitudinal effects of behaviorally-based safety performance interventions demonstrated that interventions, which successfully improved safety performance, also reduced initial injury rates and continued to do so over a five year observational period. Taken together, these meta-analytic results demonstrate that the safety performance construct is worthy of extensive study, especially when accident and injury prevention is of major concern.

CHAPTER III

LEADER JUSTICE

The following three sections describe the construct of leader justice and review the literature in support of the relationship between leader justice and safety performance. First, a brief review of justice source categories is presented highlighting the organizational agent (e.g., the immediate leader) as the source of interest in this investigation, followed by an introduction of organizational justice definitions and dimensions. Then, I build support for my hypotheses by presenting conceptual and empirical rationale for the relationship of each leader justice dimension (both general and safety-specific) with employee safety performance.

SOURCE CATEGORIES OF JUSTICE

Attribution theory suggests that when an individual is on the receiving end of a decision or outcome they have an intrinsic desire to identify the causes responsible for this event (Weiner, 1985). When evaluating whether they have been treated fairly after a decision has been made, employees come to a conclusion regarding who is accountable for the decision. Within the organizational setting, employees' attributions concerning their perceptions of justice can be broken down into two source categories, namely organizational (e.g., system) and managerial (e.g., agent; Greenberg, 1993; Rupp & Cropanzano, 2002). This distinction, referred to as *multifoci organizational justice* (Rupp & Cropanzano, 2002), defines level of analysis of the party perceived to be responsible for the justice-related decision. For instance, evaluations of organizational policies and decisions are attributed to the organization itself, rather than the leader by which these policies and decisions are enacted. On the other hand, common managerial decisions

implemented by an employee's organizational leader prompt perceptions of justice with the leader as the source. Leader justice is reflected by the extent to which employees believe they have been treated fairly by their leader (i.e., direct supervisor).

Multiple meta-analyses have investigated the relationships between leader justice and important employee outcomes (Cohen-Charash & Spector, 2001; Colquitt et al., 2001; Fassina et al., 2008; LePine, Erez, & Johnson, 2002; Robbins, Ford, & Tetrick, 2011). These studies have revealed positive effects of leader justice on employee organizational citizenship behaviors (Cohen-Charash & Spector, 2001; Colquitt et al., 2001; Fassina et al., 2008; LePine et al., 2002), organizational commitment (Colquitt et al., 2001), job satisfaction (Colquitt et al., 2001), job performance (Cohen-Charash & Spector, 2001; Colquitt et al., 2001), and indicators of physical and mental health (Robbins et al., 2011).

DEFINITIONS AND DIMENSIONS OF LEADER JUSTICE

Perceptions of justice are developed through the follower's evaluation of various decision-making processes, how these decisions are implemented, and whether or not the process and implementation are perceived as fair (Cropanzano, 1993; Greenberg, 1993). Problems tend to arise when followers determine that they have been treated unfairly by their leader; conversely, a sense of leader justice is perpetuated by a leader's fair enactment of organizational policies and procedures, provision of accurate and relevant information, and respectful interpersonal treatment. Employee perceptions of leader justice have been linked to a variety of attitudinal and behavioral outcomes ranging from organizational commitment, job satisfaction, organizational citizenship behaviors (OCB), and general performance, to off-task behaviors, deviant behavior such as employee theft,

and withdrawal behaviors such as absenteeism, turnover, and neglect (Colquitt et al., 2001; Greenberg, 1990; Viswesvaran & Ones, 2002).

Since the conceptual inception of organizational justice, a number of multidimensional models have been proposed and tested. An initial two-factor model of distributive and procedural justice (Sweeney & McFarlin, 1993) was expanded to a three-factor model with the addition of interactive justice (Bies & Moag, 1986), which in turn was broken up into two components, informational and interpersonal justice (Greenberg, 1993). Colquitt (2001) then created a four-factor model by integrating Greenberg's informational and interpersonal justices with distributive and procedural justices; results from confirmatory factor analysis supported this four-dimension factor structure. In the following paragraphs, I introduce Colquitt's four-factor model by providing definitions accompanied by conceptual examples.

Drawing upon Adams' (1965) equity theory, Deutsch (1975) and Leventhal (1976) made similar proposals explaining that employees develop perceptions of *distributive justice* by comparing the efforts they devote to the job and the outcomes they receive from their organization to the perceived input and outcomes of others in similar situations. Following equity theory, perceptions of distributive justice result from an employee perceiving that they have been treated equally in comparison to their peers (Adams, 1965). Distributive justice is the only dimension of organizational justice for which employees use the organization as the source of justice attributions rather than their direct supervisor or leader (Rupp & Cropanzano, 2002).

When on the receiving end of organizational outcomes, employees evaluate how and why the decision was reached and whether they believe these processes to be fair

(Leventhal, 1980; Thibaut and Walker, 1975); such evaluations are referred to as *procedural justice*. The emergence of procedural justice as the second organizational justice dimension is credited to Leventhal (1980) and colleagues (Leventhal, Karuza, and Fry, 1980) when they adapted Thibaut and Walker's (1975) work on procedural justice from the judicial to the organizational context. Thibaut and Walker (1975) discovered that in settings where two parties argue for opposing goals and a verdict by a third party was imminent, such as in a courtroom, both parties were satisfied with the final outcome if they perceived that the process for reaching the outcome was fair. Leventhal and colleagues (1980) developed six generalizable procedural justice criteria: minimizing bias of the decision makers (*bias suppression*); applying the process reliably and equally (*consistency*); ensuring that decisions are made based on accurate information (*accuracy*); providing an option for appealing improper outcomes (*correctability*); ensuring that all parties for which the decision is relevant are able to be heard from (*representation*); and that the process promotes and upholds personal integrities and morals (*ethicality*).

In the mid 1980s a third dimension of organizational justice entered the fray. Coined *interactional justice*, this dimension pertains specifically to the quality of interpersonal treatment one receives when policies and procedures are enacted (Bies & Moag, 1986). Less than a decade later, Greenberg (1990; 1993) identified two distinct interpersonal treatment dimensions that fell under the interactional justice umbrella, *interpersonal justice*, which assesses the extent to which the recipient of policy- and procedure-related decisions is treated with courtesy, dignity, and respect, and

informational justice, which reflects the quality of information one receives during the execution of policies and procedures.

In 2001, Colquitt set out to confirm the factor structure of a new organizational justice scale he created using items rendered from seminal research studies in this area. All four justice dimensions were represented in the analysis. The items were examined in two different samples, one composed of university students and the other included factory workers employed by an automotive parts manufacturing organization. In both studies, confirmatory factor analyses supported a four factor structure of the measure. Subsequent structural equation modeling analyses revealed that, although there were high correlations among the justice factors, each dimension had significant predictive validity, above and beyond the others, when predicting criteria, such as leader evaluation, rule compliance, helping behavior, and group commitment (Colquitt, 2001).

Meta-analytic research findings echo support for the division of distributive, procedural, informational, and interpersonal justice. Most notably, Colquitt et al.'s (2001) meta-analysis of 183 studies highlighted the strength of relationships between all four justice dimensions and relevant organizational criteria and outcomes. Their results indicated that despite high intercorrelations among the four dimensions, they did not appear to be overlapping measurements of the same construct. Furthermore, each justice dimension contributed uniquely to overall fairness perceptions, as well as showed differential relationships with attitudinal and behavioral outcomes such as job satisfaction, organizational commitment, trust, organizational citizenship behaviors, withdrawal, negative reactions, and job performance (Colquitt et al., 2001).

At this point it is important to note that distributive justice was omitted from the current studies. Because this paper aims to explain how employee perceptions of justice dimensions that derive from the leader relate to employee safety performance, and the source employee perceptions of distributive justice is the organization rather than the leader (Rupp & Cropanzano, 2002), including this dimension in analyses would have been inappropriate. Thus, distributed justice was not analyzed as part of these studies.

GENERAL VERSUS SAFETY-SPECIFIC LEADER JUSTICE

The current studies aim to illuminate whether safety performance is affected differentially when operationalizing leader justice in general (GLJ) versus safety-specific form. Employee perceptions of *safety-specific leader justice* (SSLJ) are based on evaluations of whether their leader fairly enacted procedures, provided them with sufficient safety information, and treated them with dignity and respect when safety-related decisions were directed unto them. SSLJ is likely to be an important predictor of safety performance. Fair processes in regard to safety-related decision making, provision of accurate safety-related information, and demonstrating care for employee well-being are leader attributes that are likely to motivate employee to partake in safety behaviors and instruct employees how to do so productively.

In light of the conceptual distinction among justice dimensions and in conjunction with extant empirical support (Colquitt et al., 2001), this thesis examines the effects of procedural, interpersonal, and informational aspects of GLJ and SSLJ on employee safety performance. The next section outlines the theoretical and empirical rationales for these effects.

CHAPTER IV

LEADER JUSTICE AND SAFETY PERFORMANCE

The relationship between leader justice and employee safety performance can be explained via an exchange theory perspective (Blau, 1964). Specifically, exchange theory (Blau, 1964) presents two types of exchange relationships: *economic exchange relationships* characterized by short, formally outlined agreements of specified exchanges in which time frame and terms of the agreement are enforceable by third parties; and *social exchange relationships*, reflected by an informal agreement between two parties in which both are obligated to reciprocate mutually beneficial behaviors although the exact terms of the exchanges are not specified (Moorman & Byrne, 2005). The former relationship type is personified by the exchange of concrete resources and takes place over discrete episodes. Conversely, social exchange relationships emphasize the development of long-term relationships, and, by nature of the interpersonal aspect of these exchanges, they are likely to have a greater impact on the socio-emotional dynamics between the two parties (Rupp & Cropanzano, 2002). Leader justice is an ideal mechanism for leveraging employee performance, such as safety behaviors, through social exchanges (Roch & Shancok, 2006). High leader justice is likely to inform employees how to perform tasks safely and motivate them to complete tasks safely in order to fulfill their exchange obligations.

The manner in which leader justice is likely to influence employee safety performance closely reflects Settoon, Bennett, and Liden's (1996) second level of social exchange relationships in organizations - the exchange among employees and their immediate supervisor. In this relational exchange, leaders and their employees form,

update, and maintain or discontinue social exchange relationships based on their evaluation of socio-emotional and behavioral exchanges among parties. During and after interactions, parties evaluate the cost-benefit of their relationship, compare this evaluation to alternative outcomes, and conclude whether or not they are satisfied with the relationship. The key to maintaining social exchange relationships is reciprocity; both individuals must provide mutually beneficial inputs. In work situations where safety is relevant (such as high-risk industries), inputs that parties apply toward one another are likely to be related to safety. For example, within the dyadic relation among leaders and employees, high leader justice directed toward an employee exemplifies an input from the former. In turn, the employee feels a sense of indebtedness to the leader – which Greenberg (1990) described as being highly aversive – that may be mitigated through reciprocation, such as adhering to safety procedures. In this vein, it behooves employees to engage in in-role and extra-role actions toward the source of the benefits received. In other words, employees are motivated to recompense the leader's fair treatment in a manner that will be noticed in order to propagate the social exchange relationship (Blau, 1964; McNeely & Meglino, 1994), and in high-risk industries such as construction, safety behavior is a prime example of employee social exchange currency.

Although principles of social exchange theory are applicable to the conceptual model presented in this paper, leader-member exchange (LMX) theory offers a more contextualized explanation for reciprocal behaviors at work between employees and their leaders. A derivation of social exchange theory (Blau, 1964), LMX frames the social exchange relationship around the leader and their reports, and predicts that employees

will respond to positive leader behavior by increasing their performance in domains relevant to their leader (Graen & Uhl-Bien, 1995).

One leader behavior identified as an antecedent of LMX is leader justice, as employee evaluations of the quality of their relationship with their leader is based on the treatment they receive during interactions with their superior (Masterson, Lewis, Goldman, & Taylor, 2000). Accordingly, leader justice is implicated as a powerful predictor of the quality of the relationship between a leader and their subordinate. This contention has been supported empirically (Cropanzano, Prehar, & Chen, 2002; Masterson et al., 2000; Walumbwa, Cropanzano, & Hartnell, 2009).

Research on LMX has established strong links between LMX and employee safety outcomes, showing high-quality LMX to be positively related to subordinate task and contextual performances in the safety context (Hofmann & Morgeson, 1999; Hofmann, et al., 2003; Zohar, 2002a). More specifically, LMX has been found to sponsor safety compliance, safety communication, and safety commitment by creating leader-employee relationships where employees feel comfortable and confident raising safety issues (Hofmann & Morgeson, 1999). LMX has also been shown to be positively related to employees' expanded safety citizenship role definitions and safety citizenship behaviors (Hofmann et al., 2003). Other empirical evidence supports the positive effects of transformational leadership, a leadership style indicative of high quality LMX, on safety performance (Christian et al., 2009; Nahrgang et al., 2011).

Although analysis of the relation among leader justice and safety performance is still nascent, meta-analyses demonstrating the positive link between justice dimensions and job performance and organizational citizenship behaviors (OCB; Cohen-Charash &

Spector, 2001; Colquitt et al., 2001; Fassina et al., 2008; Viswesvaran & Ones, 2002) provide strong support for hypothesizing similar relationships among leader justice and safety compliance (i.e., safety task performance) and safety participation (i.e., safety organizational citizenship behaviors).

Minimal attention has been paid to leader justice in the safety context. In fact, only one study to date has directly investigated the effects of leader justice on safety performance (Gatien, 2010), and the results are promising as denoted by positive, differential relationships among procedural, informational, and interpersonal leader justice dimensions and safety performance. As a result, relevant material from this work will be included in each of the subsequent sections followed by applicable research on relationships between justice dimensions and organizational outcomes from beyond the safety context.

GENERAL LEADER PROCEDURAL JUSTICE AND SAFETY PERFORMANCE

General leader procedural justice refers to employees perceptions of whether their leader has enacted fair processes when enforcing organizational policies and procedures (Leventhal, 1980). Using social exchange theory helps to explain how and why high general leader procedural justice is likely to motivate employees to increase their safety performance. Social exchange theory (Blau, 1964) dictates that employees will feel the need to reciprocate fair implementation of organizational policies in order to maintain their social exchange relationship with their leader (McNeely & Meglino, 1994). In settings where safety is viewed as a tangible performance outcome, employees experiencing high leader procedural justice may leverage their safety behaviors as a form of reciprocation. Because safety performance is associated with reduced accidents and

injuries (Christian et al., 2009; Clarke, 2010), and the latter has been demonstrated to negatively impact the organization's bottom line (i.e., workers compensation payments, lost productivity, etc.), increases in safety performance are likely to reflect positively on the leader via improvement of workgroup outcomes (Hofmann & Morgeson, 1999). The process outlined here exemplifies how employee safety behaviors perpetuate the social exchange relationship (Blau, 1964).

A fundamental aspect of the social exchange relationship is that behavior is motivated by obligation. Blader and Tyler (2005) note that the party on the receiving end of positive action in social exchange relationships will experience feelings of indebtedness that can only be assuaged through positive behavioral reciprocation. In the safety scenario outline above, the employee's indebtedness to the leader stems from the leader's fair implementation and enforcement of policies and procedures. In workplaces where safety is relevant, complying with safety policies and procedures and proactively monitoring safety of the workspace are two examples of methods that an employee may engage in to alleviate their feelings of indebtedness (Hofmann & Morgeson, 1999). In other words, the employee reciprocates the leader's high general procedural justice with increased safety compliance and safety participation. The returned benefits to the leader are realized indirectly through positive objective outcomes such as reductions in accidents and injuries, which are direct results of improved employee safety performance (Christian et al., 2009).

In the only empirical inspection of the relationship among leader justice and safety performance to date, Gatien (2010) conducted a series of three studies investigating the effects of perceptions of justice on safety climate, safety behaviors, and

incidents using social exchange theory to support her arguments. In the first study, she tested a mediation model in which safety climate mediated the relationship between justice perceptions and safety behaviors; the latter was operationalized using Griffin & Neal's (2000) safety participation and safety compliance. Significant positive correlations of procedural justice with safety compliance ($r = .41$ and $.46$, respectively) and safety participation ($r = .29$ and $.45$, respectively) were observed within two of the studies. Additionally, Gatien's structural model analysis indicated that a trimmed mediation model with procedural justice exhibiting direct effects on both safety compliance and participation fit the data best.

A plethora of studies, summarized in a series of meta-analyses, have linked general leader procedural justice with task and contextual aspects of job performance. Specifically, Colquitt et al.'s (2001) meta-analysis revealed moderate, positive correlations between procedural justice and job performance ($r_c = .36$), OCBs targeting the organization ($r_c = .27$), and OCBs targeting the individual employee ($r_c = .22$). Further, a meta-analysis by Viswesvaran and Ones (2002) showed significant positive relationships between procedural justice and OCBs ($r_c = .28$) and productivity ($r_c = .19$). In another meta-analytic review, Dalal's (2005) results indicated that procedural justice was significantly related to OCBs ($r_c = .27$), as well as counterproductive work behaviors ($r_c = -.33$). Given that safety compliance and safety participation represent safety task performance and safety contextual performance, respectively (Griffin & Neal, 2000), there is no reason to suspect that the meta-analytic relationships from the general organizational context will not generalize to the safety arena.

Thus, I expect that employees who perceive high general leader procedural justice will be intrinsically motivated to repay their leader for such fair treatment and may do so by increasing their safety compliance and safety participation behaviors:

Hypothesis 1a: General leader procedural justice will be positively related to safety compliance and safety participation.

SAFETY-SPECIFIC LEADER PROCEDURAL JUSTICE AND SAFETY PERFORMANCE

Safety-specific leader procedural justice has the same theoretical basis as general leader procedural justice except the construct applies exclusively to the safety context. Explicitly, safety-specific leader procedural justice refers to employees perceptions of whether their leader is enacting fair processes when enforcing organizational safety policies and procedures (Leventhal, 1980). It is likely that safety-specific leader procedural justice will be of greater relevance to safety performance than its general leader procedural justice counterpart because it explicitly signals to employees that safety is a work domain in which increases in performance will satisfy their social exchange obligations. Additionally, employees experiencing high safety-specific leader procedural justice may possess a greater understanding of the safety policies and procedures as well as rationale behind their implementation, and thus be more likely to adopt them into their work practice.

Two streams of research lend credence to the safety-specific transformation of leader procedural justice. First, prediction validity is maximized when predictors are

matched on nature and specificity with the criterion they purport to be related to (Hogan & Roberts, 1996); thus, operationalizing safety-specific leader procedural justice when predicting safety performance mitigates potential cross-context measurement issues. Second, research by Zohar (2002b) and Hofmann et al. (2003) echoed this sentiment and realized the utility of matching constructs' specificity levels by demonstrating that safety-specific leader variables exert greater influence on safety performance than those in general form because there is an inherent prioritization of safety in the former that is not present in the latter. Thus, the leader's exhibition of high safety-specific leader justice signals to employees that safety is a valued commodity and that their behavioral "repayment" to the leader should also be within the safety context. For example, when a construction worker perceives their leader was fair in enforcing a general workplace policy or procedure, they are obligated to respond with a positive action to perpetuate the social exchange relationship. Here, the onus is on the worker to decide where increased effort will be viewed most favorably by their leader. However, when a construction worker perceives that their leader was fair in enforcing a safety-related policy or procedure, the safety context of the interaction has already been framed. Consequently, the worker is presented with the specific realm for which their reciprocation should reside, (i.e., safety). For these reasons it is believed that:

Hypothesis 1b: Safety-specific leader procedural justice will be positively related to safety compliance and safety participation.

Hypothesis 1c: Safety-specific leader procedural justice will exhibit stronger relationships with safety compliance and safety participation than general leader procedural justice.

GENERAL LEADER INFORMATIONAL JUSTICE AND SAFETY PERFORMANCE

General leader informational justice perceptions are fostered when employees feel that their leader is presenting to them adequate explanations or rationale for work-related decisions or actions (Colquitt, 2001). When a leader provides sufficient and appropriate information in disseminating directions, policies, procedures, or rules, workers are likely to perceive high informational justice. Similar to leader procedural justice, high leader informational justice is likely to be viewed by the employee as an act worthy of reciprocation and employees may choose to "repay" their leader by increasing their safety performance. Furthermore, chances are even greater that an employee's behavioral response to fair leader treatment is safety-related in high-risk sectors, such as construction, where workplace safety is of major concern.

Social exchange relationships require that both parties exchange capital relevant to their work experience (Blau, 1964). In this case, the leader's fair allocation of information when decisions are being enforced represents their currency, whereas the employee's social exchange capital derives from their ability to "return the favor" by being compliant and proactive on the job. This line of reasoning is supported by research demonstrating that properly informed employees are likely to feel cared for by their leader and experience obligations to return their leaders concern (Lavelle, Rupp, &

Brockner, 2007). In work settings where safety is salient, it is more than conceivable that reciprocation of leader informational justice is realized by an increase in employee safety performance.

The agent-system model developed by Bies and Moag (1986) provides further support for leader informational justices' provocation of employee behavioral reciprocation. This model was developed as a method for predicting how individuals react when they are the recipient of an organization-related decision and to whom their behavioral response is directed (the organization or the leader; Bies & Moag, 1986). Subsequent research has shown that leader informational justice is a more powerful predictor of employee behavioral response directed toward their leader than those directed toward the organization (Colquitt et al., 2001). By providing rationale and explanations for their implementation of rules and procedures, leaders promote employee trust and commitment unto themselves. When employee trust in and commitment to the leader is present and safety is relevant to the work environment, adherence to safety rules and increased participation in maintaining workplace safety are two viable actions employees may engage in to balance out the social exchange scale.

Consistent with the above arguments, Gatien (2010) found informational justice to be positively related with safety participation ($r = .15$ and $r = .22$) and safety compliance ($r = .31$ and $r = .32$) across two independent samples. Gatien concluded that employees are likely to value leaders who dole out appropriate and timely information about policies and procedures, and that these leader behaviors spur employee proclivity to reciprocate by increasing their safety compliance and/or safety participation. The notion that leader informational justice may result in employee reciprocation is bolstered

by research linking leader informational justice to LMX. Such research suggests that the leader information justice is a catalyst for developing social exchange relationships and great expression of leader informational justice is likely to induce obligatory behavioral responses by employees in the form of task (i.e., safety compliance) and contextual behaviors (i.e., safety participation; Roch & Shanock, 2006).

Although not within the safety context, organizational research has indicated that leader informational justice is positively related to employee task and contextual performance. These relationships are highlighted in this section because they may serve as proxies for leader informational justice's effects on safety compliance and safety participation, respectively. For instance, Colquitt et al. (2001) found informational justice to be positively related to organizational citizenship behaviors directed at the individual (OCB-I; $r_c = 0.26$) and job performance ($r_c = .13$), albeit of small magnitude. These results suggest that employees' reactions to informational justice manifest as in-role behaviors directed toward supporting their leaders. Fassina et al. (2008) obtained similar results in their meta-analytic investigation of the role of conscientiousness as operationalized within OCB-I versus OCB-O (i.e., organizational citizenship behaviors directed at the organization). The authors found positive relationships between leader interactional justice (a combination of leader informational and leader interpersonal justices) and OCB-I ($r_c = .23$ and $r_c = .28$) regardless of whether conscientiousness was thought to be a part of OCB-I or a part of OCB-O. As a whole, the significant meta-analytic relationships indicate that leaders' positive informational justice behaviors are likely to induce employee in-role and extra-role performance improvements. Although

these findings are from studies outside of the safety domain, there is no reason to suspect that these relationships wouldn't generalize to the safety context.

Following the lines of reasoning highlighted above, it is expected that employees who perceive their leader to be high in general leader informational justice will respond to such treatment with high safety compliance and safety participation.

Hypothesis 2a: General leader informational justice will be positively related to safety compliance and safety participation.

SAFETY-SPECIFIC LEADER INFORMATIONAL JUSTICE AND SAFETY PERFORMANCE

Whereas general leader informational justice refers to employee perceptions of whether their leader has provided adequate explanations or rationale for work-related decisions or actions (Colquitt, 2001), I define safety-specific leader informational justice as employee perceptions of whether their leader has provided adequate explanations or rationale for safety-related decisions or actions. Thus, safety-specific leader informational justice is distinguished from its general counterpart by its exclusive focus on the safety context. Given the criticality of safety knowledge and safety communication for safety performance and outcomes (Christian et al., 2009; Cigularov, Chen, & Rosecrance, 2010; Griffin & Neal, 2000; Kines, et al., 2010; Neal et al., 2000), the argument that safety-specific leader informational justice will have an impact on safety performance is perhaps the most compelling among all justice dimensions.

Safety knowledge is considered a direct determinant of safety performance (Neal et al., 2000). As a result, accurate safety information presented by a leader is likely to contribute to the worker's safety knowledge and aid them in performing in accordance with safety standards. Additionally, presenting sufficient safety information may increase employee confidence in following leader safety-related direction in the future. Furthermore, when adequate safety information is provided the likelihood of avoiding a safety-related event or near miss increases. These postulations are supported by research indicating that safety communication is positively related to employee safety behavior and negatively related to adverse safety outcomes (Zohar, 2002b; Michael, Guo, Wiedenbeck, & Ray, 2006).

High safety-specific informational justice is likely to provoke employee safety compliance for two reasons. First, the provision of safety-related information may indicate to employees that safety is of importance. Second, by thoroughly informing employees of safety-related policies and procedures, leaders enable employees to follow them and, consequently, encourage safety compliance. Moreover, consistent and adequate presentation of safety-relevant information may empower employees to diagnose and proactively resolve potentially hazardous situations at work. These actions would be considered as going "above and beyond" simply following safety protocol and indicative of safety participation.

In high-risk industries such as construction, there is a higher probability that an employee will experience an accident or injury themselves, or know someone who will. This increased risk makes the allocation of safety-related information especially relevant for maintaining worker safety, preventing injuries, and preventing adverse reactions to

accidents or injuries, a more distal but equally relevant outcome. Colquitt, Greenberg, and Zapata-Phelan (2005) theorized that adverse reactions to safety-related events stem from workers attaching a negative valence to accidents and injuries, reviewing the information they possessed surrounding the event, and then deciding whether or not an authority (e.g., their leader) should be held accountable for an injustice (Colquitt, Greenberg, & Zapata-Phelan, 2005). Fairness theory (Folger, 1993) provides a framework for understanding a victim's allocation of blame and to which organizational authority the blame is directed toward after experiencing an adverse event. This theory suggests that when the organizational authority in question is the immediate leader, provision of adequate safety-related information is likely to buffer the negative effects of the adverse event (Folger, 1993). If the leader is perceived to be culpable for an accident or injury, the employee may no longer perceive their leader's safety information valuable, and consequently, their safety performance may suffer. Conversely, if an adverse event occurs and workers judge that all possible safety information had been provided, worker safety performance may increase because they perceive that their leader placed them in the best position to come out of the event unscathed or in the best well-being possible.

Aspects of safety communication and safety climate research overlap with components of safety-specific leader informational justice. For example, communicating safety-related information in an appropriate and timely fashion is one component of safety-specific leader informational justice; employees may interpret quality leader safety communication as fair treatment because employees rely on the leader to distribute safety performance-related information (Zohar, 2002b; Michael et al., 2006). In turn, employees experiencing high safety-specific leader informational justice are likely to

demonstrate high safety performance because they are equipped with the pertinent safety knowledge in time to apply it. Applying social exchange principles to this example, employees who perceive high safety-specific leader informational justice during exchanges with their leader should strive toward achieving the mutually-beneficial goal of high safety performance, because this keeps the employee safe while satisfying the obligation of performing up to standard (Christian et al., 2009).

Empirical evidence substantiates the above arguments. For instance, Hofmann & Morgeson (1999) integrated LMX theory and perceived organizational support (POS) with safety communication and safety commitment in their study of social exchange relations at the individual, leader, and organizational levels (Hofmann & Morgeson, 1999). Their results indicated that employees who reported higher quality LMX and safety communication were more likely to perform their job duties safely and avoid accidents and injuries. Zohar (2002b), in an intervention aimed at improving subunit safety through altering leadership practices, manipulated leader presence and safety communication to increase the frequency and quality of safety-related LMX. Post-intervention data showed that safety-related LMX increased significantly in the experimental, but not control groups. There was also evidence of significant improvements in safety related behaviors (Zohar, 2002a). Taken together, these studies indicate that allocation of accurate, timely, and comprehensive safety-related information is a key for fostering employee safety behaviors.

In sum, given the instrumental role that safety knowledge and safety communication play in determining safety performance, safety-specific leader informational justice should positively influence employee safety performance. High

safety-specific leader informational justice should indicate to employees that safety is valued by their leader, thus providing them with an avenue to reciprocate their leader's fair treatment. Additionally, employees perceiving high safety-specific leader informational justice should respond with increased safety performance because they possess the information necessary to perform safely, understand why safety-related decisions have been implemented, and have been signaled that partaking in safety-related behaviors is of particular importance. Thus, it is hypothesized that:

Hypothesis 2b: Safety-specific leader informational justice will be positively related to safety compliance and safety participation.

Hypothesis 2c: Safety-specific leader informational justice will exhibit stronger relationships with safety compliance and safety participation than general leader procedural justice.

GENERAL LEADER INTERPERSONAL JUSTICE AND SAFETY PERFORMANCE

General leader interpersonal justice perceptions reflect employee evaluation of their interactions with their leader when the leader is either informing or enforcing an organizational-related decision (Greenberg, 1993). Employee perceptions of general leader interpersonal justice are fostered when leaders treat employees with respect, dignity, or concern when enforcing managerial decisions, all of which are characteristics of high interpersonal consideration. Leaders who exhibit general leader interpersonal

justice motivate employees to reciprocate behaviorally by way of their social exchange obligations, as employees regard this treatment as benefits worthy of reciprocation (Blader & Tyler, 2005).

Respectful and caring leader behaviors may lead employees to be more enthusiastic in satisfying mandated safety-related policies and procedures (i.e., safety compliance) as well as increase their propensity to engage in extra-role safety behaviors (i.e., safety participation as a means of reciprocating the concern shown for them by their leader; Hofmann & Morgeson, 1999). In support of this claim, Gatien (2010) found evidence for a significant relationship of interpersonal justice with safety participation (r = .18) and safety compliance (r = .26). Furthermore, leader individual concern for safety may encourage employees to be proactive in maintaining a safe work environment and reporting accidents or injuries. For example, research has shown that employees are more likely to report safety-related incidents when they perceive a just organizational culture around incident reporting (Weiner, Hobgood, & Lewis, 2008).

Principles of transformational leadership (Bass, 1999) and LMX theories (Graen & Uhl-Bien, 1995) align with this vantage point asserting that high leader interpersonal treatment should be associated with optimal employee outcomes as it aids the development, maintenance, and propagation of social exchange relationships and thus motivates employees to reciprocate with functional work behaviors. Specifically, *individual consideration*, defined as the leader's attentiveness, concern, and support for the follower as an individual and their respective developmental needs, of which interpersonal justice is a direct representation, is one of four dimensions of transformational leadership (Bass, 1999). Additionally, because interpersonal interaction

is the foundation of LMX, and high quality LMX is achieved and maintained through quality interactions and behavioral reciprocity (Graen & Uhl-Bien, 1995), employees are more likely to satisfy their work obligations, including those related to safety, when treated considerately by their leader. Meta-analyses have consistently shown positive relations between transformational leadership and high-quality LMX and task-performance and OCB (Gerstner & Day, 1997; Ilies, Narhgang, & Morgeson, 2007; Judge & Piccolo, 2004). Further meta-analytic work has provided empirical evidence for the existence of these relationships in the safety context as well (Christian et al., 2009; Narhgang et al., 2011).

Empirically, interpersonal justice is strongly linked with a number of prosocial organizational behaviors such as OCBs, organizational commitment, and work attitudes (Colquitt et al., 2001). Combining the agent-system model with principles of social exchange, Fassina et al. (2008) meta-analytically investigated the relationships between interactional justice and OCB-I and OCB-O. Squared semi-partial correlation coefficients showed that interactional justice significantly explained more variance in OCB-I (r^2 = 0.023) than procedural justice.

The significant correlations presented by Gatien (2010) between safety-specific interpersonal justice and safety performance, as well as the strong meta-analytic evidence indicating that leaders who demonstrate individual concern for employees motivate employee safety behavior, indicate that interpersonal justice should exhibit a positive relationship with safety performance.

Hypothesis 3a: General leader interpersonal justice will be positively related to safety compliance and safety participation.

SAFETY-SPECIFIC LEADER INTERPERSONAL JUSTICE AND SAFETY PERFORMANCE

Safety-specific leader interpersonal justice is operationalized similarly to general leader interpersonal justice, but applies safety parameters to the formative experiences. Specifically, safety-specific leader interpersonal justice perceptions reflect the employee's evaluation of their interactions with their leader when the leader is either informing or enforcing a safety-related decision. High safety-specific leader justice is engendered when employees perceive their leader as treating them with dignity and respect during the enforcement, implementation, or provision of a safety-related decision. Here, the potential benefits of individual consideration and high-quality LMX still apply. However, the safety-specific context of safety-specific leader interpersonal justice directs employees to the forum valued by their leader (i.e., safety) and explicitly indicates that behavioral reciprocation via safety compliance and safety participation will likely fulfill social exchange obligations.

The efficacy of studying the effects of adding a safety-specific context to leader behaviors is documented in the literature (Barling, Loughlin, & Kelloway, 2002; Conchie, Taylor, & Donald, 2012). For example, Barling, Loughlin, and Kelloway (2002) developed and tested a model linking safety-specific transformational leadership to occupational safety. Although not the focal point of their article, the authors noted that leaders demonstrating individualized consideration for employee wellbeing and physical

safety are likely not satisfied with achieving minimal safety performance levels (i.e., safety compliance), but strive to exceed safety mandates (i.e., safety participation).

The expression of safety-specific leader individual consideration is an overt gesture and demonstrates to employees the value their leader places on safety, which likely influences employee motivation to perform well in this domain. According to social exchange framework, fair, personalized, and respectful safety-oriented leader interpersonal treatment should oblige employees to reciprocate in a manner that will be well-received by the leader (McNeely & Meglino, 1994). Because safety-specific leader interpersonal justice highlights safety as the domain of importance, employees are more likely to reciprocate behaviorally within this realm. Because the safety context is emphasized in safety-specific leader interpersonal justice, this variable should to have a greater impact on safety performance than general leader justice due to the similarity between the benefit and reciprocation contexts (i.e., safety). Consequently, it is expected that safety-specific leader interpersonal justice will exhibit a greater influence on safety performance than general leader interpersonal justice.

Hypothesis 3b: Safety-specific leader interpersonal justice will be positively related to safety compliance and safety participation.

Hypothesis 3c: Safety-specific leader interpersonal justice will exhibit a stronger relationship with safety compliance and safety participation than general leader procedural justice.

CHAPTER V

LEADER SUPPORT FOR SAFETY AND SAFETY PERFORMANCE

Neal & Griffin (2004) define *leader support for safety* (LSS) as "the extent to which [leaders] are perceived to place a high priority on safety, respond to safety concerns, and provide support and encouragement for subordinates who comply with safety procedures and participate in safety activities" (p. 27). The effects of LSS on safety performance becomes even more interpretable when the components of its definition are broken down and their influences on safety performance are framed using social exchange principles (Blau, 1964) and reinforcement-based learning theory (Erev, 1998).

First, by prioritizing safety over competing goals, leaders high in LSS signal to their employees the exact performance domain (i.e., safety) for which incremental performance will serve as social exchange capital (McNeely & Meglino, 1994). Stated otherwise, LSS acts as leader social exchange currency that is reimbursed by employees through their compliance with safety policies and procedures and participation in safety activities beyond those required of them (Mearns & Reader, 2008). Specifically, employees can repay their leader's support for safety by fulfilling their role obligations of complying with safety rules and proactively monitoring safety in the workplace (Hofmann & Morgeson, 1999), both of which may reduce the likelihood of employees experiencing accidents or near misses (Christian et al., 2009). Reductions in these outcomes are beneficial to the leader and the employee because they bolster their workgroup's safety record and the leader's status with the organization (Hofmann & Morgeson, 1999). Because the social exchange relationship is reciprocal in nature,

greater employee safety performance should propagate future LSS and perpetuate high quality social exchange relationships as a result of mutual fulfillment of respective role obligations (Graen & Uhl-Bien, 1995). Second, responding to employee safety concerns improves safety performance by fostering employee safety communication and safety commitment (Hofmann & Morgeson, 1999; Zohar, 2002a). Finally, by supporting and encouraging employees to adhere to safety mandates and participate in extra safety activities, leaders directly promote safety compliance and safety participation.

LSS is realized through the demonstration of espoused attitudes and behaviors; however, without explicit behavioral support, the impact of supportive safety attitudes is likely to go begging (Zohar, 2002a). For example, stating that safety is a priority reflects a leader's attitude toward safety whereas actively prioritizing safety over production reveals how these attitudes manifest in situations where safety comes into direct conflict with other organizational goals (e.g., productivity). Reinforcement-based learning theory (Erev, 1998) echoes the need for both attitudinal and behavioral support in influencing other's behavior and provides a framework for how LSS may initially reinforce and subsequently sustain employee safety performance over time. Erev's (1998) reinforcement-based learning theory posits that a behavioral pattern will perpetuate when (a) it is reinforced and (b) other behavioral options either lead to negative consequences or are not probabilistically attractive.

LSS satisfies both of Erev's (1998) requirements for reinforcement. First, leaders high in LSS reinforce employee safety performance by prioritizing safety over competing goals and responding to employee safety concerns (Neal & Griffin, 2004). Second, by providing support and encouragement for safety compliance and safety participation

leaders assign a positive valence to these behaviors. This positive valence is supported by material reinforcement; leaders are in the unique position to reward employees who comply with their directives and punish those who are disobedient (satisfying Erev's second requirement). In sum, leaders who exhibit high LSS perpetuate employee safety behavior by reinforcing safety compliance and safety participation in addition to distributing punishments for incompliance and low participation.

A substantial body of research supports the link between LSS and safety performance and outcomes (Christian et al., 2009). Andriessen (1978), using data from 207 Dutch construction workers, found that safety behaviors were at their highest when subordinates perceived their leader to respect them and their contribution to the workplace and when their leader gave equal priority to safety and production. Further, leader individualized concern and positive attitude toward safety were more strongly associated with safety behavior than enforcement of safety rules and procedures and employee risk perceptions. In a longitudinal study, Parker, Axtell, and Turner (2001) showed that leader support for safety at time one exerted a significant positive lagged effect on safe behaviors of frontline manufacturing employees at time two. Mearns and Reader (2008) analyzed data from 703 workers in the UK offshore oil and gas industry and demonstrated that support for employee health from supervisors was more strongly related to employee safety citizenship behaviors (i.e., safety participation) than support from coworkers or operators. The correlation between supervisor support for employee health and safety participation was moderately strong and positive ($r = .33$). In an investigation of the relationships between leader support for safety and occupational injuries, Huang, Chen, Krauss, and Rogers (2004) found that LSS was negatively related

to injury risk ($r = -.07$) and injury incidence ($r = -.20$), and positively related to satisfaction with the company ($r = .42$). The authors suggested that LSS was instrumental in reducing injuries, presumably through its positive effects on employee safety performance, although this mediation effect was neither hypothesized nor tested in their study.

The most compelling evidence for the positive effect of leader support for safety on safety performance is offered from a recent meta-analytic review of situational- and person-related predictors of safety performance and outcomes by Christian and colleagues (2009), who empirically summarized findings from 90 studies. Nine independent effect sizes from a combined sample of 3821 participants contributed to the LSS analysis and results showed moderately strong mean corrected correlations between LSS and safety performance ($r_c = .38$) and between LSS and accidents and injuries composite ($r_c = -.24$).

In conjunction with the literature summarized above, specific works by Neal and Griffin, Zohar, and their colleagues have consistently demonstrated the positive effects of safety climate (Neal & Griffin, 2006; Neal & Griffin, 2002; Neal et al., 2000) and supportive supervisory safety practices (Zohar, 2002a; Zohar, 2002b; Zohar and Luria, 2003) on employee safety. For example, in two separate reviews of the literature on safety climate, Neal & Griffin (2002, 2004) concluded that the role of LSS in predicting safety performance was so pervasive that it should be explicitly included as a dimension of safety climate. This was substantiated by significant findings in empirical investigations in which the Neal and Griffin safety climate scale was found to be a

significant, positive predictor of safety performance (Griffin & Neal, 2000; Neal et al., 2000, Neal & Griffin, 2006).

In a parallel line of research, Zohar (2002a, 2002b) and Zohar and Luria (2003) found support for the positive effects of supportive supervisory safety practices on worker safety. Specifically, results from these studies showed that employees perceptions of their supervisors' safety priority were negatively associated with injuries ($r = -.28$; Zohar, 2002a). Other study results showed that increasing leader's prioritization and reinforcement of employee safety behavior during daily safety interactions with leaders can substantially increase employee safety equipment use, decrease injuries resulting from unsafe behavior (Zohar, 2002a), and promote employee safety behaviors and perceptions of safety climate (Zohar & Luria, 2003).

Based on the evidence provided in the literature reviewed above, it is believed that employees who perceive their leaders to be supportive of safety will be more likely to engage in safety compliance and safety participation:

Hypothesis 4: Leader support for safety will be positively related to safety compliance and safety participation.

CHAPTER VI

THE MODERATING ROLE OF LEADER SUPPORT FOR SAFETY

Earlier it was predicted that leaders who are perceived to exhibit high general leader justice (GLJ) will have positive effects on employee safety performance. However, there is reason to believe that this effect may be moderated by the leader's level of leader support for safety (LSS). Specifically, GLJ is not confined to a specific organizational context and perceptions of GLJ are generated based on all of the employee's leader-driven, justice-related experiences. In turn, it is possible that a leader rated highly in GLJ may prioritize safety in some, but not all situations. Conversely, LSS is imbedded within the safety context and is a direct representation of the leader's tendency to prioritize safety over competing goals (e.g., production). Thus, the presence of LSS is likely to enhance the positive effects of GLJ on safety by giving safety more weight in justice-related decisions, producing a synergistic interaction effect of these variables on employee safety performance. In other words, leaders high in GLJ and LSS will be regarded as being fair when implementing procedures, providing information, and respectful during interpersonal exchanges, all while ensuring that the effects of such actions emphasize employee safety.

The subsequent paragraphs unfold as follows: first, GLJ and LSS are classified as facet-free and facet-specific leadership variables, respectively, following Zohar's (2002a) guidelines to demonstrate how LSS will hone the positive effects of GLJ on safety; second, the argument that GLJ and LSS should interact synergistically is presented, buttressed by literature exploring the relationships among facet-free and facet-specific leadership; finally, it is argued that the interaction term between SSLJ and LSS

should be nonsignificant in predicting safety performance because operationalizing leader justice in safety-specific form will render the presence of LSS as redundant rather than an enhancement.

Perhaps the most persuasive justification for a synergistic (enhancing) interaction between GLJ and LSS stems from Zohar's (2002a) discernment between facet-free and facet-specific leadership. Zohar describes facet-free leadership as leadership perspectives that do not prioritize specific goals, but instead attempt to obtain a global homeostasis among all objectives. GLJ is representative of this type of leadership because it does not attempt to emphasize safety over productivity or visa-versa. Conversely, when conflicts exist between various leadership goals, such as safety and productivity, a facet-specific leadership view is warranted so that employees may be directed toward the prioritized goal. Zohar postulates that in facet-specific leadership "supervisors more closely monitor certain performance aspects" (Zohar, 2002a, p. 157) and adjust rewards and consequences in accordance with the priority emphasized. LSS epitomizes Zohar's conceptualization of facet-specific leadership because leaders high in LSS prioritize safety over all other goals. In this vein, LSS serves to emphasize the importance of the safety context and thus may focus the effect of GLJ onto safety performance, rather than alternative goals (Hofmann & Morgeson, 2004), in situations where both are expressed.

Investigations by Zohar demonstrate how the presence of facet-specific safety leadership may moderate the relationship among facet-free leadership and employee safety outcomes. For instance, Zohar (2000) initiated research in this area and found differential effects of transactional leadership in predicting safety climate based on the leader's level of safety priority (Zohar, 2000). In his 2002(b) study inspecting the effects

of leadership, safety climate, and assigned safety priority on minor work-related injuries, Zohar found that leader safety priority significantly moderated the effects of transformational, contingent reward, management-by-exception active, and management-by-exception passive leadership styles on employees' safety climate perceptions. Specifically, each of these leadership styles were positively related to safety climate variables under high leader safety priority. Under conditions of low safety priority, results showed differential effects on safety climate depending on leadership style (Zohar, 2002b).

Hofmann et al. (2003) expanded this line of research with their investigation of safety climate as a moderator of the LMX-safety role definitions and LMX-safety behavior relationships. Using social exchange principles, the authors found that employees only reciprocated high-quality LMX with safety citizenship behaviors when safety climate was high (Hofmann et al., 2003). They concluded that safety prioritization was essential in garnering employee safety-related reciprocation.

Not only do results from Hofmann et al. (2003) support the potential interaction among GLJ and LSS, but they also reinforce the use of social exchange theory as an explanatory framework in the present study. Explicitly, Hofmann et al.'s findings demonstrate that when safety is assigned a high priority by the leader, employees are likely to respond by expanding their in-role safety behaviors to include otherwise discretionary safety behaviors. Such a modification of definitions of in-role behaviors is a perfect illustration of employee willingness to reciprocate fair leader treatment with safety performance. This example for modeling the reciprocal nature of social exchange

relationships is even more exemplary because safety citizenship behaviors aren't prescribed by the leader.

Whereas the postulation that the relationship between GLJ and safety performance will be moderated by LSS is sound, posing the same assertion for SSLJ would be unfounded. SSLJ contextualizes leader justice within the boundaries of safety performance on its own. In turn, it is unlikely that LSS will modify the relationship between SSLJ and safety performance because safety prioritization is inherent in SSLJ (Zohar, 2002b). Stated otherwise, unlike with GLJ, where LSS is necessary for the proliferation of a safety-first environment, the added safety focus of LSS is redundant in the presence of SSLJ. In the paragraphs above, GLJ was hypothesized to interact with LSS because the latter provided context (safety) for the effect of the former to exert influence on employee behavior. If leader justice is operationalized in a safety-specific form, then the signaling role that LSS plays in providing direction for the context in which employees can reciprocate is nullified; instead, the context is provided by the safety orientation of SSLJ.

Given the arguments and supportive information presented above, I expect LSS to moderate the effect of GLJ on safety performance, such that the positive effects of GLJ will be even stronger in the presence of high LSS (see Figure 1). Conversely, when leader justice is operationalized in a safety-specific form, I suspect that it will not exhibit a significant interaction with LSS in predicting safety performance (see Figure 2).

Hypothesis 5a: Leader support for safety will moderate the positive relationships of general leader justice with safety compliance and safety participation, so that these relationships will be stronger under high leader support for safety.

Hypothesis 5b: The relationships of safety-specific leader justice with safety compliance and safety participation will remain stable across levels of leader support for safety.

Comprehensive conceptual models for Studies 1 and 2 are presented in Figures 3 and 4, respectively.
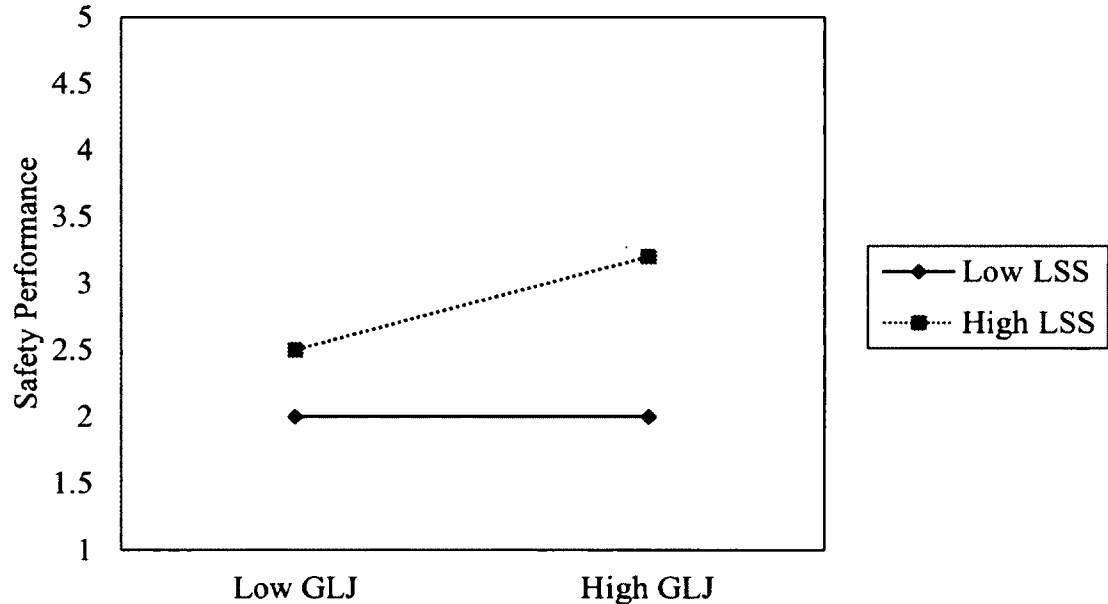
Figure 1. Hypothesized moderation effect of leader support for safety on the relationship between general leader justice and employee safety performance.
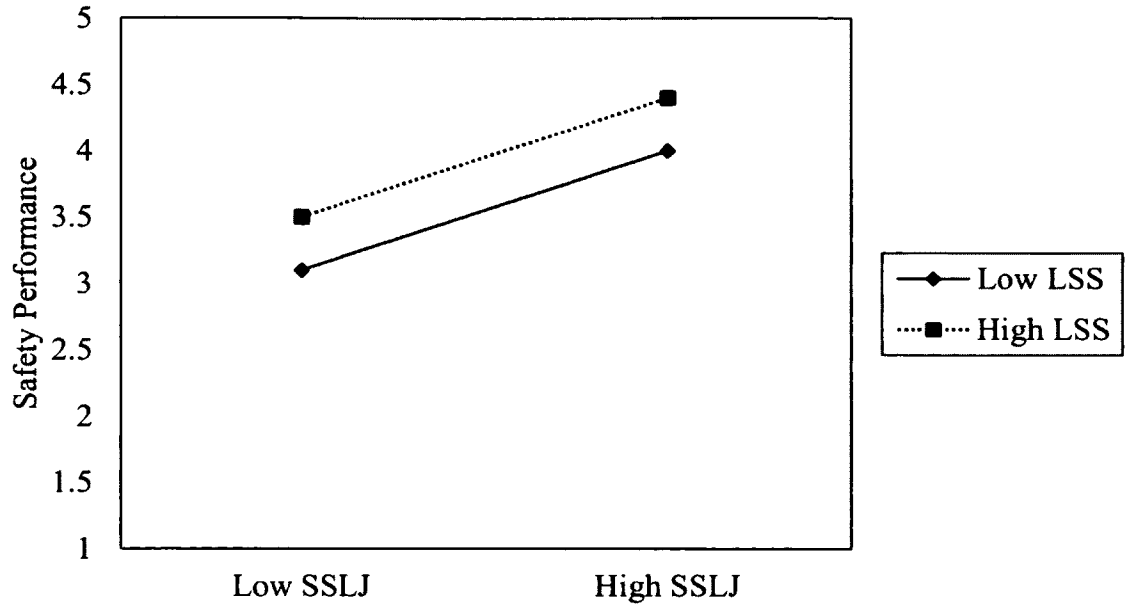
Figure 2. Hypothesized effects of safety-specific leader justice on employee safety performance, independent of level of leader support for safety.
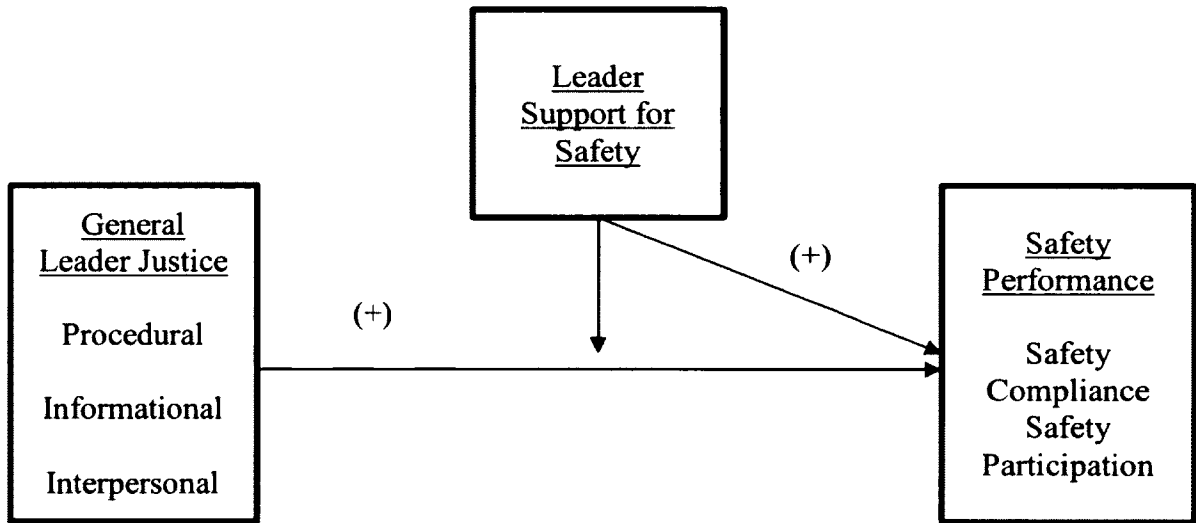
Figure 3. Study 1 Conceptual Model: Leader support for safety moderating the relationship between general leader justice and employee safety performance.
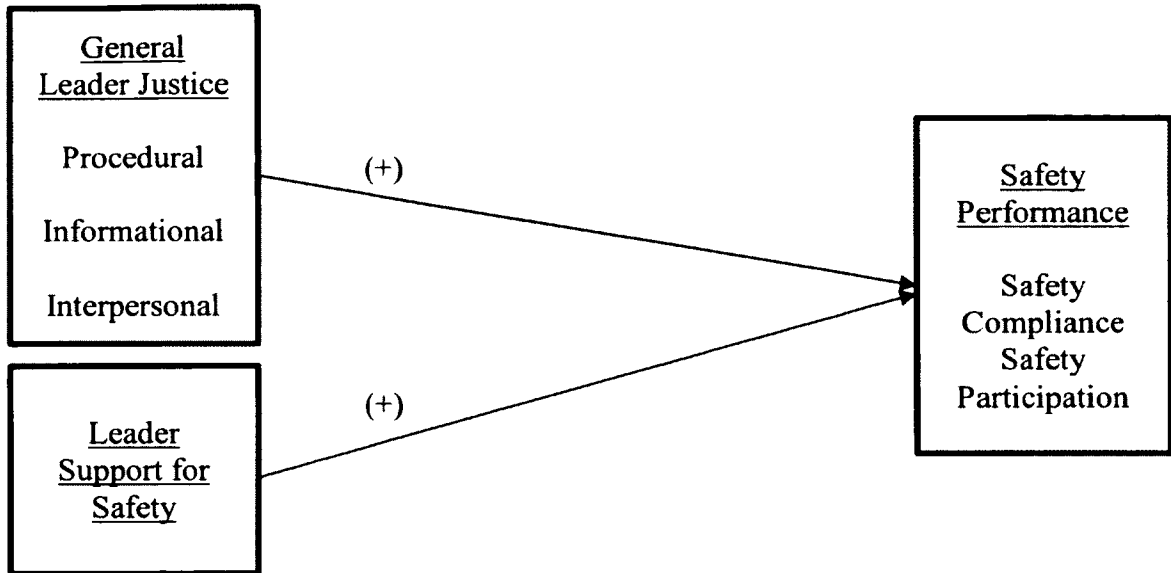
Figure 4. Study 2 Conceptual Model: Leader support for safety and safety-specific

leader justice on safety performance.

CHAPTER VII

METHOD

PARTICIPANTS

Participants in Study 1. For this study, 422 unionized mechanical trades apprentices and journeymen belonging to one of three U.S. Locals of the United Associations of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States, were recruited and distributed surveys. The three Locals were: Local 3 Denver, CO; Local 290 in Portland, Oregon; and Local 597 in Chicago, Illinois. Of the 422 surveys distributed, 249 were returned completed yielding a 59% response rate. Participants, on average, were 35 years old (SD = 11.83), were 97% male, and 82% were Caucasian. The majority of participants, 59%, identified themselves as Apprentices, and participants reported having an average tenure with their current leader of 2.56 years (SD = 2.58).

Participants in Study 2. Unionized mechanical trades apprentices and journeymen belonging to one of the above listed three U.S. Locals of the same association as study one participated in Study 2. Two-hundred and thirty of the 415 surveys distributed were returned completed resulting in a response rate of 56%. Ninety-six percent of participants were male, 83% described themselves as Caucasian, and their mean age was just under 35 years old (SD = 11.90). Participants, on average, reported having just over three years tenure with their current supervisor (M = 3.12, SD = 5.13), and 61% of the sample were Apprentices.

PROCEDURE

Archival data from two samples of construction workers across three regions of the United States were collected as a part of a larger needs-assessment study investigating the role of leadership in occupational safety in the construction industry. This study was supported by The Center for Construction Research and Training (CPWR) in cooperation with the National Institute of Occupational Safety and Health (NIOSH). The two archival datasets used in this thesis come from two surveys (out of a total of six surveys used in the needs-assessment project) of which none of the predictor and moderator variables, which were specific to these two datasets, have been analyzed previously. Only the dependent variable in this proposal (which was common in all six surveys) has been used as a part of a master's thesis based on combined data from all six surveys, which examined a completely different model. The Safety Management Applied Research Team (S.M.A.R.T.) at Old Dominion University has been in sole possession of these data, has retained priority for their analysis, and, consequently, these data have not been analyzed in any manner prior to this thesis.

Data were collected via two methods: mailed surveys and on-site surveys. Following suggestions made by Dillman (2000), survey packets were mailed to the mechanical trades apprentices and journeymen belonging to the above mentioned Locals. In addition to the survey, each packet contained a cover letter and a self-addressed reply envelope. The cover letter, presented in Appendix A, provided an introduction to the research team, outlined the goals of the research project, and conveyed the endorsement of the partner organizations. Additional information expressed that participation was voluntary, answers would remain anonymous, and underscored that no right or wrong

answers to the survey existed. Two subsequent post-cards were sent out at two and four week intervals after the initial survey packet was mailed and each served as a reminder to complete and return the survey.

Data were also collected on-site at all three Local training centers. Surveys were proctored by principal investigators and trained graduate students, depending on the collection site, during the participants' regularly scheduled class hours. Before proctoring the survey, the researchers introduced the research project's goals, the other participating Locals, the partnering organizations, the outline of the survey, and the relevance of the research. The researchers also explained that the participants' answers would remain anonymous and expressed the desire that they answered honestly; that there were no right or wrong answers; and that participants should complete the survey independently. Participants were given a cover letter including a brief description of the survey as well as information for contacting the researchers. The survey was then proctored and, upon completion, any outstanding questions were answered.

POWER ANALYSIS

In order to examine if sample size was adequate to obtain sufficient statistical power, a power analysis was conducted using the program G*Power 3.13 (Faul, Erdfelder, Buchner, & Lang, 2009). Gatien (2010) provided zero-order correlations among dimensions of leader justice and safety compliance and safety participation. The weakest zero-order correlation from her study, that between informational justice and safety participation ($r = .15$), was used in the statistical power analysis to provide a conservative sample size estimate. The a priori bivariate normal model correlation power analysis design revealed that a total sample size of 273 would be necessary to detect a

correlation of $r = .15$ with 80% probability. For this test, the power analysis required the user to input the following parameters: an indication of the number of tails (one); a correlation for the alternative hypothesis (determined to be $r = .15$); alpha error probability (set at .05); desired power (set at .80); and a null hypothesis value for the correlation $(r = .00)$.

It should be reiterated that although thorough a prior power analyses were conducted, data used for this study were archival and thus the number of participants was unable to be manipulated for the purposes of this thesis. Consequently, post hoc bivariate normal model correlational design power analyses were conducted. These analyses called for the same input as the a priori power analysis with one exception: the sample size for each study was required in order to compute the achieved power. With sample sizes of 249 and 230, the achieved power was calculated to be .76 for Study 1 and .73 for Study 2, respectively.

MEASURES IN STUDY 1

Safety performance. Safety performance was operationalized using a shortened version of Neal and Griffin's (2006) scales measuring safety compliance and safety participation (see Appendix B). Respondents were directed to think about their current, or if not currently working, most recent, workplace and leader when answering the items. Three items measured safety compliance ($\alpha = .81$; *At my current workplace I use the correct safety procedures for carrying out my job*) and three items were used to measure safety participation ($\alpha = .79$; *At my current workplace I put in extra effort to improve the safety of the workplace*). These measures can also be found in Appendix B. Participants

were asked to indicate to what extent they agreed with each item on a scale from 1 (*Strongly disagree*) to 5 (*Strongly agree*).

Reliability of these scales has been robust in the literature. For example, excellent reliability was observed for safety compliance ($\alpha = .94$) and safety participation ($\alpha = .89$) measures in a sample of 525 hospital employees (Neal et al., 2000). Neal & Griffin (2006) also found strong test-retest reliability for these scales when administered before and after a two year lag (safety compliance, $\alpha = .93$ Year 2; $\alpha = .92$, Year 4; safety participation, $\alpha = .89$, Year 2; $\alpha = .86$, Year 4).

Neal and Griffin's (2006) safety behavior scales (conceptualized in this paper as safety performance) are slight modifications of previously constructed safety compliance and safety participation scales by the same authors (Griffin & Neal, 2000; Neal et al., 2000), and are well established within the literature (Cullen & Hammer, 2007; Inness, Turner, Barling, & Stride, 2010; Mullen & Kelloway, 2009; Parboteeah & Kapp, 2008).

General leader justice. Following Colquitt's (2001) multidimensional approach to measuring facets of organizational justice, 12 items (see Appendix B) were adapted from his measure for the purposes of the current study to assess procedural, informational, and interactional GLJ. Two items were dropped from Colquitt's original scale resulting in a total of five items assessing procedural justice ($\alpha = .91$; *To what extent has your current, immediate supervisor collected accurate information before making a decision?*). Four out of the original five items in Collquitt's scale were used to measure informational justice ($\alpha = .87$; e.g. *To what extent has your current, immediate supervisor communicated details about work procedures and tasks in a timely manner?*). Three items assessed interpersonal justice, however, one item exhibited less than adequate

intercorrelations and thus was dropped resulting in a two item interpersonal justice scale

($\alpha = .93$; e.g. *To what extent has your current, immediate supervisor treated you with*

dignity and respect?). Additionally, the example item above was modified from

Colquitt's original scale by combining "dignity and respect" into a single item as opposed

to having individual items for each. For each dimension's scale participants were asked

to rate their supervisors on a scale from 1 (*To a small extent*) to 5 (*To a large extent*).

Colquitt (2001) observed excellent reliability for these scales when administered

to a field sample (procedural justice, $\alpha = .93$; informational justice, $\alpha = .90$; and

interpersonal justice, $\alpha = .92$). Colquitt also provided initial validity evidence for the use

of his scales based on confirmatory factor analysis results, which demonstrated the

distinctness of the justice factors (e.g., distributive, procedural, informational, and

interpersonal). In addition, he found predictive validity coefficients (ranging from .12 to

.46), which linked the justice dimensions to outcome variables such as outcome

satisfaction, leader evaluation, group commitment, helping behavior, and rule

compliance. Since then, these scales have been widely used to examine justice in a

variety of contexts (Colquitt et al., 2001; Eberlin & Tatum, 2007; Judge & Colquitt,

2004; Mayer, Nishii, Schneider, & Goldstein, 2007). For example, Walumbwa,

Cropanzano, and Hartnell (2009), using Colquitt's (2001) justice scales, found that

procedural ($r = .36$), interpersonal ($r = .25$), and informational ($r = .24$) justice

perceptions were all significantly correlated with supervisory-rated subordinate task

performance of car sales representatives. Additionally, Colquitt's justice scales have

begun to be included in safety research. Gatien (2010) identified significant correlations

of procedural justice with safety compliance ($r = .41$) and safety participation ($r = .29$),

informational justice with safety compliance ($r = .31$) and safety participation ($r = .15$), and interpersonal justice with safety participation ($r = .18$) and safety compliance ($r = .26$) providing early evidence of criterion-related validity of Colquitt's justice scales for predicting safety performance among Canadian employees from a large, private construction company and employees from a large, public sector transportation organization.

Leader support for safety. Neal and Griffin's (2006) three-item measure of management support for safety was adapted to assess LSS ($\alpha = .92$, see Appendix B). The original scale evaluated employees' perceptions of the extent to which management valued safety and the importance management placed on safety. In order to capture employee perceptions of LSS, the word *management* was replaced with *current, immediate supervisor* to modify the referent from organizational management to the employee's direct leader. An example item, reflecting the referent modification outlined above, is: "*At my current workplace my current, immediate supervisor places a strong emphasis on workplace health and safety.*" Possible responses ranged from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Over two administrations separated by two years, Neal and Griffin (2006) found excellent test-retest reliability for this scale ($\alpha = .95$, Year 2; $\alpha = .94$, Year 4). In addition, scores on their three-item measure exhibited strong, significant correlations with scores on safety outcome scales administered concurrently (i.e., safety motivation, $r = .49$; safety compliance, $r = .50$; safety participation, $r = .56$), and moderate, significant correlations after a two-year lag (i.e., safety motivation, $r = .27$; safety compliance, $r = .27$; safety participation, $r = .34$).

Control variables. Participants were asked to provide their age, as well as information on background variables including the participant's professional role (apprentice or journeyman), Local union, their tenure with their current supervisor, and their supervisors official job position title.

MEASURES IN STUDY 2

Safety performance. Safety performance was operationalized using the same Neal and Griffin (2006) scales measuring safety compliance and safety participation as study 1 (α = .89 and α = .83 for safety compliance and safety participation in Study 2, respectively). The response scale ranged from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Safety-specific leader justice. Colquitt's (2001) justice scales were slightly altered to reflect the added emphasis on safety. Specifically, safety-specific language was infused into the original 12 items from Study 1 so as to develop a safety-oriented frame of reference for the leader justice construct. The example items listed here are the same items as provided in Study 1, but reflect safety-specific modification; these items are used so that the reader can see the extent to which the items were altered. Full measures are provided in Appendix B. Three items measured safety-specific interpersonal justice, but one was dropped due to low correlations with the other items in the scale yielding a two item scale (α = .83, e.g., *To what extent has your current, immediate supervisor treated you with dignity and respect when discussing your safety performance?*); four items evaluated safety-specific informational justice (α = .89, e.g., *To what extent has your current, immediate supervisor communicated details about safety rules and procedures in a timely manner?*); and five items assessed safety-specific

procedural justice ($\alpha = .91$, e.g., *To what extent has your current, immediate supervisor collected accurate information before deciding how to handle a worker's safety violation?*). Participants were asked to rate their current, immediate supervisors on a scale from 1 (*To a small extent*) to 5 (*To a large extent*).

Leader support for safety. LSS was operationalized in the exact form as Study 1 using the Neal and Griffin (2006) scale outlined previously ($\alpha = .92$ in Study 2). Participants responded on a scale that ranged from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*).

Control variables. Participants were asked to respond to the same demographic and background variables as in Study 1, presented above.

CHAPTER VIII

RESULTS

PRELIMINARY ANALYSES

Pearson's r correlation coefficients and hierarchical multiple linear regression were used to test the hypotheses. Pearson's r correlation coefficients are ideal for measuring the linear relationship between two variables because the coefficient describes the direction and strength of the relationship, regardless of the units of measurement of the two variables in question (Cohen, Cohen, West, & Aiken, 2003). Hierarchical multiple linear regression analysis was determined to be the appropriate test for evaluating main and moderation effects because it assesses the effects of multiple independent variables while accounting for their presumed causal (temporal) order (Cohen et al., 2003). Specifically, a series of "blocks" of simultaneous regressions estimate the unique portion of variance in the dependent variable accounted for by the centered predictors, partitioning out the effects of variables also included in the model that are presumed to precede them casually (i.e., included in preceding blocks; Cohen et al., 2003). Thus, the relative contribution of each block of k centered independent variables in the prediction of the dependent variable can be evaluated.

Before hypothesis testing was conducted, the data were examined for incorrect values, outliers, missing data, and assumption violations associated with the use of multiple linear regression. The results of data cleaning and assumption check procedures are outlined below.

Incorrect values. Frequency tables were examined to identify any irregular values or values outside of the scale's range. Specifically, within the frequency tables,

existing values and minimum and maximum values were inspected to ensure that all data corresponded to possible integers within the range of the scale and that no values exceeded these parameters. After inspection, no incorrect values were identified in the data from Studies 1 and 2.

Outlier analysis. Univariate outliers were evaluated following Tabachnick and Fidell's (2007) recommendation that, for medium or small sample sizes, any standardized score more extreme than ± 3.29 should be considered an outlier. Thus, participant scale scores were transformed into Z-scores, ordered, and outliers were flagged for removal. This process was repeated for each variable related to Studies 1 and 2. Eight participants were identified as univariate outliers in Study 1, and six participants had extreme data in Study 2. Due to the low percentage of outliers relative to the overall sample size, outliers were annulled by way of case deletion (Tabachnick & Fidell, 2007).

Multivariate normality was also assessed. Potential outliers were sought out using the Mahalanobis distance statistic, which assesses the discrepancy between a specific case and the centroid of all IVs using the chi-squared (χ^2) distribution (Cohen et al., 2003; Tabachnik & Fidell, 2007). Specifically, a Mahalanobis distance statistic was calculated for each participant and this value was compared to a critical χ^2 cutoff value, obtained using input of $\alpha = .001$ and $df = 2$, and yielded a critical $\chi^2 = 13.82$. Cases were then sorted based on their associated Mahalanobis statistic in order to evaluate if any exceeded the threshold. Based on these criteria, no cases in Study 1 were identified as multivariate outliers; however, two cases in Study 2 exceeded the critical χ^2 and these participants' data were removed from the study.

Missing data. Missing data were analyzed for all variables using SPSS missing values analysis (MVA). Generally, missing data are only of concern when patterns of missing data are systematic rather than random (Tabachnick & Fidell, 2007). To evaluate the patterns of missing data, MVA was conducted to identify variables with greater than five percent missing data. Those that met this criterion were dichotomized, recoded, and subjected to t-tests with groups coded as missing versus nonmissing data. These groups were then assessed to see if respondents with missing data differed significantly on study-related variables from those without missing data (Tabachnick & Fidell, 2007). For Study 1 and Study 2, nonsignificant t-tests indicated that responses on study independent and dependent variables from participants with missing data did not differ significantly from those who answered all items.

Variables with greater than five percent missing data were also scrutinized using Little's (1998) missing completely at random (MCAR) test. Across both studies, nonsignificant MCAR tests provided further support that data were not missing in a systematic manner indicating that missing data was unlikely to bias results and, in turn, providing flexibility regarding decisions for how to deal with missing data (Tabachnick & Fidell, 2007). Thus, for variables with greater than five percent missing data, expectation maximization was chosen to replace the missing values (Little, 1998). For variables with less than five percent missing data, cases were removed using list-wise deletion during analysis.

Assumption Violations. Unless strong theory suggests otherwise, linear multiple regression models assume the relationship between the independent and dependent variables to be linear. Scatterplots, with the raw independent variable on the x-axis and

the unstandardized residuals of the full regression model on the y-axis were examined for each independent variable, with a Loess line fit to each graph. According to Cohen et al. (2003), the assumption is met if the Loess line is approximately horizontal at the zero interval of the y-axis across the entire spectrum of x-values, indicating that the mean of the residuals is zero and that the regression weights are unlikely to be biased. Systematic deviation of the Loess line from zero (i.e., deviation of the line from being horizontal at zero of the y-axis) indicate a violation of linearity of the relationship among the independent and dependent variables. For both, Study 1 and Study 2, superimposed Loess lines did not appear to deviate substantially from zero on the y-axis across the spectrum of x-values indicating that the assumption of linearity had been met.

Homoscedasticity concerns the variance of the residuals and this assumption requires the variance to be constant across the spectrum of the independent variable and not be related to any of the independent variables or the predicted values. Modified Levene's tests were conducted to assess homoscedasticity quantitatively. Thus, for all predictors in each study, the residuals were divided in half and the variances of each half, using the median for the measure of central tendency dividing threshold, were calculated (Cohen et al., 2003) and then compared using a modified Leven's test for equality of variances. For Study 1, eight t-tests were conducted, one for each dichotomized predictor on each dependent variable. Significant t-tests indicated that the variances of the residuals for general leader interpersonal justice and general leader procedural justice were heteroscedastic when predicting safety compliance. No modified Levene's tests were significant for tests with safety participation as the dependent variable. For Study 2, t-tests signaled that modified Levene's tests were significant for each predictor dependent

variable combination except leader support for safety with safety compliance, indicating that the variance of the residuals was related to the independent variables or the predicted values, thus violating the homoscedasticity assumption. The most common option for addressing heteroscedasticity is transformation of the dependent variable. However, Tabachnick & Fidell (2007) note two reasons why this transformation is not always ideal. First, transforming the dependent variable alters its scale and muddies interpretation of analysis (Tabachnick & Fidell, 2007). Second, although violation of homoscedasticity can weaken prediction, it does not invalidate it (Tabachnick & Fidell, 2007). For these two reasons no transformations were made in either study to adjust heteroscedastic residuals.

Another assumption of multiple regression is that the residuals are independent across participants. Clustering, or sampling from preexisting groups may result in a violation of this assumption. Participants in the present studies belonged to one of two preexisting groups, either apprentices or journeymen, based on their area of expertise. As such, group membership was included as a predictor in all analyses to control for any preexisting mean differences across groups, thus nullifying problems associated with nonindependence (Cohen et al., 2003).

Finally, an additional assumption discussed by Cohen et al. (2003) states that the residuals should be normally distributed around the regression line. To test this, Q-Q plots were examined. Results for Study 1 and Study 2 indicated that the data points in the middle portion of respective graphs fell close to the line, satisfying this assumption for both studies.

Reliability. Internal consistency reliability analyses were conducted for all operationalized scales across the two studies presented in this thesis. Guidelines for item analysis presented by Nunnally and colleagues (Nunnally, 1967; Nunnally, 1978; Nunnally & Bernstein, 1994) were followed to assess internal consistency as measured by coefficient alpha. Item-total statistics such as coefficient alpha (α), inter-item correlations, and "α if item is deleted" statistics were examined for each scale. The common convention of $\alpha = .70$ or higher was followed (Nunnally, 1978). In Study 1, analyses indicated that the coefficient alpha for general leader interpersonal justice scale was inadequate ($\alpha = .60$). Weak inter-item correlations (range of $rs = .13$ to $.15$) and a low item-total correlation ($r = .152$) implicated one item, *"To what extent has your current, immediate supervisor made improper comments to you?"*, as the poorest performer (statistics provided from reliability analysis of general leader interpersonal justice). As a result, this item was removed from the scale. Deleting this item resulted in a substantial improvement to coefficient alpha. Reflecting removal of this item, reliabilities for Study 1 scales were as follows: general leader interpersonal justice ($\alpha = .93$); general leader informational justice ($\alpha = .87$); general leader procedural justice ($\alpha = .91$); leader support for safety ($\alpha = .92$); safety compliance ($\alpha = .81$); and safety participation ($\alpha = .80$).

For Study 2, the same item, albeit operationalized in the safety context (*"To what extent has your current, immediate supervisor made improper comments to you about your safety performance?"*), performed poorly for the safety-specific leader interpersonal justice scale as identified by weak inter-item correlations (range of $rs = -.14$ to $-.06$), item-total correlation ($r = -.11$), and a low coefficient alpha ($\alpha = .37$) (statistics provided

from reliability analysis of safety-specific leader interpersonal justice). Deleting this item

increased coefficient alpha for this scale to an appropriate level (α = .83). All other

scales in Study 2 indicated adequate reliability: safety-specific leader informational

justice (α = .89); safety-specific leader procedural justice (α = .91); safety compliance (α

= .89); and safety participation (α = .83).

Control variables. Zero-order correlations, t-tests, and omni-bus ANOVAs were

performed to identify prospective continuous, dichotomous, and categorical control

variables, respectively, that should be included as covariates in the regression analyses.

Results from these analyses showed that participants' age and role (apprentice or

journeyman) should be included in Study 1 as controls for safety compliance, and age,

role, and tenure with current supervisor should be included for safety participation.

Study 2 covariate identification analyses showed the same pattern, with age and role

included as covariates for safety compliance, and age, role, and tenure with current

supervisor for safety participation. These covariates were included in Step 1 for all

hierarchical regression analyses to partial out their effects on the dependent variables

from the independent variables also included in the analysis (Becker, 2005). Following

this analytic approach for identifying controls helped ensure that statistical power was not

compromised by oversaturating the model with irrelevant variables (Becker, 2005).

Confirmatory Factor Analysis. Given that the hypotheses are predicated on the

multi-dimensionality of general leader justice (GLJ), safety-specific leader justice

(SSLJ), and safety performance, confirmatory factor analyses (CFA) were conducted to

evaluate whether the data conformed to the anticipated factor structures in Studies 1 and

2. CFA tests a priori hypotheses regarding the relationships between observed variables

and factors, or latent variables (Jackson, Gillaspy, & Purc-Stephenson, 2009), and is the preferred method for testing factor structures of measurement models when loading patterns of observed variables onto factors have been theoretically established and supported.

Boomsma (2000) recommends testing alternative models to evaluate if data discriminate among factors of latent variables in agreement with theory. Accordingly, two CFAs were conducted to compare and evaluate the structure and fit of the data in six alternative, nested models in Studies 1 and 2.

As noted in the Literature Review section, Colquitt has established substantial evidence for the theoretical and empirical distinction between the three justice dimensions examined in the current research (i.e., interpersonal, informational, and procedure justice; Colquitt, 2001; Colquitt et al., 2001). Additionally, Griffin & Neal (2000) have found stability for their two-factor model of safety performance – safety compliance and safety participation (Neal & Griffin, 2006). On the basis of this framework, the six models tested for Study 1 and Study 2 are described as follows (different factor names for Study 2 are presented in parentheses). The first model reflected a six-factor measurement model that included the above-specified three dimensions of GLJ (SSLJ), a leader support for safety (LSS) factor, and the two dimensions of safety performance (safety compliance and safety participation). The next two models presumed that general leader (safety-specific) interpersonal, informational, and procedural justices, and safety compliance and safety participation are second-order factors of higher-order GLJ (SSLJ) and safety performance, respectively. Due to strong correlations between dimensions and the purported presence of a higher-order factor,

previous researchers have indicated that conceptualizing safety performance as a single factor model may be meaningful (Burke et al., 2002; Christian et al., 2009). Similarly, Ambrose and Arnaud (2005) highlight that some researchers take a holistic approach to justice, pointing out that perceptions of fairness (Lind, 2001) and justice (Greenberg, 2001) are made at the global, rather than individual dimension level, supporting the single-factor model of leader justice. Thus, the second model, a five-factor model, retained separate interpersonal, informational, and procedural dimensions of GLJ (SSLJ), yet converged safety compliance and safety participation to the single, higher-order safety performance factor. Conversely, model three combined leader interpersonal, informational, and procedural justices into a single GLJ (SSLJ) factor and tested the four-factor model with a global GLJ (SSLJ) factor, a LSS factor, and individual safety compliance and safety participation factors. Finally, a three-factor model was evaluated containing the composite GLJ (SSLJ) factor, the LSS factor, and the composite safety performance factor. All CFA analyses were conducted in Mplus Version 7 (Muthen & Muthen, 1998-2012) using the maximum likelihood (ML) estimation method to estimate the fit between the predicted and sample covariances.

Assessments of model fit across the two sets of hypothesized and alternative models included the model chi-square, comparative fit index (CFI, Bentler, 1990), standardized root mean square residual (SRMR; Bentler, 1995), and root mean square error of approximation (RMSEA; Steiger & Lind, 1980). These indexes were chosen on the basis of results from Hu and Bentler's (1998) Monte Carlo simulation study assessing the performance of fit indexes to detect model misspecification under a variety of estimation methods, sample sizes, and assumptions regarding the independence of latent

variables. Their results indicated that the CFI and RMSEA were most sensitive to models with misspecified factor loadings and the SRMR was most sensitive to models with misspecified factor covariances (Hu & Bentler, 1998). The CFI was found to perform better with smaller sample sizes while the RMSEA performed better with larger sample sizes. Assessment of these four indexes was believed to cover a wide range of model specification criteria, with strengths of each index compensating for the other's purported shortcomings. Thus, interpretation convergence of model fit across indexes should increase confidence in model fit results (Hu & Bentler, 1998).

A few years later, Yu (2002) replicated and expanded aspects of Hu and Bentler's (1998) Monte Carlo simulation when she explored the performance of fit indexes under varying situations of sample sizes, model misspecification, type of outcome variables, and type of model specification. Her results mirrored Hu and Bentler's findings, with only a slight deviation in the recommended cutoff value for the CFI (.96 vs. .95). Given the widespread acceptance and use of Hu and Bentler's suggested cutoff values (Kline, 2011) and their subsequent validation by Yu, cutoff thresholds for each index in the presented studies were determined following recommendations by Hu and Bentler.

The model chi-square tests the exact-fit hypothesis in overidentified models, which expects no discrepancy between the covariances predicted in the model and those that exist in the population (Kline, 2011). A nonsignificant test indicates that observed discrepancies between the model-implied covariance and the population covariance are due to chance. The CFI measures the fit improvement of the proposed model compared with a baseline independence model. The independence model assumes that the covariances among all observed variables are zero (Kline, 2011). Values of the CFI that

are greater than .95 suggest good model fit. The SRMR assesses the differences between the sample and predicted correlation matrices and estimates the mean of the differences between each matrix. SRMR values less than .08 indicate good model fit. The RMSEA is a badness-of-fit index and evaluates the degree of misspecification in the model. RMSEA values less than .05 indicate good model fit, and values ranging from .05 - .08 indicate adequate model fit, according to this index. Factor loadings for Study 1 and Study 2 are presented in Table 1 and Table 2, respectively. Fit statistics for the six measurement models for Study 1 are reported in Table 3, and Table 4 contains fit statistics for the six measurement models evaluated for Study 2.

Study 1 results showed that the six-factor model demonstrated the best fit to the data, χ^2 (154) = 330.75, $p < .001$; CFI = .95; SRMR = .04; RMSEA = .06, 90% CI [.058, .078]; with the four-factor model demonstrating the next best fit, χ^2(163) = 453.48, $p < .001$; CFI = .92; SRMR = .05; RMSEA = .08, 90% CI [.076, .094]. Because all other models had higher chi-square test statistics than the four-factor model, this model was chosen for comparison to the six-factor model; significant differences between these two models would indicate that the six-factor model fits the data better than all other competing measurement models. Comparison of the six-factor model to the four-factor model was conducted using a chi-square difference test in which the chi-square value and the df from the nested model (six-factor model) was subtracted from the chi- square value and the df of the larger model (four-factor model). This operation yielded a significant chi-square difference statistic, $\Delta\chi^2(9) = 122.73$, $p < .001$, indicating empirical support for using the separate leader justice and safety performance dimensions for hypotheses analyses.

Table 1

Study 1 Factor Loadings for General Leader Justice, Leader Support for Safety, and Safety Performance

Items	Factor Loadings					
	Interpersonal	Informational	Procedural	LSS	Safety Compliance	Safety Participation
To what extent has your current, immediate supervisor						
1. Talked with you in a polite manner?	.92					
2. Treated you with dignity and respect?	.94					
3. Been honest in his communications with you?		.75				
4. Explained work procedures and tasks thoroughly?		.76				
5. Communicated details about work procedures and tasks in a timely manner?		.83				
6. Tailored his communications about work to individual worker's style?		.80				
7. Collected accurate information before making a decision?			.82			
8. Provided opportunities for workers to appeal or challenge decisions?			.83			
9. Been free of bias when making a decision?			.89			
10. Applied company policies and procedures consistently when making a decision?			.77			
11. Allowed all involved individuals to express their views and feelings about an issue before deciding how to deal with it?			.87			

Table 1 Continued.

Items	Factor Loadings					
	Interpersonal	Informational	Procedural	LSS	Safety Compliance	Safety Participation
At my current workplace						
12. My current, immediate supervisor places a strong emphasis on workplace health and safety				.91		
13. Safety is given a high priority by my current, immediate supervisor				.95		
14. My current immediate supervisor considers safety to be important				.88		
15. I use all the necessary safety equipment to do my job					.79	
16. I use the correct safety procedures for carrying out my job					.82	
17. I ensure the highest levels of safety when I carry out my job					.77	
18. I promote the safety program within my contractor						.68
19. I put in extra effort to improve the safety of the workplace						.89
20. I voluntarily carry out tasks or activities that help to improve workplace safety						.74

Note. Interpersonal = general leader interpersonal justice; Informational = general leader informational justice; Procedural = general leader procedural justice; LSS = leader support for safety.

Table 2

Study 2 Factor Loadings for Safety-Specific Leader Justice, Leader Support for Safety, and Safety Performance

Items	Factor Loadings					
	Interpersonal	Informational	Procedural	LSS	Safety Compliance	Safety Participation
To what extent has your current, immediate supervisor						
1. Talked with you about your safety performance in a polite manner?	.81					
2. Treated you with dignity and respect when discussing your safety performance?	.87					
3. Been honest in his communications about safety issues at work?		.82				
4. Explained safety rules and procedures thoroughly?		.86				
5. Communicated details about safety rules and procedures in a timely manner?		.89				
6. Tailored his communications about work safety concerns to individual worker's style?		.71				
7. Collected accurate information before deciding how to handle a worker's safety violation?			.79			
8. Provided opportunities for workers to appeal or challenge safety violation claims?			.73			
9. Been free of bias when dealing with workers' safety violations?			.83			

Table 2 Continued.

Items	Factor Loadings					
	Interpersonal	Informational	Procedural	LSS	Safety Compliance	Safety Participation
10. Applied safety standards and company policies consistently in dealing with workers' safety violations?			.89			
11. Allowed all involved individuals to express their views and feelings about a safety violation before deciding how to deal with it?			.86			
At my current workplace						
12. My current, immediate supervisor places a strong emphasis on workplace health and safety				.94		
13. Safety is given a high priority by my current, immediate supervisor				.93		
14. My current immediate supervisor considers safety to be important				.84		
15. I use all the necessary safety equipment to do my job					.89	
16. I use the correct safety procedures for carrying out my job					.92	
17. I ensure the highest levels of safety when I carry out my job					.87	
18. I promote the safety program within my contractor						.79
19. I put in extra effort to improve the safety of the workplace						.86
20. I voluntarily carry out tasks or activities that help to improve workplace safety						.85

72

Table 2 Continued.

Note. Interpersonal = safety-specific leader interpersonal justice; Informational = safety-specific leader informational justice; Procedural = safety-specific leader procedural justice; LSS = leader support for safety.

Table 3

Confirmatory Factor Analysis Results for Nested-Models for Study 1

Model	$\chi2$	df	$\chi2/df$	CFI	SRMR	RMSEA	RMSEA CI
$N = 257$							
6-Factor[a]	330.750	154	2.158	0.957	0.046	0.068	[.058 - .078]
5-Factor[b]	464.281	159	2.920	0.926	0.054	0.088	[.079 - .097]
4-Factor[c]	453.485	163	2.782	0.929	0.050	0.085	[.076 - .094]
3-Factor[d]	585.185	166	3.525	0.898	0.057	0.101	[.092 - .110]
1-Factor[e]	1583.926	169	9.372	0.655	0.142	0.184	[.176 - .192]

Note. All χ^2 values are significant at $p < .001$. CFI = comparative fit index; SRMR = standardized-root-mean-square-residual; RMSEA = root-mean-square error of approximation.
[a]Six factors include general leader interpersonal, informational, and procedural justices, leader support for safety, safety compliance and participation. [b]This model is based on the six-factor model, combining the safety compliance and participation items into a composite safety performance factor. [c]This model is based on the six-factor model, combining general interpersonal and informational leader justices items into an interactional justice factor. [d]This model includes composite general leader justice and safety performance factors, as well as leader support for safety. [e]All measurement items were combined into one general factor.

Results for Study 2 were very similar to those from Study 1; the six factor model demonstrated the best fit for the data, χ^2 (155) = 350.19, $p < .001$; CFI = .95; SRMR = .04; RMSEA = .07, 90% CI [.060, .080]; and the four-factor model provided the next-best fit, χ^2 (164) = 429.01, $p < .001$; CFI = .93; SRMR = .04; RMSEA = .07, 90% CI [.070, .089]. A comparison of the six-factor and four-factor models using the chi-squared difference test indicated that they were significantly different, $\Delta\chi^2(9) = 32.98$, $p < .001$.

These results implicated the six-factor model as preferred for testing our hypotheses over all alternative models tested using Study 2 data.

Table 4

Confirmatory Factor Analysis Results for Nested-Models for Study 2

Model	χ^2	df	χ^2/df	CFI	SRMR	RMSEA	RMSEA CI
N = 257							
6-Factor[a]	350.193	155	2.259	0.955	0.045	0.070	[.061 , .080]
5-Factor[b]	508.799	160	3.179	0.920	0.049	0.092	[.083 , .101]
4-Factor[c]	429.012	164	2.616	0.939	0.056	0.079	[.070 , .089]
3-Factor[d]	584.112	167	3.497	0.905	0.050	0.099	[.090 , .107]
1-Factor[e]	1791.569	170	10.538	0.629	0.135	0.193	[.185 , .201]

Note. All χ^2 values are significant at $p < .001$. CFI = comparative fit index; SRMR = standardized-root-mean-square-residual; RMSEA = root-mean-square error of approximation.
[a]Six factors include safety-specific leader interpersonal justice, safety-specific leader informational justice, safety-specific leader procedural justice, leader support for safety (LSS), safety compliance, and safety participation. [b]This model is based on the six-factor model, combining the safety compliance and safety participation items into a composite safety performance factor. [c]This model is based on the six-factor model, combining safety-specific interpersonal and informational leader justice items into an interactional justice factor. [d]This model includes composite safety-specific leader justice and safety performance factors, as well as leader support for safety. [e]All measurement items were combined into one general factor.

HYPOTHESES TESTING

Study 1 Results. Hypotheses 1a, 2a, and 3a predicted that perceptions of general leader interpersonal, informational, and procedural justices, respectively, would be significantly and positively related to safety compliance and safety participation. Pearson's *r* correlation coefficients were examined in order to evaluate these bivariate relationships. These correlations are presented in Table 5 and show partial support for Hypothesis 1a in that general leader interpersonal justice was not significantly related to safety compliance ($r = .088, p = .178$), but was significantly related to safety participation ($r = .160, p = .014$). Hypotheses 2a and 3a were supported by way of significant, positive correlations of general leader informational justice and general leader procedural justice

with safety compliance ($r = .168$, $p = .010$, and $r = .144$, $p = .028$, respectively) and with

safety participation ($r = .203$, $p = .002$, and $r = .188$, $p = .004$, respectively). As predicted

by Hypothesis 4a, LSS exhibited significant, positive relationships with safety

compliance ($r = .424$, $p < .001$) and safety participation ($r = .316$, $p < .001$).

Hierarchical moderated multiple regression analysis was conducted to evaluate

hypothesized main and interactive effects in which covariates were entered first,

independent variables second, the moderator third, and the interaction term fourth. This

order of entry reflected the temporal precedence of the leader justice dimensions over

LSS, and allowed for assessment of the unique effects of justice dimensions on safety

performance irrespective of LSS.

Interestingly, as indicated in Table 6, when the three justice variables were

entered simultaneously into a regression equation as predictors of safety compliance, all

regression coefficients were statistically nonsignificant (general leader interpersonal

justice, $B = -0.03$, $p = .571$; general leader informational justice, $B = 0.11$, $p = .161$;

general leader procedural justice, $B = -0.27$, $p = .758$). The addition of LSS to the same

regression equation demonstrated a positive effect on safety compliance above and

beyond the three leader justice dimensions ($B = 0.32$, $p < .001$).

The simultaneous prediction of safety participation by general leader justice

dimensions showed that general leader informational justice was the only dimension to

exhibit a statistically significant effect ($B = 0.23$, $p = .014$); general leader procedural and

interpersonal justices did not show significant partial effects on safety participation ($B = 0.00$, $p = .998$, and $B = -0.05$, $p = .619$, respectively). Adding LSS to the regression

equation showed that LSS and general leader informational justice were statistically

Table 5

Intercorrelations, Means, and Standard Deviations for Study 1 Variables

Measures	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	34.95	11.95	-									
2. Role	1.41	0.49	.692**	-								
3. Tenure	31.05	48.83	.449**	.437**	-							
4. Interpersonal	3.87	0.91	-.106	.046	.010	-						
5. Informational	3.70	0.95	-.148*	-.036	-.074	.720**	-					
6. Procedural	3.59	1.02	-.124	.003	-.049	.795**	.882**	-				
7. GLJ	3.58	0.85	-.116	.018	-.047	.856**	.946**	.976**	-			
8. LSS	4.13	0.81	-.015	.003	.038	.450**	.462**	.484**	.500**	-		
9. Safety Compliance	4.17	0.57	.183**	.196**	.074	.088	.168**	.144*	.159*	.424**	-	
10. Safety Participation	3.89	0.68	.314**	.368**	.184**	.160*	.203**	.188**	.221**	.316**	.551**	-

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); Interpersonal = general leader interpersonal justice; Informational = general leader informational justice; Procedural = general leader procedural justice; GLJ = general leader justice, composite of general interpersonal, informational, and procedural leader justice dimensions; LSS = leader support for safety.

*p < .05. **p < .01.

significant predictors of safety participation ($B = 0.22, p < .001; B = 0.20, p = .026$, respectively). The above results are also displayed in Table 6.

Hypothesis 5a stated that LSS would moderate the relationships between GLJ dimensions and safety compliance and safety participation, and purported that these relationships would be stronger when LSS is high. Stated otherwise, Hypothesis 5a indicated that the relationships

between GLJ dimensions and safety performance would be contingent upon the level of LSS, such that these relationships would not be uniform across different levels of LSS (Cohen et al., 2003). Support for this hypothesis would be indicated by (a) significant product terms of GLJ dimensions x LSS (general leader interpersonal justice x LSS; general leader informational justice x LSS; and, general leader procedural justice x LSS) in the prediction of the dependent variables when main effects of each predictor are controlled for, and (b) if the slope of GLJ dimensions' predictions of safety performance are steeper under conditions of high LSS compared to conditions of low LSS.

To evaluate Hypothesis 5a, a hierarchical multiple regression was performed in which the control variables were entered into the equation in step one, general leader interpersonal, informational, and procedural justice dimensions in step two, LSS in step three, and three product terms (one for each justice dimension) in step four (see Table 6). Results of step four were reviewed in order to evaluate Hypothesis 5a. Although no product terms were statistically significant when predicting safety compliance, the interaction of LSS and general leader procedural justice was statistically significant when predicting safety participation ($B = .228, p = .025, \Delta R^2 = .023$). Probing this interaction

Table 6

Predicting Safety Performance from General Leader Justice Dimensions, Leader Support for Safety, and their Interaction Term

Predictor	Safety Compliance[a]		Safety Participation[b]	
	ΔR^2	B	ΔR^2	B
Step 1	.036**		.141**	
Age		.004		.005
Role		.169		.453**
Tenure		-		.000
Step 2	.024*		.055**	
Interpersonal		-.033		.000
Informational		.115		.234*
Procedural		.027		-.051
Step 3	.154**		.053**	
LSS		.320**		.228**
Step 4	.013		.020*	
Interpersonal x LSS		.019		-.007
Informational x LSS		-.108		-.139
Procedural x LSS		.151		.228*
Total R^2	.227**		.269**	
n	227		212	

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); Interpersonal = general leader interpersonal justice; Informational = general leader informational justice; Procedural = general leader procedural justice; LSS = leader support for safety.
[a]Control variables included: Age and Role. [b]Control variables included: Age, Role, and Tenure.

*p < .05. **p < .01.

using simple slopes analysis revealed that when LSS was low, the relationship among GLJ and safety participation was negative and significantly different from zero, $t(223) = -2.263$, $p = .025$, but this was not true when LSS was high, $t(223) = 1.101$, $p = .272$, see Figure 3.

Given the large number of variables in the prediction models in Study 1 (i.e., six predictors and three interaction terms for testing safety compliance and seven predictors and three interaction terms for safety participation), it was possible that low statistical power could increase the likelihood of Type II error (Cohen, 1992). Consequently, post-hoc power analyses were conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) for each dependent variable analysis based on the following inputs: f^2 ($f^2 = .03$ for safety compliance; $f^2 = .04$ for

predictors (nine for safety compliance, i.e., two control variables, four main effects, three product terms; and ten for safety participation, i.e., three control variables, four main effects, three product terms). These analyses yielded statistical power of $\beta = .58$ for safety compliance, and $\beta = .70$ for safety participation, raising concerns for low power (Cohen, 1992), which may have mitigated the likelihood of identifying significant effects, if they did exist, especially for Study 1.

To address the above concern, additional regression analyses were conducted in which general leader justice dimensions were collapsed into a composite general leader justice predictor. This was deemed acceptable following assertions by Greenberg (2001), Lind (2001), and Tornblom and Vermunt (1999) who argued that perceptions of individual justice dimensions are used to inform an overall justice assessment, and it is the holistic justice impression that motivates behavior, not impressions at the dimension

level. Following this path of reasoning, Ambrose and Schminke (2009) tested and found

support for their hypothesis that overall justice would mediate the relationship between

specific types of justice and individual attitudes and behavior. Further, the three justice

variables in Study 1 showed high inter-scale correlations (ranging from .720 to .882) and

additional CFA including only the three justice scales indicated that a one-factor justice

model (χ^2 (42) = 141.06, $p < .001$; CFI = .96; SRMR = .03; RMSEA = .09, 90% CI =
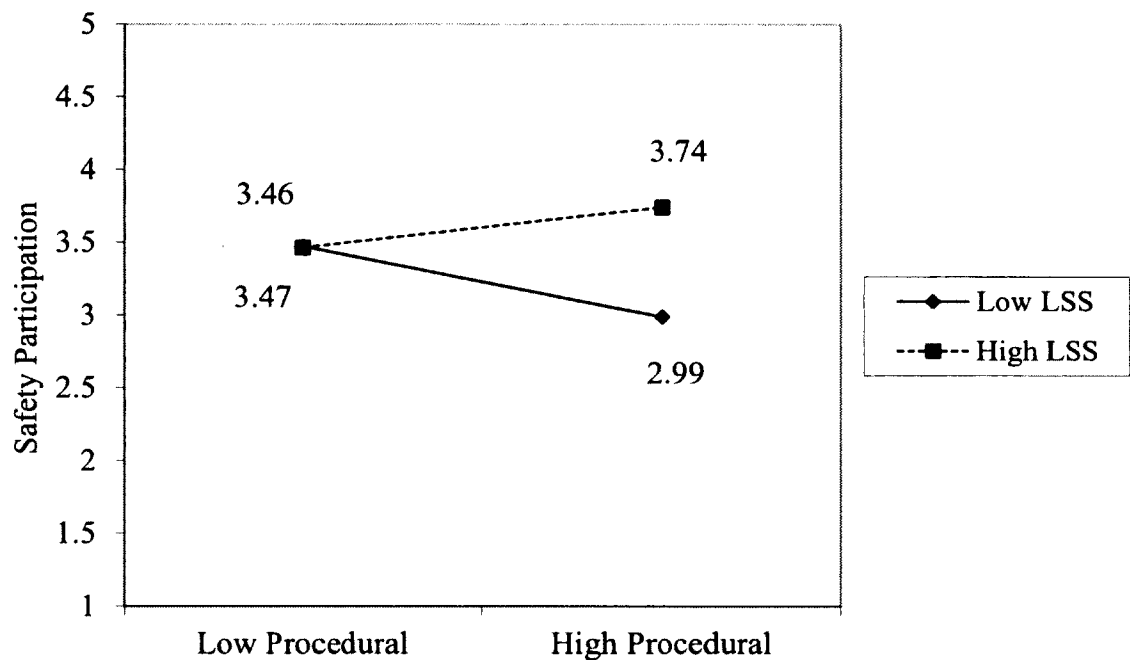
Figure 5. Leader support for safety as a moderator of the relationship between general

leader procedural justice and safety participation.

[.081, .117]) fit the data as well as a three-factor justice model (χ^2 (40) = 137.46, $p <$

.001; CFI = .96; SRMR = .03; RMSEA = .10, 90% CI = [.082, .119]), as evidenced by a

nonsignificant chi-square difference test ($\Delta\chi^2(2)$ = 3.60, $p = .165$).

More specifically, the revised prediction models included control variables in step

one, composite general leader justice (GLJ) in step two, LSS in step three, and the

product term between GLJ and LSS in step four. As illustrated in Table 7, the interaction

between GLJ and LSS significantly predicted safety compliance (B = .089, p = .026, ΔR^2

= .014) and safety participation (B = .115, p = .016, ΔR^2 = .018).

Table 7

Predicting Safety Performance from General Leader Justice, Leader Support for Safety, and their Interaction Term

Predictor	Safety Compliance[a]		Safety Participation[b]	
	ΔR^2	B	ΔR^2	B
Step 1	.035**		.139**	
Age		.004		.005
Role		.166		.452**
Tenure		-		.000
Step 2	.175**		.102**	
GLJ		-.030		.082
LSS		.314**		.223**
Step 3	.014*		.018*	
GLJ x LSS		.089*		.115*
Total R²	.224**		.259**	
n	225		211	

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); GLJ = general leader justice, composite of general interpersonal, informational, and procedural leader justice dimensions; LSS = leader support for safety. [a]Control variables included: Age and Role. [b]Control variables included: Age, Role, and Tenure.
*p < .05. **p < .01.

Simple slopes analysis demonstrated that when LSS was low, the relationship

among GLJ and safety compliance was negative and significantly different from zero,

$t(223)$ = -2.088, p = .038, yet, when LSS was high, this relationship was not significantly

different from zero, $t(223)$ = 0.977, p = .330. The opposite was true when safety

participation was considered. Specifically, when LSS was low, the relationship among

GLJ and safety participation was not significantly different from zero, $t(209) = -0.480$, p

$= .632$, but this relationship was positive and significant when LSS was high, $t(209) =$

2.738, $p = .007$ (see *Figure 4* and *Figure 5*, respectively).
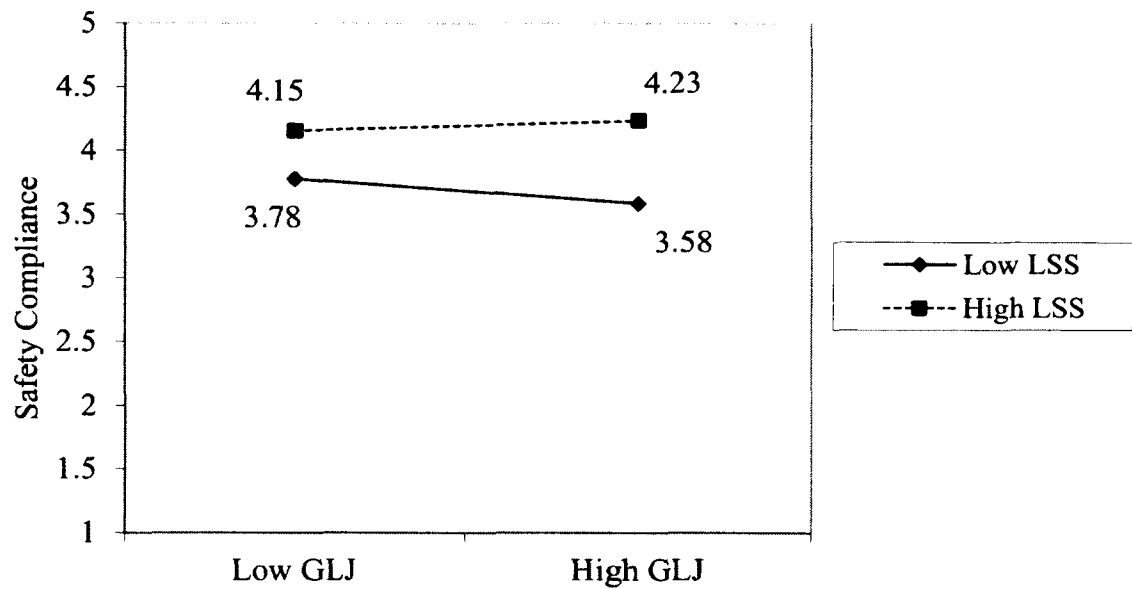
Figure 6. Leader support for safety as a moderator of the relationship between general

leader justice and safety compliance.
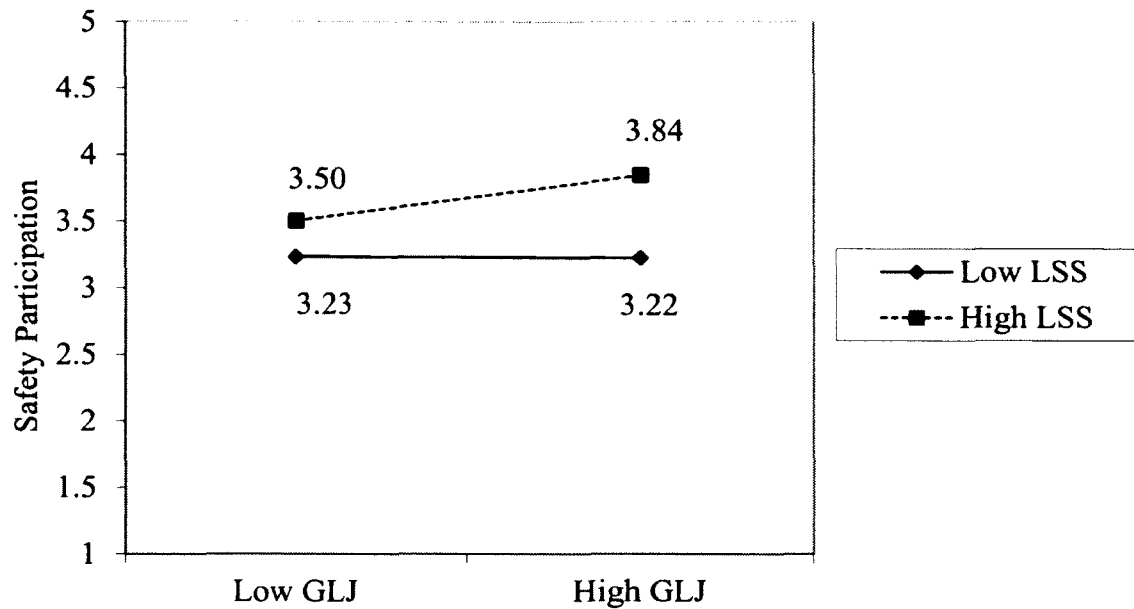
Figure 7. Leader support for safety as a moderator of the relationship between general leader justice and safety participation.

Study 2 Results. Hypotheses 1b, 2b, 3b, and 4b predicted that perceptions of safety-specific leader interpersonal justice, safety-specific leader informational justice, safety-specific leader procedural justice, and LSS would be significantly and positively related to both safety performance dimensions. All four hypotheses were supported as evidenced by significant, positive correlations of safety-specific leader interpersonal, informational, and procedural justices with safety compliance ($r = .368$, $p < .001$; $r = .442$, $p < .001$; $r = .448$, $p < .001$, respectively) and safety participation ($r = .317$, $p < .001$; $r = .354$, $p < .001$; $r = .381$, $p < .001$, respectively), as well as significant, positive correlations of LSS with safety compliance ($r = .563$, $p < .001$) and safety participation ($r = .458$, $p < .001$). The complete correlation matrix is presented in Table 8.

Hierarchical multiple regression analysis was used to evaluate the relative importance of each predictor and to see if hypotheses 1b-4b were still supported when shared variance among the predictors was accounted for. After controlling for covariates, results showed that when safety compliance was regressed on safety-specific leader justice dimensions, safety-specific leader informational ($B = 0.17, p = .025$) and procedural ($B = 0.15, p = .023$) justices were significant predictors of safety compliance, whereas safety-specific leader interpersonal justice was not ($B = -0.03, p = .622$). Adding LSS to the regression equation showed that it significantly and positively predicted safety compliance ($B = 0.35, p < .001$). After accounting for control variables, results from the regression of safety participation on SSLJ dimensions indicated that safety-specific leader procedural justice was the only dimension to uniquely predict this outcome ($B = 0.16, p = .027$). When LSS was entered in the regression equation, it was also found to be a significant predictor ($B = 0.26, p < .001$, see Table 9).

Hypothesis 5b anticipated that the relationships between SSLJ dimensions and safety compliance and safety participation would not differ across levels of LSS, i.e., predicting a differential moderating effect of LSS (see Hypothesis 5a). This hypothesis would be supported by nonsignificant product terms for SSLJ dimensions x LSS in prediction of safety compliance and safety participation. The same hierarchical procedure was employed for this hypothesis as Hypothesis 5a above, yielding nonsignificant results for all three SSLJ dimensions x LSS interaction terms (see Table 9). Following the rationale presented above for Study 1, post-hoc power analyses were conducted based on Study 2 results to evaluate to what extent low statistical power may f^2 (for safety have fueled Type II errors in Study 2 (Cohen, 1992). These post-hoc power

Table 8

Intercorrelations, Means, and Standard Deviations for Study 2 Variables

Measures	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	34.71	11.80	-									
2. Role	1.40	0.49	.684**	-								
3. Tenure	37.59	61.91	.437**	.428**	-							
4. Interpersonal	2.99	0.98	-.036	.034	.002	-						
5. Informational	3.52	1.11	.002	.011	-.023	.820**	-					
6. Procedural	3.37	1.13	.058	.029	.034	.761**	.843**	-				
7. SSLJ	3.32	1.01	.030	.026	.002	.882**	.951**	.956**	-			
8. LSS	4.04	0.86	.070	.077	-.020	.583**	.634**	.615**	.662**	-		
9. Safety Compliance	4.14	0.71	.195**	.194**	.072	.368**	.442**	.448**	.474**	.563**	-	
10. Safety Participation	3.89	0.75	.255**	.278**	.128*	.317**	.354**	.381**	.402**	.458**	.623**	-

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); Interpersonal = safety-specific leader interpersonal justice; Informational = safety-specific leader informational justice; Procedural = safety-specific leader procedural justice; SSLJ = safety-specific leader justice, composite of safety-specific interpersonal, informational, and procedural leader justice dimensions; LSS = leader support for safety.

*p < .05. **p < .01.

Table 9

Predicting Safety Performance from Safety-Specific Leader Justice Dimensions, Leader Support for Safety, and their Interaction Term

Predictor	Safety Compliance[a]		Safety Participation[b]	
	ΔR^2	B	ΔR^2	B
Step 1	.043**		.065**	
Age		.008		.008
Role		.132		.306*
Tenure		-		.000
Step 2	.207**		.138**	
Interpersonal		-.030		.010
Informational		.179*		.092
Procedural		.159*		.168*
Step 3	.103**		.049**	
LSS		.355**		.264**
Step 4	.009		.021*	
Interpersonal x LSS		.090		.093
Informational x LSS		-.117		-.004
Procedural x LSS		.092		.039
Total R^2	.353**		.273**	
n	236		231	

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); Interpersonal = safety-specific leader interpersonal justice; Informational = safety-specific leader informational justice; Procedural = safety-specific leader procedural justice; LSS = leader support for safety.
[a]Control variables included: Age and Role. [b]Control variables included: Age, Role, and Tenure.
*$p < .05$. **$p < .01$.

analyses were again conducted in G*power and the following components were used: compliance $f^2 = .02$; for safety participation $f^2 = .04$), alpha ($\alpha = .05$), sample size (for safety compliance, $n = 236$; for safety participation, $n = 231$), number of tested predictors = 3 (three product terms), and total number of predictors is 9 for safety compliance (four main effects, three product terms, two control variables) and 10 for safety participation

(four main effects, three product terms, three control variables). These power analyses yielded a β = .56 for safety compliance, and β = .75 for safety participation, signaling that the likelihood of detecting significant effects, if they did exist, was less than that prescribed by conventional standards (i.e., .80; Cohen, 1992).

Following the same rationale as presented in Study 1 (justice interscale correlations for Study 2 ranged from .761 to .843), regression analyses were rerun by collapsing SSLJ dimensions into a composite, and regressing the dependent variables on three blocks of predictors: first, the control variables; second, the composite SSLJ and LSS scores; and third, composite SSLJ x LSS product term.

After controlling for covariates and main effects, results showed that LSS did not significantly moderate the relationship between SSLJ and safety compliance. However, contrary to expectation, the interaction between SSLJ and LSS significantly predicted safety participation (B = .142, p = .002, ΔR^2 = .028), indicating that LSS moderated the effect of SSLJ on safety participation. The latter result was unexpected, and meant that Hypothesis 5b was only partially supported. These results are summarized in Table 10. Implications of these results are in the next section.

Simple slopes analysis was conducted to probe the statistically significant interaction between SSLJ and LSS in predicting safety participation. This analysis revealed that when LSS was low, the relationship between SSLJ and safety participation was not significant, $t(224)$ = 0.239, p = .811. Conversely, when LSS was high, the relationship among SSLJ and safety participation was positive and significantly different from zero, $t(224)$ = 4.026, p < .001 (see Figure 6).

Table 10

Predicting Safety Performance from Safety-Specific Leader Justice, Leader Support for Safety, and their Interaction Term

Predictor	Safety Compliance[a]		Safety Participation[b]	
	ΔR^2	B	ΔR^2	B
Step 1	.040**		.074**	
Age		.161		.008
Role		.008		.327*
Tenure		-		.000
Step 2	.315**		.197**	
SSLJ		.137**		.158**
LSS		.342**		.234**
Step 3	.000		.028**	
SSLJ x LSS		.003		.142**
Total R^2	.353**		.299**	
n	231		226	

Note. Role = apprentice or journeyman; Tenure = participant's tenure with their current supervisor (in months); SSLJ = safety-specific leader justice, composite of safety-specific interpersonal, informational, and procedural leader justice dimensions; LSS = leader support for safety.
[a]Control variables included: Age and Role. [b]Control variables included: Age, Role, and Tenure.
*$p < .05$. **$p < .01$.
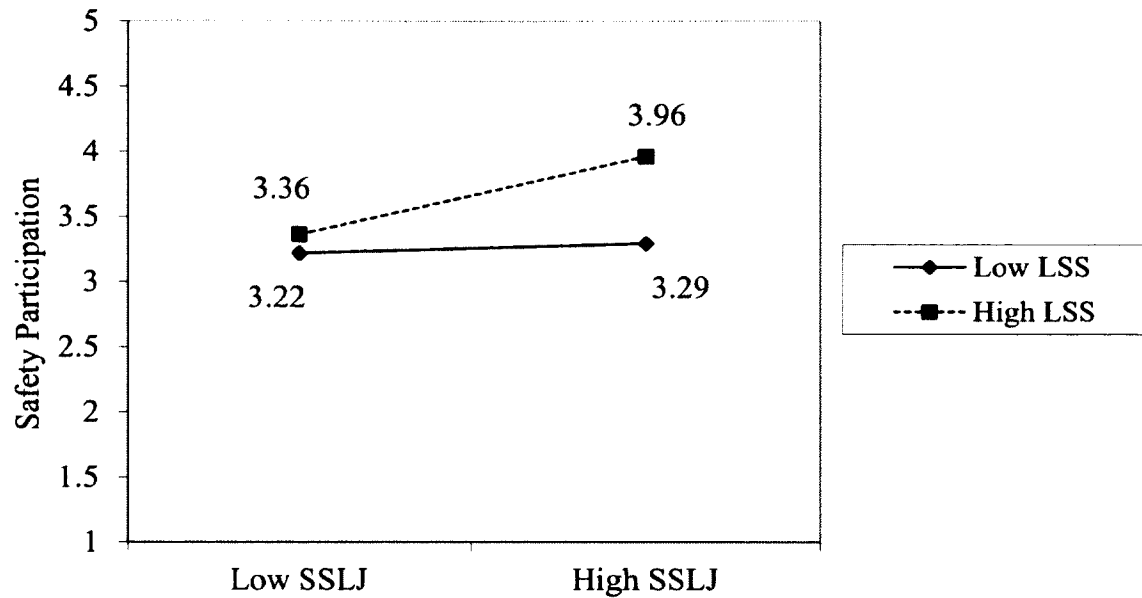
Figure 8. Leader support for safety as a moderator of the relationship between safety-specific leader justice and safety participation.

Between Study Results. Hypotheses 1c, 2c, and 3c predicted that compared to GLJ dimensions, SSLJ dimensions would exhibit stronger relationships with safety compliance and safety participation. The evaluation of these hypotheses called for the comparison of correlation coefficients across independent studies by first transforming each correlation using Fisher's (1921) transformation, and then conducting a z-test on the difference between the two transformed correlation coefficients. Support for these hypotheses would be gained if the z-test comparing the two correlations was significant and positive, indicating that the effect size of SSLJ was larger than the effect size of GLJ on safety performance.

Results from these tests, summarized in Table 11, indicated that for each comparison between corresponding SSLJ and GLJ dimensions, the SSLJ dimensions' relationships with safety compliance and safety participation were significantly stronger

than the relationships between GLJ dimensions and safety compliance and safety participation. More specifically, safety-specific leader interpersonal justice was more strongly related to safety compliance ($r = .368$ vs. $r = .088$, $z = 3.23$, $p < .01$) and safety participation ($r = .317$ vs. $r = .160$, $z = 1.81$, $p < .05$) than general leader interpersonal justice. A similar discrepancy was observed when comparing different contexts of informational justice, with safety-specific informational justice exhibiting stronger relations than general leader informational justice with safety compliance ($r = .442$ vs. $r = .168$, $z = 3.31$, $p < .01$) and safety participation ($r = .354$ vs. $r = .203$, $z = 1.78$, $p < .05$). This pattern continued for comparisons of safety-specific procedural justice and general leader procedural justice relationships' with safety compliance ($r = .448$ vs. $r = .144$, $z = 3.66$, $p < .01$) and safety participation ($r = .381$ vs. $r = .188$, $z = 2.29$, $p < .05$). Thus, hypotheses 1c, 2c, and 3c were supported.

Table 11

Testing the Difference Between SSLJ and GLJ Correlations with Safety Compliance and Safety Participation

Variables	Safety Compliance			Safety Participation		
	SSLJ	GLJ	z-score	SSLJ	GLJ	z-score
Interpersonal						
r	.368	.088		.317	.160	
N	243	234		243	234	
z-test			3.23**			1.81*
Informational						
r	.442	.168		.354	.203	
N	243	235		243	235	
z-test			3.31**			1.78*
Procedural						
r	.448	.144		.381	.188	
N	241	235		241	235	
z-test			3.66**			2.29*

Note. Safety-Specific Leader Justice dimension correlation coefficients were listed first to reflect the order of calculations in the z-test. All z-tests were 1-tailed. SSLJ = safety specific leader justice; GLJ = general leader justice. Calculations were conducted using software developed by Preacher (2002).

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

CHAPTER IX

DISCUSSION

The current studies were conducted to fill three gaps in the safety performance literature. Specifically, only two previous studies have explored the effects of general leader justice (GLJ) on safety performance (Gatien, 2010; Thompson et al., 1998). In addition, no prior research has contextualized leader justice in safety-specific terms and evaluated the effects of safety-specific leader justice (SSLJ) on safety performance. Finally, no studies to my knowledge have examined the moderating role of leader support for safety (LSS) in the dynamics between GLJ and SSLJ and safety performance. Studies 1 and 2 addressed these gaps in the following ways. First, Study 1 reevaluated the magnitude and direction of relationships between GLJ dimensions and safety compliance and safety participation with a sample of construction workers, expanding the research evidence supporting these relationships. Second, Study 2 provided the inaugural operationalization of SSLJ and tested its relationships with safety compliance and safety participation among a second, independent sample of construction workers. Finally, both Studies 1 and 2 assessed the moderating role of LSS within the leader justice-safety performance relationship operationalizing leader justice in general and safety-specific terms, respectively. I hypothesized that general (Hypotheses 1a-3a) and safety-specific (Hypotheses 1b-3b) leader interpersonal, informational, and procedural justices, and LSS (Hypotheses 4a and 4b) would be positively and significantly related to safety compliance and safety participation. I also predicted that LSS would significantly moderate the relationships between GLJ and safety compliance and participation

(Hypothesis 5a), but not those between SSLJ and the safety performance dimensions (Hypothesis 5b).

The correlational findings from Study 1 suggested that general leader informational and procedural justices and LSS were all positively and significantly related to safety compliance and safety participation, and that general leader interpersonal justice was positively related to safety participation but not to safety compliance, providing support for Hypotheses 1a, 2a, and 4a, but only partial support for Hypothesis 3a, respectively. These findings indicate that properly informing employees about work decisions (i.e., general leader informational justice) and implementing such decisions fairly (i.e., general leader procedural justice) may have an effect on employees' engagement in safety compliance and safety participation. Somewhat surprisingly, perceptions of interpersonal justice were not related to employee compliance, indicating that employees who perceive that their leader has treated them with dignity and respect after they have been on the receiving end of a decision tended to engage in extra-role safety behaviors, but not mandated ones.

These positive relationships between GLJ dimensions and safety compliance and safety performance are consistent in direction and significance with the research conducted by Gatien (2010), with the exception of the nonsignificant relationship observed in Study1 between general leader interpersonal justice and safety compliance. Generally, correlations from Study 1 were noticeably smaller than those presented by Gatien for all relationships between GLJ dimensions and safety compliance. For example, Gatien found correlations between general procedural justice and safety compliance to range from .41 to .46, whereas the present study found this relationship to

be .14. Conversely, correlations between GLJ dimensions and safety participation from Study 1 were more on par with those observed by Gatien, with general leader procedural justice displaying the most pronounced discrepancy: where Gatien found this relationship to range from .29 to .45, it was found to be .18 in Study 1.

The divergence between Gatien (2010) and Study 1 results may be a product of measurement artifacts and dissimilarities in sample characteristics rather than substantive differences. With regard to measurement, Gatien operationalized seven-point scales in her studies, compared to the five-point scales used here, which may have increased score variability in Gatien's studies and subsequently escalated the strength of relationships among variables since variability directly influences the magnitude of a correlation (Goodwin & Leech, 2006). Standard deviations of scale scores from Gatien and the present studies were examined to investigate the validity of this assertion. Standard deviations from Gatien were found to be uniformly higher than those observed in Study 1, with 0.320 being the largest discrepancy (safety participation) and 0.084 being the smallest discrepancy (interpersonal justice). Differences in sample characteristics may also have contributed to magnitude discrepancies. For example, for the present studies, the samples originated from the United States and were composed of participants from the pipefitting and plumbing trades, and were unionized, whereas data from Gatien's was collected in Canada and participants were from a variety of trades (crane operators, administrative, managerial, and support staff). Thus, discrepancies in governmental or industry related safety regulations may have influenced results. With that said, the similarities between results from the present research and Gatien's findings are notable

and their congruencies support the notion that dimensions of leader justice are significantly and positively related to safety compliance and safety participation.

As predicted by hypotheses 1b-4b, Study 2 correlations showed all three SSLJ dimensions (interpersonal, informational, and procedural) and LSS to be significantly and positively related to safety participation and safety compliance, indicating that when a safety-related decision has been made, treating employees with dignity and respect, providing them with correct safety information, implementing safety rules and procedures accurately, and prioritizing safety over competing goals are all relevant to mandatory and voluntary employee safety behaviors.

Comparing Study 2 SSLJ correlational findings to Gatien's (2010) results painted a slightly different picture than what was depicted by Study 1. For these relationships, correlations between SSLJ dimensions and safety compliance and safety participation were either of similar or greater magnitude than those found by Gatien. These results lend credence to contextualizing leader variables within the specific performance domain of interest so as to increase their predictive validity. In other words, Study 2 correlational results support the notion that predictive validity can be maximized by ensuring that the predictor(s) and criteria match in level of domain specificity (a topic further discussed in sections below). Table 12 summarizes the correlational results from each of these studies and provides an initial outlook of bivariate relationships among interpersonal, informational, and procedural justice dimensions and safety performance dimensions. Upon viewing this table, the reader should bear in mind that each study originates from an independent sample, and thus correlations are not directly comparable.

The stronger zero-order correlations between leader justice dimensions and safety behaviors from Study 2 compared to those from Study 1 highlight the efficacy of contextualizing leader justice in safety-specific terms when outcome variables of interests are safety-related, supporting hypotheses 1c-3c. Since this study marks the first operationalization of SSLJ, no prior research exists to compare with the present results.

Albeit not related to leader justice, Mullen and Kelloway (2009) found similar results when they compared the effects of safety-specific and general transformational leadership interventions. Their study aimed to assess the relative improvement of leader and employee safety attitudes and behaviors based on whether leaders received safety-specific or general transformational leadership training. The authors reasoned that although leaders may be considered transformational in some aspects of work, "transformational leaders are not necessarily safety leaders" (Mullen & Kelloway, 2009, p. 256). They predicted and found support for the hypotheses that safety-specific transformational leadership would be more predictive of employee perceptions of safety-related events and injuries than general transformational leadership.

Although correlational findings from Study 1 provided promise that GLJ dimensions may significantly predict safety performance, results from hierarchical multiple regression analysis with all three dimensions included in the same predictor block did not corroborate. Specifically, after accounting for control variables, no GLJ dimensions demonstrated significant predictive validity of safety compliance, and when safety participation was regressed on all three GLJ dimensions, only general leader informational justice emerged as a significant predictor of this outcome. These results indicate that employee promotion of workplace safety is more likely to occur under

conditions where employees feel they have been fully and accurately informed about organizationally relevant decisions. Further, leaders' fair allocation of information to employees appears to supersede propensity to demonstrate kindness and respect when informing employees of organizational decisions, and ability to fairly enforce procedures and protocol in effecting employee safety behaviors. Comparatively, main effect results from Study 1 bear resemblance to Gatien (2010), who found informational justice to be a significant antecedent of employee safety participation and interpersonal justice to be unrelated to any safety behaviors.

Initial bivariate relationships indicated that all three SSLJ dimensions are significant predictors of safety compliance and safety participation, however, main effects from hierarchical regression analysis showed that only safety-specific informational and procedural justices explained a significant amount of unique variance in safety compliance and only procedural justice for safety participation. The significant effects of procedural justice on safety compliance and safety participation is consistent with previous research. In her studies, Gatien (2010) found that procedural justice was the only dimension to consistently predict safety behaviors, albeit through safety climate perceptions.

Given that general leader informational justice was found to be a significant predictor of safety participation, it is curious that the safety-specific form of this variable did not mirror these results. Two potential explanations for the finding that safety-specific informational justice is predictive of safety compliance but not safety participation stem from the knowledge and motivation components of the model of safety performance (Neal et al., 2000).

Table 12

Comparison of Correlations of Justice Dimensions With Safety Performance Dimensions Between Gatien (2010) and the Present Studies

Justice Dimension	Gatien (2010) Study 1		Gatien (2010) Study 2		Study 1 - GLJ		Study 2 - SSLJ	
	Comp.	Part.	Comp.	Part.	Comp.	Part.	Comp.	Part.
Interpersonal	.26**	.18**	.22**	.18**	.09	.16*	.37**	.32**
Informational	.32**	.22**	.31**	.15**	.17**	.20**	.44**	.35**
Procedural	.46**	.45**	.41**	.29**	.14**	.19**	.45**	.38**

Note. Gatien (2010) operationalized justice in a general context. Comp. = safety compliance; Part. = safety participation; GLJ = general leader justice; SSLJ = safety-specific leader justice.

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

First, employee compliance with mandatory safety rules and procedures is likely predicated on their knowledge of safety policies and procedures. Recall that safety knowledge and safety motivation are direct determinants of safety performance, thus accurate and timely safety-related information provided by the leader is likely to affect the employee's ability to comply with safety procedures (*e.g.*, operating machinery safely and properly wearing safety protective equipment) rendering safety-specific informational justice instrumental to promoting safety compliance. However, it's likely that leaders will concentrate on relaying safety-related information directly related to in-role behaviors as opposed to peripheral safety tasks. In turn, fair allocation of safety-related material may not promote safety participation as much as demand compliance with mandatory safety tasks. Second, and relatedly, employees experiencing safety-specific leader justice may perceive that complying with mandated safety procedures fulfills their exchange obligations with their leader. Because leader-member exchange maintenance is predicated on balancing one's own inputs with outputs received from the leader, if employees perceive that their compliance with safety mandates have already satisfied their reciprocating obligation, they may be less willing to expend extra effort by going above and beyond what is required of them for maintaining workplace safety.

The inability of interpersonal justice to explain unique variance in safety performance dimensions in both Studies 1 and 2 is also counter to expectation. Perhaps employees assign greater weight to consistent and fair allocation of safety information, and implementation and enforcement of safety rules and procedures than whether they are treated with respect and dignity during these processes. Another potential

explanation is that interpersonal communication style in the construction industry differs from other industries. For example, communication on the construction site is generally informal and characterized by frequent use of irony, sarcasm, wit, and foul language, often as a part of banter and with the goal of conveying humor (Dainty, Moore, & Murray, 2006). As a result, interpersonal justice may be less salient to this population as it represents "softer" aspects of communication and is not as tangible compared to informational and procedural justices.

Moderation analyses from Study 1 revealed that the effects of GLJ on safety compliance and safety participation varied based on the level of LSS, supporting Hypothesis 5a. The significant regression coefficient for the interaction among GLJ and LSS supports the assertion that the effect of leader fair treatment on employee safety behaviors is contingent upon the employee's perception of their leader's support for safety. Specifically, GLJ was only found to be positively related to safety behaviors when leaders were perceived to encourage workplace safety. Thus, it appears that leaders who express support for safety (i.e., high LSS) signal to employees that complying with safety protocol and monitoring the broader safety environment will be noticed and rewarded, as predicted by reinforcement-based learning theory, and that these behaviors can be used to satisfy employees' exchange obligations owed to their leader (in exchange for leader's fair treatment unto them), as forecasted by principles of LMX theory (Graen & Uhl-Bien, 1995). This result is also congruent with previous investigations by Zohar (2002b) and Hofmann et al. (2003) that demonstrated the moderating effects of facet-specific leadership variables on the relationships between context-free leadership variables and safety outcomes. For example, Zohar identified leader's prioritization of

safety to significantly moderate the relationships of full-range leadership styles (facet-free leader variables) with safety climate. Hofmann et al. showed facet-specific safety climate to be a significant moderator of the relationship between facet-free LMX and employee safety citizenship behaviors. Study 1 results extend this body of work by providing further support that context-specific leadership variables regulate the influence of general leadership variables on relevant employee attitudinal and performance domains.

Study 2 moderator analyses revealed that LSS did not affect the relationship between SSJL and safety compliance, implying that applying the safety context to leader justice is sufficient for signaling to employees to recompense high SSLJ by complying with safety rules and standards. However, this was not true for safety participation, where results showed that the positive effect of SSLJ on voluntary safety behaviors disappeared when LSS was low, i.e., when the leader was not a strong supporter of safety. In other words, low LSS attenuated the effect of SSLJ on safety participation. Together, these results demonstrated partial support for hypothesis 5b. Succumbing to the hindsight bias, the fact that LSS was a significant moderator of the relationship between SSLJ and safety participation makes sense, retrospectively. Employees with leaders who are not supportive of safety should be less likely to expend energy on voluntary safety behaviors due to their beliefs that extra effort in this contextual performance domain is not valued and thus likely to go unnoticed by their leader. Such a result underscores the importance of leader reinforcement of safety (*e.g.*, LSS) for encouraging employees to partake in safety behaviors that are above and beyond what is required of them.

Finally, the observed correlations between safety compliance and safety participation in Study 1 ($r = .551$) and Study 2 ($r = .623$) were generally on par with those found in previous studies. For example, Neal et al. (2000) found the relationship between safety compliance and safety participation to be .54, Neal and Griffin (2006) found it to be .57 and .64 at two separate time points, and Christian et al.'s (2009) mean corrected meta-analytic correlation for this relationship was .46. These findings enhance the confidence in the validity and generalizability of the findings from the present studies.

When interpreting nonsignificant results an important topic of consideration is that of practical significance. Prominent psychological researchers have long acknowledged issues associated with null hypothesis significance tests (NHST) and have instead argued that researchers should determine whether they deem their results to demonstrate practical significance based on evaluation of effect sizes (Cohen, 1994; Schmidt, 1996). Emphasis on practical significance may be especially pertinent to safety. For example, Hauer (2004) noted the utility of practical significance when safety is of concern, stating that using results of NHST for "decision-making and policy ... leads to misapplication of resources and unnecessary loss of life and limb" (Hauer, 2004, p. 499). Thus, it may be important for safety researchers to base conclusions on effect sizes, rather than NHST results, as even small increments of proportion of variance in safety outcomes explained may be the difference between life and death. Results from the present studies exemplify this viewpoint. With regard to GLJ findings, together, GLJ dimensions explained 2.4% of the variance in safety compliance and 5.5% of the variance in safety participation (an increment of explained variance comparable to LSS's 5.3%) even though general leader informational justice was the only dimension found to be a

significant predictor. Comparatively, analysis of SSLJ facets on safety compliance and safety participation showed that these dimensions explained 20.7% and 13.8% of the variance in safety compliance and safety participation, respectively, compared to LSS which explained 10.3% in safety compliance and 4.9% in safety participation. Such findings demonstrate that perceptions of fairness do in fact account for variability in worker adherence to safety mandates and proactive safety maintenance of the workplace, especially when fairness is embedded within the safety context. As highlighted throughout this paper, these two outcomes are direct determinants of workplace accidents, injuries, and deaths. Consequently, I contend that the various nonsignficant NHST results found in the present studies may indeed be practically significant, and that future research should continue to investigate the impact of leader fair treatment on employee safety performance.

IMPLICATIONS FOR FUTURE RESEARCH, THEORY, AND PRACTICE

Research and theoretical implications. The present studies help to develop an understanding of the relationship between leader justice and employee safety performance by integrating and expanding the current literature. Significant relationships between general leader interpersonal, informational, and procedural justices with safety participation, and between the latter two and safety compliance echo Gatien's (2010) findings and suggest that leader justice is an important factor in maintaining and promoting employees' safety behaviors. Initially, positive and significant bivariate relationships between individual justice dimensions and safety compliance and safety participation supported the utility of using Colquitt's (2001) multidimensional justice model when considering the effects of fair treatment on employee safety performance.

However, strong intercorrelations among general and safety-specific leader justice dimensions indicated that, despite their theoretical individuality, employees in these samples did not discriminate well between the justice dimensions. These suspicions were confirmed by results from confirmatory factor analyses in which a single justice factor model was found to fit the data as well as a three-factor model.

The emergence of single-factor GLJ and SSLJ in Study 1 and Study 2, respectively, suggests that employees relied on global perceptions of justice rather than considering each type of leader justice on an individual basis. This response pattern aligns with the theory of overall fairness (Greenberg, 2001; Lind, 2001; Tornblom & Vermunt, 1999), which postulates that employees combine whatever justice information is available and salient to them to form an overall perception of justice (Greenberg, 2001) and are not generally concerned with which type of justice, interpersonal, informational, or procedural, has driven their perception (Shapiro, 2001). Perhaps the utility of overall justice was captured in the present study given the significant main and interaction (with LSS) effects compared to the (generally) nonsignificant individual dimension main effects and interaction coefficients. Based on these results, it appears that future research should consider the mediating role of overall leader justice when exploring the effects of individual justice dimensions on employee attitudes and behaviors within and beyond the safety domain, as well as further explore the possibility and utility of a second order model of leader justice.

Although neither LMX nor social exchange were explicitly modeled in this study, the positive relationships found in the present studies between leader justices and safety performance corroborate reciprocation principles outlined by these theories. A recent

meta-analysis, motivated by the emergence of social exchange principles as the domineering explanatory mechanism for justice effects on organizational outcomes, found that indicators of social exchange quality, including LMX, mediated the relationships between leader justice and task performance and citizenship behaviors (Colquitt, Scott, Rodell, Long, Zapata, & Conlon, 2013). It has been argued that perceptions of fairness are antecedents to quality social exchange relationships and employees base their willingness to engage in social exchange relationships on their experiences of fair treatment (Moorman, 1991; Organ & Konovsky, 1989). In turn, employee experiences of positive leader justice initiate participation in social exchange relationships, which then induces reciprocative actions by employees (Cropanzano & Rupp, 2008). Thus, although correlational results showed that leader justices and safety performance are related, future research explicitly modeling social exchange or LMX, or indicators of social exchange relationships is likely to yield dividends for better explaining the link between leader justice and safety performance.

Findings from the current studies also lend support to Zohar's (2002b) distinction between facet-free and facet-specific leadership, especially regarding the manner in which the two would interact when predicting safety-related outcomes. Specifically, Study 1 revealed that effects of GLJ on safety performance were negligible unless leaders were perceived to be supportive of workplace safety. This result supports Zohar's claim that positive effects of facet-free leadership (i.e., high GLJ) on specific performance domains (i.e., safety performance) may only be realized under conditions in which leaders explicitly express that the respective performance domain is valued (e.g., LSS for safety performance). Study 2 extended the boundaries of facet-free/facet-specific

research by exploring whether contextualizing leader justice in safety-specific terms would render the signaling effect of facet-specific LSS inconsequential. Unexpectedly, results showed that this was not true for contextual safety performance behaviors (*i.e.*, extra-role safety behaviors). Further research is needed to explore the differential effects of contextualized leader variables, in concert with other facet-specific variables, on task and contextual performance dimensions within the relevant performance domain.

Comparisons of corresponding GLJ and SSLJ relationships with safety compliance and safety participation demonstrated SSLJ's superior predictive validity of safety performance over its GLJ counterpart. Considering findings from the safety-specific transformational leadership literature, results from the current study underscore the importance of contextualizing leadership variables to the domain of interest. The notion that predictive validity will be maximized when predictors and criteria are matched according to their domain and level of specificity is supported by recommendations derived from the bandwidth-fidelity issue (Hogan & Roberts, 1996).

Other research suggests that SSLJ may pay dividends beyond the scope of safety performance. For instance, although not addressed in the present study, SSLJ may have an impact on employee injury reporting, especially within high-risk industries. Daniels and Marlow (2005) identified construction, agriculture, hospitality, and health care as four industries in which underreporting of injuries is pervasive, and Probst, Brubaker, and Barsotti (2008) found that rate of underreporting was moderated by organizational safety climate, such that organizations with higher safety climate experienced less underreporting than those with lower safety climate. As such, to the extent that SSLJ is positively related to safety climate (as would be expected), the prevalence of

underreporting of injuries may be mitigated when workers perceive their leaders to be fair when dealing with safety-related issues and decisions. Preliminary evidence already exists suggesting that level of organizational justice affects reporting of patient-related safety incidents (Weiner et al., 2008). In turn, exploring how general and safety-specific leader justices impact worker perceptions of safety climate and propensity to report injuries appear to be fruitful areas for further research.

Practical Implications. The results of these studies indicate that leader justice affords an opportunity for enhancing worker safety performance. Specifically, organizations may indirectly improve employee safety by hiring or promoting leaders who demonstrate a disposition toward treating their employees fairly, or by training leaders to treat employees respectfully, inform them accurately and in a timely manner, and enact policies and procedures correctly when issuing organizationally relevant decisions. However, the findings also suggest that cultivating general leader justice (GLJ) may not be sufficient in and of itself to encourage safety behaviors. Instead, results indicate that safety-specific leader variables should take precedence when employee safety is of concern. This assertion is supported by results showing that SSLJ dimensions were more strongly related to safety performance than GLJ dimensions and by the significant moderating role of LSS within the GLJ-safety performance dynamic. Studies by Kelloway, Mullen, and colleagues (Kelloway, Mullen, & Francis, 2006; Mullen & Kelloway, 2009) underscore the efficiency of targeting safety-specific leadership variables rather than their general manifestations for improving safety outcomes. Explicitly, these studies showed that safety-specific variables accounted for incremental variance (Kelloway et al., 2006) and were more efficacious in increasing safety when

operationalized in trainings compared to their facet-free equivalents (Mullen &
Kelloway, 2009). Based on this evidence, it would behoove interventionists to consider
SSLJ rather than GLJ when designing training programs aimed at increasing worker
compliance with safety protocol and/or proactive safety behaviors.

Whereas leader justice provides one avenue for improving worker safety, results
from the present study suggested that safety compliance and safety participation may be
affected to a greater extent by leader support for safety (LSS). This point is emphasized
by Study 1 results which showed that the effect of GLJ on safety performance was only
realized when leaders supported workplace safety, a finding that exemplifies the context
prioritization qualities of the facet-specific leadership variable (Zohar, 2002a). This
finding bears practical significance in that organizations may be able to extend the reach
of general leadership development programs into the safety realm by first training leaders
to actively and verbally support safety because the leader's level of support for safety
appears to regulate the effects of general or facet-free leadership variables, such as
transformational, transactional, and laissez-faire (Zohar, 2002b), as well as leader-
member exchange (Hofmann et al., 2003), on safety performance. If leaders are
equipped with and practiced at applying the skills needed to support employee adherence
to safety protocol and to encourage employee preemptive safety maintenance of the work
environment, then they may become adept at adapting facet-free skills into the safety
sphere and utilize them effectively for promoting safety behaviors.

LIMITATIONS

It is important to acknowledge that all research is accompanied by certain
limitations that may influence results and subsequent conclusions. The studies presented

here are no exception. One such limitation of the current research is common method variance (CMV), or systematic measurement error which may be introduced when responses to all measures are provided by the same source and are in self-report format (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The presence of CMV is of particular concern because of its potential to inflate zero-order correlations (Podsakoff et al., 2003). Historically, the presiding paradigm has been that CMV is pervasive across all same-source and self-report data. However, recent research has begun to refute this ideology by indicating that CMV is a problem idiosyncratic to the study rather than an omnipresent issue (Meade, Watson, & Kroustalis, 2007; Spector, 2006). Despite these repudiations, recommendations provided by Podsakoff et al. were followed in order to ensure that CMV did not pose a significant threat to findings.

Multiple strategies were employed in attempt to mitigate the effects of CMV. First, counterbalancing was used in which criterion scales were presented prior to predictor scales in effort to prevent respondents from inferring causal relationships between items (*item priming effects*). Second, criterion scales and predictor scales were separated by other items so as not to appear consecutively on the questionnaire. This strategy was used to assuage effects of the *consistency motif* and *implicit theories*, in which participants aim to maintain consistency in responses to questions of similar content across scales and make inferences about covariations among particular behaviors and outcomes, respectively. Finally, participants were assured that there were no correct answers and that their responses would remain anonymous in attempt to reduce their propensity to respond in a socially desirable manner (*social desirability*), make lenient ratings about their leader (*leniency biases*), or otherwise adjust their responses due to the

belief that they may be held accountable for them. Despite these concerns, certain results of the present studies indicated that CMV was unlikely to be influential. For example, correlations between predictors and criteria were of the low to moderate variety and within the same range found by Gatien (2010). Confirmatory factor analyses indicated that all measures were distinct factors, despite close conceptual relations. The likelihood of these results occurring if CMV had been an issue in the present data is low.

The cross-sectional design of the current studies represents an additional limitation. Specifically, because criteria and predictor data were collected at the same time point, causal inferences from results are inappropriate. Additionally, although the directionality of relationships was hypothesized and results were interpreted accordingly, this was based on theory and the potential of reverse causality remains. Despite these issues, Barling et al. (2002) noted that cross-sectional research designs are suitable for nascent areas of research. Given that Gatien (2010) offered the only previous foray into exploring the relations among leader justice and employee safety, this categorization applies to the present studies.

Finally, as with most research, the generalizability of the current findings is limited to populations that share characteristics with the current samples. As such, the outcomes presented here should not be expected to apply beyond unionized apprentices and journeymen from the pipefitting and plumbing vocations. For example, research has demonstrated that unionization contributes positively to workers safety experience as unionized and nonunionized construction workers differ on a number of safety-relevant features such as exposure to safety training, knowledge about safety practices, employment stability, perceptions about coworkers' attitudes toward safety, and safety-

self efficacy (Dedobbeleer, Champagne, & German, 1990). However, this same research showed no differences in union and nonunion construction workers' perceptions of management's attitude toward safety and immediate leader's safety enforcement, indicating that unionization may not moderate the effects of leadership. Moreover, a more recent qualitative review pointed out that studies have been inconclusive in elucidating the effects of unionization on safety outcomes, with some studies indicating that this relationship is positive, some negative, and others nonsignificant (Kelloway, 2004). Given that 23.1% and 26.1% of participants from the current studies indicated that they had suffered an injury within the last two months, it appears that despite the unionized status of the samples, safety remains a major concern. Nevertheless, it is prudent that future research considers union status of the target population when investigating the effects of leadership on employee safety performance.

CONCLUSION

Despite numerous technological advancements and increased industry regulations, occupational injuries and illnesses persist at alarming rates (BLS, 2012a; 2012b). As a result, researchers have invested substantially in identifying organizational strategies for improving worker safety performance (Griffin & Neal, 2000), and recent meta-analytic evidence has implicated leadership as a key predictor of employee safety behavior (Christian et al., 2009; Clarke, 2013; Nahrgang et al., 2011). Thus, the main objective of the two studies presented in this thesis was to extend the literature linking leadership with employee safety by investigating the effects of leader justice, conceptualized in general and safety-specific contexts, on employee safety performance. Further, these studies explored how leader support for safety moderated the effects of general and safety-

specific leader justices on safety performance. Results indicated that safety-specific leader justice dimensions were more predictive of safety compliance and safety participation than their general leader justice counterparts, and that leader support for safety was a significant moderator of the relationships between general leader justice and both safety performance dimensions, as well as safety-specific leader justice and safety participation, but not safety compliance. These findings indicate that employee safety performance may be dictated to a certain extent by their perceptions of leader fairness, and that the influence of leader justice is even more prominent when embedded in the safety context. Theoretically, these results support Zohar's (2002a) notion that facet-specific leadership variables should be explored as a moderators of the effects of facet-free leadership variables on relevant criteria. The practical implications of these findings suggest that safety-specific leader justice, and leader support for safety in particular, should be considered by organizations and safety interventionists alike when generating strategies or designing training programs to improve employee safety behaviors.

REFERENCES

Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 267-299). San Diego, CA: Academic Press.

Ambrose, M. L., & Arnaud, A. (2005). Are procedural justice and distributive justice conceptually distinct? In J. Greenberg & J. A. Colquitt (Eds.), *Handbook of organizational justice* (pp. 329-354). Mahwah, NJ: Lawrence Erlbaum Associates.

Ambrose, M. L., & Schminke, M. (2009). The role of overall justice judgments in organizational justice research: A test of mediation. *Journal of Applied Psychology, 94*(2), 491-500.

Andriessen, J. (1978). Safe behavior and safety motivation. *Journal of Occupational Accidents, 1,* 363-376.

Barling, J., Loughlin, C., & Kelloway, E. K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of Applied Psychology, 87*(3), 488-496.

Bass, B. M. (1999). Two decades of research and development in transformational leadership. *European Journal of Work & Organizational Psychology, 8*(1), 9-32. doi:10.1080/135943299398410

Becker, T. E. (2005). Potential problems in the statistical control of variables in organizational research: A qualitative analysis with recommendations. *Organizational Research Methods, 8,* 274-289.

Bentler, P. M. (1990). Comparative fit indexes in Structural Models. *Quantitative Methods in Psychology, 107*(2), 238-246.

Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.

Bies, R. J., & Moag, J. S. (1986). Interactional justice; Communication criteria of fairness. In R. J. Lewicki & B. H. Sheppard & B. H. Bazerman (Eds.), *Research on negotiation in organizations* (Vol. 1, pp. 43-55). Greenwich, CT: JAI Press.

Blader, S. L. & Tyler, T. R. (2005). How can theories of organizational justice explain the impact of fairness? In J. Greenberg & J. A. Colquitt (Eds.), *Handbook of organizational justice* (pp. 329-354). Mahwah, NJ: Lawrence Erlbaum Associates.

Blau, P. (1964). *Exchange and Power in Social Life*. New York: Wiley.

Boomsma, A. (2000). Reporting analyses of covariance structures. *Structural Equation Modeling, 7*(3), 461-483.

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 71-98). San Francisco, CA: Jossey Bass.

Burke, M. J., Sarpy, S. A., Tesluk, P. E., & Smith-Crowe, K. (2002). General safety performance: A test of a grounded theoretical model. *Personnel Psychology, 55*(2), 429-457.

Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 1, pp. 687-732). Palo Alto, CA: Consulting Psychologists Press.

Campbell, J. P., McHenry, J. J., & Wise, L. L. (1990). Modeling job performance in a

    population of jobs. *Personnel Psychology, 43*(2), 313-333.

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of

    performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in*

    organizations (pp. 35-70). San Francisco: Jossey-Bass.

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace safety:

    a meta-analysis of the roles of person and situation factors. *The Journal Of*

    Applied Psychology, 94(5), 1103-1127.

Cigularov, K. P., Chen, P. Y., & Rosecrance, J. (2010). The effects of error management

    climate and safety communication on safety: A multi-level study. *Accident*

    Analysis and Prevention, 42, 1498-1506.

Clarke, S. (2010). An integrative model of safety climate: Linking psychological climate

    and work attitudes to individual safety outcomes using meta-analysis. *Journal of*

    Occupational and Organizational Psychology, 83, 553-578.

Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and

    transactional leadership styles as antecedents of safety behaviors. *Journal of*

    Occupational and Organizational Psychology, 86, 22-49.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159.

Cohen, J. (1994). The earth is round ($p < .05$). *American Psychologist, 49*(12), 997-1003.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple*

    regression/correlation analysis for the behavioral sciences (3rd ed.). Mahwah,

    NJ: Erlbaum.

Cohen-Charash, Y., & Spector, P. E. (2001). The Role of Justice in Organizations: A

Meta-Analysis. *Organizational Behavior and Human Decision Processes, 86,* 278-321.

Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology, 86*(3), 386-400.

Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology, 86,* 425-445.

Colquitt, J. A., Greenberg, J., & Zapata-Phelan, C. P. (2005). What is organizational justice? A historical overview of the field. In J. Greenberg & J. A. Colquitt (Eds.), *The handbook of organizational justice* (pp. 3-56). Mahwah, NJ: Erlbaum.

Conchie, S. M., Taylor, P. J., & Donald, I. (2012). Promoting safety voice with safety-specific transformational leadership: The mediating role of two dimensions of trust. *Journal of Occupational Health Psychology, 17,* 105-115.

Cooper, M. D., Phillips, R. A., Robertson, I. T., & Duff, A. R. (1993). Improving safety on construction sites by the utilisation of psychologically based techniques: Alternative approaches to the measurement of safety behavior. *European Review of Applied Psychology, 43,* 33-41.

Conchie, S. M., Taylor, P. J., & Donald, I J. (2012). Promoting safety voice with safety-specific transformational leadership: The mediating role of two dimensions of trust. *Journal of Occupational Health Psychology, 17*(1), 105-115.

Cropanzano, R. (1993). *Justice in the workplace: Approaching fairness in human resource management.* Hillsdale: NJ: Lawrence Erlbaum Associates.

Cropanzano, R., Prehar, C. A., & Chen, P. Y. (2002). Using social exchange theory to

distinguish procedural from interactional justice. *Group and Organizational Management, 27*, 324-351.

Cropanzano, R., & Rupp, D. E. (2008). Social exchange theory and organizational justice: Job performance, citizenship behaviors, multiple foci, and a historical integration of two literatures. In S. W. Gilliland, D. P. Skarlicki, & D. D. Steiner (Eds.), *Research in social issues in management: Justice, morality, and social responsibility* (pp. 63–99). Greenwich CT: Information Age Publishing.

Cullen, J. C., & Hammer, L. B. (2007). Developing and testing a theoretical model linking work-family conflict to employee safety. *Journal of Occupational Health Psychology, 12*, 266-278.

Dainty, A., Moore, D., & Murray, M. (2006). *Communication in Construction: Theory and Practice*. New York, NY: Taylor & Francis.

Dalal, R. S. (2005). A meta-analysis of the relationship between organizational citizenship behavior and counterproductive work behavior. *Journal of Applied Psychology, 90*(6), 1241–1255.

Daniels, C., & Marlow, P. (2005). *Literature review on the reporting of workplace injury trends*. Buxton: Health and Safety Laboratory.

Dedobbeleer, N., Champagne, F., & German, P. (1990). Safety performance among union and nonunion workers in the construction Industry. *Journal of Occupational Medicine, 31*(11), 1099-1103.

Deutsch, M. (1975). Equity, equality, and need: What determines which value will be used as the basis of distributive justice? *Journal of Social Issues, 31*(3), 137-149. doi: 10.1111/j.1540-4560.1975.tb01000.x

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* New York, NY: John Wiley & Sons, Inc.

Eberlin, R. J., & Tatum, B. C. (2007). Making just decisions: organizational justice, decision making, and leadership. *Management Decision, 46*(2), 310-329.

Erev, I. (1998). Signal detection by human observers: A cutoff reinforcement learning model of categorization decisions under uncertainty. *Psychological Review, 105*(2), 280-298.

Fassina, N. E., Jones, D. A., & Uggerslev, K. L. (2008). Meta-analytic tests of relationships between organizational justice and citizenship behavior: testing agent-system and shared-variance models. *Journal of Organizational Behavior, 29*, 805-828.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Folger, R. (1993). Reactions to mistreatment at work. In J. K. Murnighan (Ed.), *Social psychology in organizations: Advances in theory and research* (pp. 161-183). Englewood Cliffs, NJ: Prentice Hall.

Gatien, B. (2010). An investigation into the relationship between perceptions of safety climate and organizational justice (Unpublished master's thesis). Saint Mary's University, Halifax, Nova Scotia.

Gerstner, C. R., & Day, D. V. (1997). Meta-analytic review of leader-member exchange theory: Correlates and construct issues. *Journal of Applied Psychology, 82*(6), 827-844.

Goodwin, L. D., & Leech, N. L. (2006). Understanding correlation: Factors that affect the

size of *r*. *The Journal of Experimental Education, 74*(3), 251-266.

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership:

Development of leader–member exchange (LMX) theory of leadership over 25

years: Applying a multi-level multi-domain perspective. *Leadership Quarterly, 6,*

219 –247. doi:10.1016/1048-9843(95)90036-5

Greenberg, J. (1990). Employee theft as a reaction to underpayment inequity: The hidden

cost of pay cuts. *Journal of Applied Psychology, 75*, 561-568.

Greenberg, J. (1993). The social side of fairness: Interpersonal and informational classes

of organizational justice. In Cropanzano, R. (Ed.), *Justice in the Workplace:*

Approaching Fairness in Human Resource Management, 79-103. Hillsdale, NJ:

Lawrence Erlbaum Associates.

Greenberg, J. (2001). Setting the justice agenda: Seven unanswered questions about

"what, why, and how." *Journal of Vocational Behavior, 58*, 210-219.

Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking

safety climate to safety performance, knowledge, and motivation. *Journal of*

Occupational Health Psychology, 5, 347-358. doi:10.1037/1076-8998.5.3.347

Haslam, C., Haefeli, K., & Haslam, R. (2010). Perceptions of occupational injury and

illness costs by size of organization. *Occupational Medicine, 60*, 484-490.

Hauer, E. (2004). The harm done by tests of significance. *Accident Analysis and*

Prevention, 36, 495-500.

Hayes, B. E., Perander, J., Smecko, T., & Trask, J. (1998). Measuring perceptions of

workplace safety: Development and validation of the work safety scale. *Journal*

of Safety Research, 29(3), 145-161.

Hofmann D. A. & Morgeson, F. P. (1999). Safety-related behavior as a social exchange: The role of organizational support and leader-member exchange. *Journal of Applied Psychology, 84*(2), 286-296.

Hofmann, D. A. & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents, *Personnel Psychology, 49*, 307-339.

Hofmann, D. A., Morgeson, F. P., & Gerras, S. (2003). Climate as a moderator of the relationship between LMX and content specific citizenship: Safety climate as an exemplar. *Journal of Applied Psychology, 88*, 170-178.

Hofmann, D. A. & Morgeson, F. P. (2004). The role of leadership in safety. In J. Barling & M. R. Frone (Eds.), *The psychology of workplace safety*. Washington, D.C.: American Psychological Association.

Hogan, J. & Roberts, B. W. (1996). Issues and non-issues in the fidelity-bandwidth trade-off. *Journal of Organizational Behavior, 17*, 627-637.

Huang, Y. H., Chen, P. Y., Krauss, A. D., & Rogers, D. A. (2004). Quality of the execution of corporate safety policies and employee safety outcomes: Assessing the moderating role of supervisor safety support and the mediating role of employee safety control. *Journal of Business and Psychology, 18*(4), 483-506.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3*(4), 424-453.

Hunt, S. T. (1996). Generic work behavior: an investigation into the dimensions of entry-level, hourly job performance. *Personnel Psychology, 49*(1), 51-83.

Ilies, R., Narhgang, J. D., & Morgeson, F. P., (2007). Leader-member exchange and citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 92*(1), 269-277.

Inness, M., Turner, N., Barling, J., & Stride, C. B. (2010). Transformational leadership and employee safety performance: a within-person, between-jobs design. *Journal of Occupational Health Psychology, 15*(3), 279-290.

Jackson, D. L., Gillaspy Jr., J. A., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: An overview and some recommendations. *Psychological Methods, 14*(1), 6-23.

Janssens, M., Brett, J. M., & Smith, F. J. (1995). Confirmatory cross-cultural research: Testing the viability of a corporation-wide safety policy. *Academy of Management Journal, 38*(2), 364-382.

Judge, T. A., & Colquitt, J. A. (2004). Organizational justice and stress: The mediating role of work-family conflict. *Journal of Applied Psychology, 89*(3), 395-404.

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology, 89*(5), 755-768.

Kelloway, K. E. (2004). Labor unions and occupational safety: Conflict and cooperation. In J. Barling & M. R. Frone (Eds.), *The psychology of workplace safety.* (pp. 15-34). Washington, DC, US: American Psychological Association.

Kines, P., Andersen, L. P., Spangenberg, S., Mikkelsen, K. L., Dyreborg, J., & Zohar, D. (2010). Improving construction site safety through leader-based verbal safety communication. *Journal of Safety Research, 41*, 399-406.

Kline, R. B. (2011). *Principles and practice of structural equation modeling (3rd*

 Edition). New York, NY: The Guilford Press.

Komaki, J., Barwick, K. D., & Scott, L. R. (1978). A behavioral approach to occupational

 safety: Pinpointing and reinforcing safe performance in a food manufacturing

 plant. *Journal of Applied Psychology, 63*(4), 434-445.

Krause, T. R., Seymore, K. J., & Sloat, K. (1999). Long-term evaluation of a behavior-

 based method for improving safety performance: a meta-analysis of 73 interrupted

 time-series replications. *Safety Science, 32,* 1-18.

Lavelle, J. J., Rupp, D. R., & Brockner, J. (2007). Taking a multifoci approach to the

 study of justice, social exchange, and citizenship behavior: The target similarity

 model. *Journal of Management, 33*(6), 841-866.

LePine, J. A., Erez, A., & Johnson, D. E. (2002). The nature and dimensionality of

 organizational citizenship behavior: A critical review and meta-analysis. *Journal*

 of Applied Psychology, 87(1), 52-65.

Leventhal, G. S. (1976). The distribution of rewards and resources in groups and

 organizations. In L. Berkowitz & W. Walster (Eds.), *Advances in experimental*

 social psychology, vol. 9 (pp. 91–131). New York: Academic Press.

Leventhal, G. S. (1980). What should be done with equity theory? New approaches to the

 study of fairness in social relationship. In K. Gergen, M. Greenberg, & R. Willis

 (Eds.), *Social exchange: Advances in theory and research* (pp. 27-55). New York:

 Plenum Press.

Leventhal, G. S., Karuza, J., & Fry, W. R. (1980). Beyond fairness: A theory of

   allocation preferences. In G. Mikula (Ed.), *Justice and social interaction* (pp. 167-

   218). New York: Springer-Verlag.

Liberty Mutual Research Institute for Safety. (2012). *2012 Liberty mutual workplace*

   safety index. Retrieved from: http://www.libertymutual.com/researchinstitute.

Lind, E. A. (2001). Fairness heuristic theory: Justice judgments as pivotal cognitions in

   organizational relations. In M.S. Greenberg, & R. Cropanzano (Eds.), *Advances in*

   organizational justice (pp. 56-88). Stanford, CA: Stanford University Press.

Little, R. J. A. (1998) A test of missing completely at random for multivariate data with

   missing values. *Journal of the American Statistical Association,83*, 1198 – 1202.

Mayer, D., Nishii, L., Schneider, B., & Goldstein, H. (2007). The precursors and products

   of justice climates: Group leader antecedents and employee attitudinal

   consequences. *Personnel Psychology, 60*, 929-963.

Masterson, S. S., Lewis, K., Goldman, B. M., & Taylor, M. S. (2000). Integrating justice

   and social exchange: The differing effects of fair procedures and treatment on

   work relationships. *Academy of Management Journal, 43*(4), 738-748.

McNeely, B. L., & Meglino, B. M. (1994). The role of dispositional and situational

   antecedents in prosocial organizational behavior: An examination of the intended

   beneficiaries of prosocial behavior. *Journal of Applied Psychology, 79*, 836-844.

Meade, A. W., Watson, A. M., & Kroustalis, C. M. (2007). *Assessing Common Method*

   Bias in Organizational Research. Paper presented at the 22nd Annual Meeting of

   the Society for Industrial and Organizational Psychology, New York.

Mearns, K. J., & Reader, T. (2008). Organizational support and safety outcomes: An

uninvestigated relationship? *Safety Science, 46*, 388-397.

Michael, J. H., Guo, Z. G., Wiedenbeck, J. K., & Ray, C. D. (2006). Production supervisor impacts on subordinates' safety outcomes: An investigation of leader-member exchange and safety communication. *Journal of Safety Research, 37*, 469-477.

Moorman, R. H. (1991). Relationship between organizational justice and organizational citizenship behaviors: Do fairness perceptions influence employee citizenship? *Journal of Applied Psychology, 76*, 845–855.

Moorman, R. H., & Byrne, Z.S. (2005). What is the role of justice in promoting organizational citizenship behavior? In J. Greenberg & J. A. Colquitt (Eds.), *Handbook of Organizational Justice: Fundamental Questions about Fairness in the Workplace* (pp. 355-380). Lawrence Erlbaum Associates.

Mullen, J. E., & Kelloway, E. K. (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of Occupational and Organizational Psychology, 82*, 253-272.

Muthen, L. K., & Muthen, B. O. (1998-2012). Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthen & Muthen.

Nahrgang, J. D., Morgeson, F. P., & Hofmann, D. A. (2011). Safety at work: A meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology, 96*, 71-94. doi:10.1037/a0021484

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science, 34*, 99-109.

Neal, A., & Griffin, M. A. (2002). Safety climate and safety behaviour. *Australian Journal of Management, 27*(1), 67-75.

Neal, A., & Griffin, M. A. (2004). Safety climate and safety at work. In J. Barling & M. R. Frone (Eds.), *The psychology of workplace safety.* (pp. 15-34). Washington, DC, US: American Psychological Association. Retrieved from: http://psycnet.apa.org.proxy.lib.odu.edu/index.cfm?fa=search.displayRecord&uid =2003-88217-002

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology, 91*(4), 946-953.

Nunnally, J. C. (1967). *Psychometric Theory (1ˢᵗ Edition).* New York: McGraw-Hill.

Nunnally, J. C. (1978). *Psychometric Theory (2ⁿᵈ Edition).* New York: McGraw-Hill.

Nunnally, J.C., & Bernstein, I. H. (1994). *Psychometric Theory (3ʳᵈ Edition).* New York: McGraw-Hill.

Organ, D. W., & Konovsky, M. (1989). Cognitive versus affective determinants of organizational citizenship behavior. *Journal of Applied Psychology, 74,* 157–164.

Parboteeah, K. P., & Kapp, E. A. (2008). Ethical climates and workplace safety behaviors: An empirical investigation. *Journal of Business Ethics, 80,* 515-529.

Parker, S. K., Axtell, C. M., & Turner, N. (2001). Designing a safer workplace: Importance of job autonomy, communication quality, and supportive supervisors. *Journal of Occupational Health Psychology, 6*(3), 211-228.

Podsakoff, P. M., MacKenzie, S. B., Lee, J-Y., & Podsakoff, N. P. (2003). Common

method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Preacher, K. J. (2002, May). Calculation for the test of the difference between two independent correlation coefficients [Computer software]. Available from http://quantpsy.org

Probst, T. M., Brubaker, T. L., & Barsotti, A. (2008). Organizational injury rate underreporting: The moderating effect of organizational safety climate. *Journal of Applied Psychology, 93*(5), 1147-1154.

Robbins, J. M., Ford, M. T., & Tetrick, L. E. (2011). Perceived Unfairness and Employee Health: A Meta-Analytic Integration. *Journal of Applied Psychology*. Advance online publication. doi: 10.1037/a0025408

Roch, S. G., & Shanock, L. R. (2006). Organizational justice in an exchange framework: Clarifying organizational justice distinctions. *Journal of Management, 32*, 299-322.

Rupp, D. E., & Cropanzano, R. (2002). The mediating effects of social exchange relationships in predicting workplace outcomes from multifoci organizational justice. *Organizational Behavior and Human Decision Processes, 89*, 925-946.

Schmidt, F. L. (1996). Statistical significance testing and cumulative knowledge in psychology: Implications for the training of researchers. *Psychological Methods, 1*, 115-129.

Settoon, R. P., Bennett, N., & Liden, R. C. (1996). Social exchange in organizations: The differential effects of perceived organizational support and leader member exchange. *Journal of Applied Psychology, 81*(3), 219-227.

Shapiro, D. (2001). The death of justice theory is likely if theorists neglect the "wheels" already invented and the voices of the injustice victims. *Journal of Vocational Behavior, 58*, 235-242.

Simard, M. & Marchand, A. (1995). A multilevel analysis of organisational factors related to the taking of safety initiatives by work group. *Safety Science, 21*, 113-129.

Spector, P. E. (2006). Method variance in organizational research: Truth or Urban Legend? *Organizational Research Methods, 9*, 221-232.

Steiger, J. H., & Lind, J. C. (1980). *Statistically-based tests for the number of common factors*. Paper presented at the annual Spring Meeting of the Psychometric Society in Iowa City.

Sweeney, P. D., & McFarlin, D. B. (1993). Workers' evaluations of the "ends" and the "means": An examination of four models of distributive and procedural justice. *Organizational Behavior and Human Decision Processes, 55*(1), 23-40.

Tabachnick, G. G., & Fidell, L. S. (2007). *Using Multivariate Statistics (5th edition)*. New York, NY: Pearson

Thibaut, J., & Walker, L. (1975). *Procedural justice: A psychological analysis*. Hillsdale, NJ: Erlbaum.

Thompson, R. C., Hilton, T. F., & Witt, L A. (1998). Where the safety rubber meets the shop floor: A confirmatory model of management influence on workplace safety. *Journal of Safety Research, 29*(1), 15-24.

Tornblom, K. Y., & Vermunt, R. (1999). An integrative perspective on social justice: Distributive and procedural fairness evaluations of positive and negative outcome

allocations. *Social Justice Research, 12,* 39-64.

U.S. Department of Labor, Bureau of Labor Statistics. (2012a). *Incidence rates of nonfatal occupational injuries and illnesses by industry and case types.* Retrieved from http://www.bls.gov/iif/oshwc/osh/os/ostb3191.pdf.

U.S. Department of Labor, Bureau of Labor Statistics. (2012b). *Revisions to the 2011 census of fatal occupational injuries counts.* Retrieved from http://www.bls.gov/iif/oshwc/osh/os/ostb3191.pdf.

U.S. Department of Labor, Bureau of Labor Statistics. (2012c). *Union members - 2012.* Retrieved from http://www.bls.gov/news.release/pdf/union2.pdf.

Viswesvaran, C. & Ones, D. S. (2002). Examining the construct of organizational justice: A meta-analytic evaluation of relations with work attitudes and behaviors. *Journal of Business Ethics, 38*(3), 193-203.

Waehrer, G. M., Dong, X. S., Miller, T., Haile, E., & Men, Y. (2007). Costs of occupational injuries in construction in the United States. *Accident Analysis & Prevention, 39*(6), 1258-1266. doi:10.1016/j.aap.2007.03.012

Walumbwa, F. O., Cropanzano, R., & Hartnell, C. A. (2009). Organizational justice, voluntary learning behavior, and job performance: a test of the mediating effects of identification and leader–member exchange. *Journal of Organizational Behavior, 30,* 1103-1126.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*(4), 548-573.

Weiner, B. J., Hobgood, C., & Lewis, M. A. (2008). The meaning of justice in safety incident reporting. *Social Science & Medicine, 66,* 403-413.

Wiegmann, D. A., Zhang, H., von Thaden, T., Sharma, G., & Gibbons, A. M. (2009). Safety culture: An integrative review. *The International Journal of Aviation Psychology, 14*(2), 117-134.

World Health Organization. (2008). *Global strategy on occupational health for all: The way to health at work.* Retrieved from http://www.who.int/occupational_health/en/

Yu, C-Y. (2002). Evaluating cutoff criteria of model fit indices for latent variable models with binary and continuous outcomes (Doctoral dissertation). University California Los Angeles, Los Angeles, CA.

Zohar, D. (2000). *Safety climate and leadership factors as predictors of injury records in work-groups.* Paper presented at the Academy of Management Annual Meeting, Toronto, Ontario, Canada.

Zohar, D. (2002a). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of Organizational Behavior, 23,* 75-92. doi:10.1002/job.130

Zohar, D. (2002b). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. *Journal of Applied Psychology, 87*(1), 156-163.

Zohar, D. & Luria, G. (2003). The use of supervisory practices as leverage to improve safety behavior: A cross-level intervention model. *Journal of Safety Research, 34,* 567-577.

Zohar, D. (2011). Safety climate: Conceptual and measurement issues. In J. C. Quick & L. E. Tetrick (Eds.) *Handbook of occupational health psychology* (2 ed.).

Washington, D.C.: American Psychological Association.

APPENDIX A

INFORMED CONSENT

PIPE FITTERS

u.a.   CHICAGO

Colorado State University

Dear Local Union 597 Pipe Fitter,

Professor Peter Chen and doctoral student, Krista Hoffmeister, researchers from Colorado State University, invite you to participate in a research study because you are a member of Local Union 597. The title of the study is "**Project LeAD**." The purpose of the study is to identify leadership skills that will have the most impact on construction safety. This study is conducted by researchers at Colorado State University in conjunction with U.A. Local 3 Denver, U.A. Local 208 Denver, U.A. Local 290 Oregon, U.A. Local 597 Chicago, the MCAA and the National U.A.

While there are no direct benefits to you in participating in this study, the results from this research will be used to develop a leadership program within your industry, and this is your opportunity to be a part of this national effort. We are asking you to complete a brief survey that will ask your opinions and views of your organization and work environment. The survey should take about 20 minutes to complete. Your participation is completely voluntary and you may withdraw from this study at any time without any adverse consequence.

Your information will be combined with information from other people taking part in the study. Results from this survey will be provided to the safety professional and top management of your company to help your organization make your job safer. No identifying information will be collected on the survey, and the results will be reported in aggregate form only, thus, it is highly unlikely that your supervisor or anyone within the company would be able to identify your individual answers.

When we write about the study to share it with other researchers, we will write about the combined information we have gathered. We may publish the results of this study; however, you will not be identified in these written materials.

There are no known risks associated with participating in this discussion. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

Once you are completed with the survey, please return it using the business reply mail envelope provided.

If any other issues arise pertaining to this study, or you would like to know more information about this study or its results, please do not hesitate to contact your representatives or the administrative contact for this project, Krista Hoffmeister, hoffmk@rams.colostate.edu. If you have questions about your treatment as a participant in this study, please contact Janell Barker, Human Research Administrator at 970-491-1655.

Thank you for your time and cooperation in this research. Sincerely,

Principal Researcher   Training Coordinator

PLEASE CONTINUE ONTO THE BACK PAGE
THANK YOU!

APPENDIX B

STUDY MEASURES

Safety Performance Scale

Safety Compliance

At my current workplace...
1. I use all the necessary safety equipment to do my job.
2. I use the correct safety procedures for carrying out my job.
3. I ensure the highest levels of safety when I carry out my job.

Safety Participation

At my current workplace...
1. I promote the safety program within my contractor.
2. I put in extra effort to improve the safety of the workplace.
3. I voluntarily carry out tasks or activities that help to improve workplace safety.

General Leader Justice Scales

General Leader Procedural Justice

To what extent has your current, immediate supervisor...

1. Collected accurate information before making a decision?
2. Provided opportunities for workers to appeal or challenge decisions?
3. Been free of bias when making a decision?
4. Applied company policies and procedures consistently when making a decision?
5. Allowed all involved individuals to express their views and feelings about an issue at work before deciding how to deal with it?

General Leader Informational Justice

To what extent has your current, immediate supervisor...

1. Been honest in his communications with you?
2. Explained work procedures and tasks thoroughly?
3. Communicated details about work procedures and tasks in a timely manner?
4. Tailored his communications about work to individual worker's style?

General Leader Interpersonal Justice

To what extent has your current, immediate supervisor...

1. Talked with you in a polite manner?
2. Treated you with dignity and respect?
3. Made improper remarks or comments to you?

Safety-Specific Leader Justice Scales

Safety-Specific Leader Procedural Justice

To what extent has your current, immediate supervisor...
1. Collected accurate information before deciding how to handle a worker's safety violation?
2. Provided opportunities for workers to appeal or challenge safety violation claims?
3. Been free of bias when dealing with workers' safety violations?
4. Applied safety standards and company policies consistently in dealing with workers' safety violations?
5. Allowed all involved individuals to express their views and feelings about a safety violation before deciding how to deal with it?

Safety-Specific Leader Informational Justice

To what extent has your current, immediate supervisor...
1. Been honest with you in his communications about safety issues at work?
2. Explained safety rules and procedures thoroughly?
3. Communicated details about safety rules and procedures in a timely manner?
4. Tailored his communications about work safety concerns to individual worker's style?

Safety-Specific Leader Informational Justice

To what extent has your current, immediate supervisor...
1. Talked with you about your safety performance in a polite manner?
2. Treated you with dignity and respect when discussing your safety performance?
3. Made improper remarks or comments to you about your safety performance?

Leader Support for Safety Scale

At my current workplace...
1. My current, immediate supervisor places a strong emphasis on workplace health and safety.
2. Safety is given a high priority by my current, immediate supervisor.
3. My current immediate supervisor considers safety to be important.

VITA

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EDUCATION

Old Dominion University, Norfolk, VA
- Ph.D. in Industrial/Organizational Psychology   *Expected: 2016*
- M.S. in Industrial/Organizational Psychology   *Expected: 2014*

Portland State University, Portland, OR
- Post Baccalaureate Major: Psychology. Emphasis: I/O Psychology   *Fall, 2010*

University Of Oregon, Eugene, OR
- Bachelor of Arts: Spanish   *June, 2009*

PUBLICATIONS & PRESENTATIONS

Kaufman, B., Cigularov, K., Chen, P., Hoffmeister, K., Gibbons, A. M., & Johnson, S. K. (May, 2013). *Leader Justice and Safety Performance: Moderating Effect of Leader Support for Safety.* Poster accepted for presentation at Work, Stress, and Health (WSH), Los Angeles, CA.

Cigularov, K. P., Sawhney, G., Chen, P. Y., Tomazic, R., Henry, K., **Kaufman, B.**, & Li, Y. (April, 2013). *School safety and work-family conflict: The role of transformational leaders.* Paper accepted at the 28th Annual Conference of the Society for Industrial and Organizational Psychology, Houston, Texas.

Mogan, T., Cigularov, K. P., & **Kaufman, B. R.** (2013, May). *The role of leadership in occupational safety: A review of safety intervention literature.* Paper accepted for presentation at the 10th International Conference on Occupational Stress & Health, Los Angeles, CA.

Kaufman, K., Tews, H., Schuett, J. & **Kaufman, B.** (2011). Prevention is better than cure –The value of situational prevention in organizations. In M. Erooga (Ed.) *Towards Safer Organizations – Practical steps to prevent the abuse of children by those working with them.* London, England: Wiley-Blackwell Press.

Hammer, L.B., Neal, M.B., LeComte, J.R., & **Kaufman, B**. The Sandwiched Generation: A 10-Year Follow-Up. Presented at Society for Industrial Organizational Psychology (SIOP), April, 2009.

MANUSCRIPTS IN PREPARATION

Kaufman, B. R., & Cigularov, K. P. (in preparation). *Construction management programs nationwide study: Curricula information.*

Mogan, T., Cigularov, K. P., & **Kaufman, B. R.** (in preparation). *The role of leadership in occupational safety: A review of safety intervention literature.*