Old Dominion University
ODU Digital Commons

Psychology Theses & Dissertations | Psychology

Fall 2017

Creativity and Innovation Through the Job Demands-Resources Model

Nathan Haugejorde Bjornberg
Old Dominion University

Follow this and additional works at: https://digitalcommons.odu.edu/psychology_etds

 Part of the Applied Behavior Analysis Commons, and the Industrial and Organizational Psychology Commons

Recommended Citation
Bjornberg, Nathan H.. "Creativity and Innovation Through the Job Demands-Resources Model" (2017). Doctor of Philosophy (PhD), dissertation, Psychology, Old Dominion University, DOI: 10.25777/rrhz-sz03
https://digitalcommons.odu.edu/psychology_etds/63

This Dissertation is brought to you for free and open access by the Psychology at ODU Digital Commons. It has been accepted for inclusion in Psychology Theses & Dissertations by an authorized administrator of ODU Digital Commons. For more information, please contact digitalcommons@odu.edu.

CREATIVITY AND INNOVATION THROUGH THE JOB DEMANDS-RESOURCES MODEL

by

Nathan Haugejorde Bjornberg
B.A. May 2009, University of Minnesota
M.S. May 2015, Old Dominion University

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

PSYCHOLOGY

OLD DOMINION UNIVERSITY
December 2017

Approved by:

Donald D. Davis, Ph.D. (Co-director)

Konstantin P. Cigularov, Ph.D. (Co-director)

Charles B. Daniels, Ph.D. (Member)

ABSTRACT

CREATIVITY AND INNOVATION THROUGH THE JOB DEMANDS-RESOURCES MODEL

Nathan Haugejorde Bjornberg
Old Dominion University, 2017
Co-Directors: Dr. Donald D. Davis, Dr. Konstantin P. Cigularov

Organizational innovation is key to organizations' financial performance and long-term success (Anderson, Potočnik, & Zhou, 2014; Bowen, Rostami, & Steel, 2010). Employees drive organizational innovation through their creativity and innovation, making the understanding of how to influence these behaviors especially important. Previous research has stressed the importance of the work environment and individual differences in supporting creativity and innovation (Byron & Khazanchi, 2011; Hammond, Neff, Farr, Schwall, & Zhao, 2011; Hülsheger, Anderson, & Salgado, 2009; Hunter, Bedell, & Mumford, 2007), but results have been unclear about how this occurs (Hennessey & Amabile, 2010). This study used the job-demands resources model (Bakker & Demerouti, 2016) to examine the roles that burnout and work engagement play as mediators across antecedents to creativity and innovation. A sample of 817 employees with 277 subordinate-supervisor matched pairs was collected from a large organization to assess the hypothesized model. Results indicated that creativity and innovation were best supported through role expectations, intellectual stimulation, and employee creative self-efficacy. Tests of structural models supported the hypothesized model, and tests of indirect effects supported work engagement, but not burnout, as an important mediator across antecedents.

Copyright, 2017, by Nathan Haugejorde Bjornberg, All Rights Reserved.

ACKNOWLEDGEMENTS

I would like to thank my dissertation committee for their support throughout the process. Dr. Donald Davis was instrumental in helping me develop the research idea and ensuring academic rigor and meaningfulness to organizations. He retired from teaching halfway through the process but remained involved until the end, for which I am grateful. Dr. Konstantin Cigularov was gracious enough to take over as my dissertation chair and support me through the process. He was a reliable source of useful feedback and guidance. I especially appreciate the quick turnarounds on drafts and detailed recommendations to improve my writing. I thank Dr. Charles Daniels for providing a perspective outside of industrial/organizational psychology. He helped me better understand the nuances of the engineering sample and their interpretation of the constructs I wanted to assess.

I would like to acknowledge the role of my family and friends in this process. They provided much needed encouragement and support. They also provided me with patience and understanding when I was busy or didn't have the bandwidth for them.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Intense, global competition requires organizations to be efficient and effective in the innovation of their products and services (Anderson et al., 2014; Bowen et al., 2010; George, 2007; Oldham & Cummings, 1996; Zhou & Shalley, 2003). In the United States, innovation and technological change accounted for over half the productivity growth from 1948-2012 (Office of the Press Secretary, 2015). Through meta-analysis, Bowen et al. (2010) estimated a positive relationship of organizational innovation with financial performance (p = .20). Organizations' innovativeness is driven by the creativity and innovation of their employees. Employee creativity is defined as the generation of ideas that are both contextually unique and useful (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Amabile, 1988). Creativity provides the foundation for innovation, which is defined as the implementation of ideas into products, processes, and procedures (Amabile et al., 1996; Anderson, De Dreu, & Nijstad, 2004; Anderson et al., 2014; West & Farr, 1990). Organizational leadership plays a central role in eliciting or impeding these behaviors (Amabile, 1988; Anderson et al., 2014; Ford, 1996; Hammond et al., 2011; Hennessey & Amabile, 2010; Scott & Bruce, 1994; Woodman, Sawyer, & Griffin, 1993). While a large number of individual factors (e.g., openness to experience, efficacy beliefs) and organizational factors (e.g., supervisor support, resource support, climate for innovation) associated with creativity and innovation have been identified (Anderson et al., 2014; Hammond et al., 2011; Hennessey & Amabile, 2010; Hülsheger et al., 2009), the underlying causal mechanisms are still not well understood (George, 2007; Hennessey & Amabile, 2010).

Understanding casual mechanisms is fundamental to the theory development process (Fisher & Aguinis, 2017). Gaining a richer understanding of how individual and organizational

factors relate to creativity and innovation will help refine theory and encourage more targeted research efforts. Organizations can benefit from a better understanding of causal mechanisms by being able to more strategically invest resources towards actions that result in predicted impact and utility in driving innovation.

A promising approach to understanding mediating mechanisms to creativity and innovation is the job demands-resources model (JD-R; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Taris, 2014). The JD-R model argues that work characteristics can be categorized as either job demands or job resources. Job demands are physical, social, and organizational work characteristics that require prolonged physical and mental effort (Demerouti et al., 2001). Whereas job resources are physical, social, and organizational work characteristics that assist in the achievement of work goals, reduce job demands and resulting strain, or stimulate personal growth.

The JD-R model integrates and specifies relationships between the work environment (e.g., workload, autonomy, support) and work outcomes (e.g., job performance, well-being) through the two mediating mechanisms of health impairment and motivation. The health impairment process is often measured using burnout, which is defined in this study as the degree of physical and psychological fatigue associated with a person's work (Kristensen, Borritz, Villadsen, & Christensen, 2005). The motivational process is often measured using work engagement, which is defined as a positive, cognitive-affective motivational state comprised of high levels of energy, dedication, and absorption (Schaufeli, Salanova, González-romá, & Bakker, 2002). These two mediating mechanisms have been used to enhance the understanding of the causal relationships of the work environment to numerous outcomes, including task performance, contextual performance, turnover, and safety behaviors (Schaufeli & Taris, 2014).

Initial applications of the JD-R model to creativity and innovation have yielded promising results (Agarwal, Datta, Blake-Beard, & Bhargava, 2012; Bakker & Xanthopoulou, 2013; Carmeli, McKay, & Kaufman, 2014; Chang, Hsu, Liou, & Tsai, 2013; De Spiegelaere, Van Gyes, De Witte, Niesen, & Van Hootegem, 2014; Park, Song, Yoon, & Kim, 2013) but have been limited and incomplete in several ways. Table 1 summarizes previous applications of the JD-R model to creativity and innovation. First, the primary focus has been on testing the motivational process, while ignoring the health impairment process. This is problematic because these processes are not independent, so they should be considered jointly (Schaufeli & Taris, 2014). In addition, theoretical and empirical research suggests that negative emotions and anxiety can interfere with creativity and innovation (Byron & Khazanchi, 2011; Hennessey & Amabile, 2010; Huhtala & Parzefall, 2007). Second, researchers have focused on factors that support creativity and innovation (e.g., autonomy, support), while ignoring the role of potential hindering factors (e.g., workload, conflict) and individual characteristics (e.g., self-efficacy beliefs). Third, previous research has not adequately distinguished creativity and innovation. Studies have measured creativity and innovation separately or confounded them into a single measure. Montag, Maertz Jr, and Baer (2012) contribute the inconsistent findings in creativity research to measurement problems associated with commonly used scales, such as scale contamination and deficiency. And fourth, previous applications of the JD-R model have largely relied on self-report, which has been found to inflate relationships in general (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and the relationship of antecedents to creativity and innovation, specifically (Ng & Feldman, 2012).

Table 1
Previous Research Examining JD-R Mediating Mechanisms to Creativity and Innovation

Authors	Sample	JD	JR	PR	BO	WE	Outcome
Agarwal (2014a)	510 in India (SR)		X			x	Mixed
Agarwal (2014b)	450 in India (SR)		X			x	Mixed
Agarwal et al. (2012)	979 in India (SR)		X			x	Mixed
Bakker and Xanthopoulou (2013)	190 in the Netherlands (M)		X	x		x	Mixed
Carmeli et al. (2014)	202 (SR)			x		x	Creativity
Chang et al. (2013)	267 in Taiwan (M)	x	X			x	Mixed
De Spiegelaere et al. (2014)	927 in Belgium (SR)	x	x			x	Mixed
Karatepe (2012)	212 in Cameroon (M)		x			x	Creativity
Maden (2015)	240 in Turkey (SR)		x			x	Mixed
Park et al. (2013)	326 in Korea (SR)	x				x	Mixed
Slatten and Mehmetoglu (2011)	279 in Norway (SR)	x				x	Mixed

Note. SR = self-report, M = employee-supervisor matched, JD = job demands, JR = job resources, PR = personal resources, WE = work engagement, BO = burnout.

In response to the research gaps identified above, the current study examines a mediational model, depicted in Figure 1, that contains multiple contextual and individual antecedents to creativity and innovation, assessing both burnout and work engagement as mediators, separating the measurement of creativity and innovation, and using self-reported and manager-reported outcomes. More specifically, the hypothesized model portrays the impact the contextual factors of workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, and psychological safety have on creativity and innovation. Workload is the degree to which a job requires an employee to work quickly and intensely (Spector & Jex, 1998). Creativity role expectations refer to perceived or actual expectations that employees must be creative at their job (Scott & Bruce, 1994; Unsworth, Wall, & Carter, 2005). Interpersonal conflict is the degree to which disagreements at work related to interpersonal differences occur (De Dreu & Weingart, 2003; Jehn, 1995). Interpersonal conflict relates to the relationship conflicts arising as people work together and are often unrelated to the task at hand (Amason &

Schweiger, 1994; De Dreu & Weingart, 2003; de Wit, Greer, & Jehn, 2012; Jehn, 1995, 1997). Autonomy refers to the degree to which a job allows an employee control over their working methods and timing (Hackman & Oldham, 1980). Intellectual stimulation describes leader behaviors that encourage creative thought and problem-solving (Bass, 1985; Burns, 1978). Psychological safety is the degree employees feel they are able to take risks, speak up, and admit mistakes without fear of embarrassment, rejection, or punishment (Edmondson, 1999).

The individual factors portrayed in the hypothesized model are creative self-efficacy and resiliency. Creative self-efficacy is a person's confidence in their ability to be creative (Tierney & Farmer, 2002). Resiliency is the degree to which a person can effectively work through adversity (Connor & Davidson, 2003; King, Newman, & Luthans, 2015). These organizational and individual factors are modeled to have an impact on creativity and innovation directly and through the two pathways of burnout and work engagement.

This manuscript will proceed in the following way. First, an overview of the JD-R model and its application to creativity and innovation will be provided. Second, the hypothesized model will be discussed in detail along with the construct relationships to be tested. Third, the research methodology and sample characteristics of the organization will be provided. Fourth, the hypothesized model fit will be evaluated along the hypothesized direct and indirect effects. Lastly, the implications of the research findings to future research and applications will be discussed.

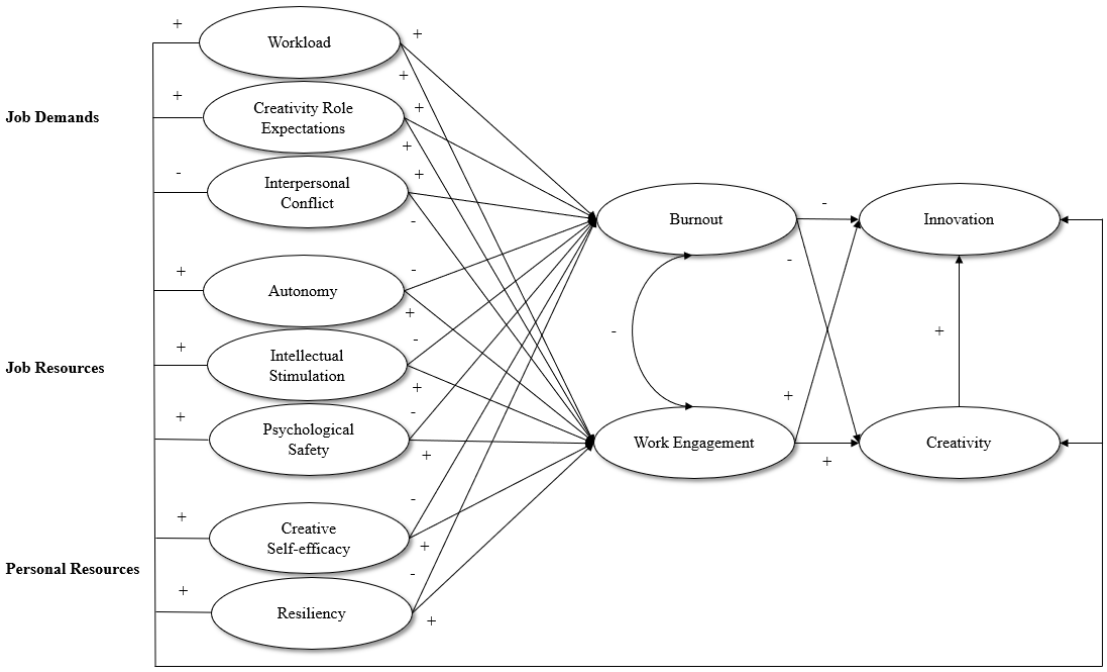

Figure 1. Hypothesized Job Demands-Resources Model of Creativity and Innovation

CHAPTER II

BACKGROUND

The Job Demands-Resources Model

Many theoretical models of work stress suggest balancing a demanding work environment with adequate resources to support employee performance and well-being (Demerouti et al., 2001; Karasek, 1979; Karasek & Theorell, 1990; Siegrist, 1996). A seminal model in this field, the job demand-control model (Karasek, 1979), hypothesized that demanding work conditions (e.g., work overload) have a negative impact on employee well-being, but this effect can be mitigated through increased levels of job control. A later iteration of this model, the Job Demand-Control-Support model (Johnson & Hall, 1988), introduced social support as an additional factor that can reduce negative impacts of a demanding work environment on well-being. In a more recent theory, the Effort-Reward Imbalance model (Siegrist, 1996), demanding work conditions are argued to require a compensatory amount of rewards (e.g., money, career opportunities). One of the main limitations of these models is that they use a limited set of constructs (e.g., job control, work overload, social support), which is an oversimplification and makes generalization across occupations and outcomes difficult.

The JD-R model (Bakker & Demerouti, 2007, 2014; Demerouti et al., 2001; Schaufeli & Bakker, 2004) builds upon previous models by continuing with a focus on the balance between job demands and job resources but embraces differences across occupations by allowing a wide variety of work and individual characteristics to be included in the model. Table 2 presents a selection of job demands, job resources, and personal resources that have been examined previously. Personal resources are defined as self-beliefs related to one's efficacy and resiliency (Hobfoll, Johnson, Ennis, & Jackson, 2003).

Table 2
Job Demand, Job Resource, and Personal Resource Examples Adapted from Schaufeli and Taris (2014)

Type	Examples
Job Demands	Cognitive demands, complexity, computer problems, demanding patients, emotional demands, interpersonal conflict, job insecurity, physical demands, qualitative workload, responsibility, role ambiguity, role conflict, sexual harassment, time pressure, work-home conflict, work pressure
Job Resources	Appreciation, autonomy, financial rewards, goal clarity, information, job challenge, leadership, opportunities for development, performance feedback, procedural fairness, safety climate, social support, task variety, trust in management
Personal Resources	Emotional competence, extraversion, hope, emotional stability, optimism, organizational-based self-esteem, regulatory focus, resiliency, self-efficacy

The JD-R model has been updated and extended considerably since its original conceptualization (Bakker & Demerouti, 2007; Demerouti et al., 2001; Schaufeli & Bakker, 2004; Schaufeli & Taris, 2014). Demerouti's (2001) JD-R model was largely influenced by Lee and Ashforth's (1996) categorizations of job demands and job resources and Maslach, Jackson, and Leiter's (1997) model of burnout. In this model, job demands and job resources were hypothesized as having direct effects on exhaustion and disengagement, which were conceptualized as two facets of burnout (Demerouti et al., 2001). Job demands were proposed to increase exhaustion, while job resources were expected to reduce disengagement.

Schaufeli and Bakker (2004) later revised the model by using a more robust representation of burnout that included multiple indicators (e.g., exhaustion and withdrawal), separating the construct of burnout from work engagement, adding a direct effect from job resources to burnout, and describing two mediating pathways that linked job demands and job resources to organizational outcomes. These two paths were called the energetic process and the motivational process (Schaufeli & Bakker, 2004; Schaufeli & Taris, 2014). In the energetic process, extended exposure to job demands depleted physical and mental resources, which led to

burnout and subsequent negative effects on health outcomes (e.g., illness, depression, anxiety). In the motivational process, job resources increased engagement, which subsequently, had a positive effect on organizational outcomes (e.g., performance). A representation of the model is shown in Figure 2.

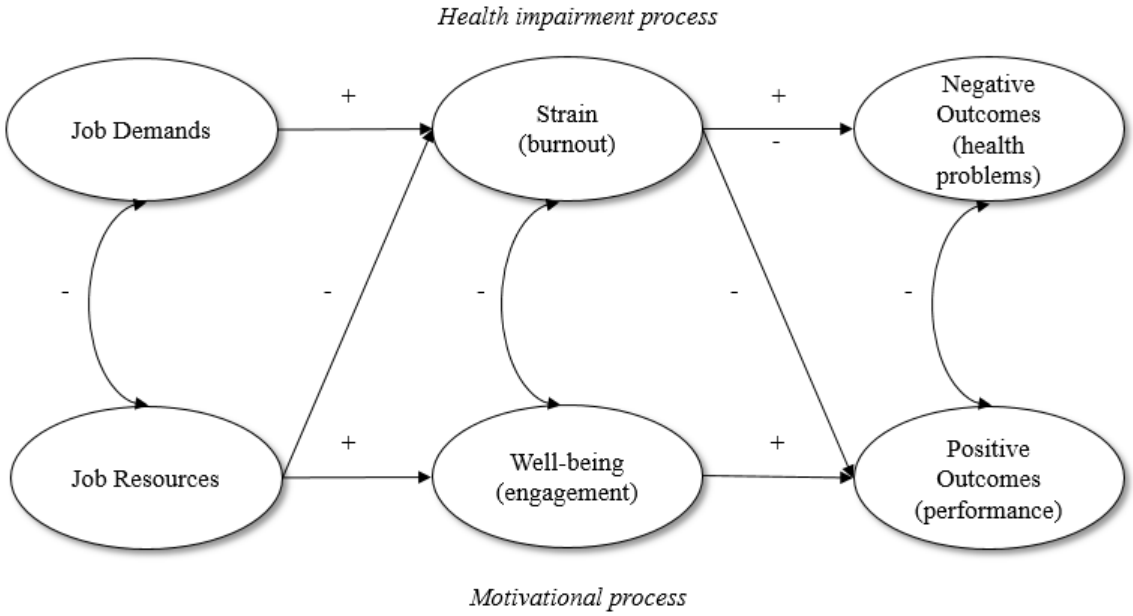

Figure 2. Job Demands-Resources Model

Bakker and Demerouti (2007) updated the model by hypothesizing two interaction effects. The first interaction hypothesis was that the relationship between job demands and strain decreases as job resources increase. For example, increasing a person's job control would reduce the degree that time pressure impacted strain. The second interaction hypothesis was that the relationship between job resources and motivation would increase as job demands increased. For example, increasing a person's workload would increase the importance of leader support to their motivation.

Bakker, Demerouti, and Sanz-Vergel (2014) provide the most recent version of the model. The authors supplemented job resources with personal resources. They hypothesized them acting in a similar way to job resources with positive impacts on motivation and negative impacts on strain. The JD-R model often conceptualizes a path between strain and motivation. In this version of the model, the authors specified a causal relationship from strain to work engagement. The largest change in the model was the addition of feedback loops in which motivation could impact resources and strain could impact job demands. Job crafting, which is defined as an individual shaping their actual and perceptual work environment (Wrzesniewski & Dutton, 2001), is the mechanism used to explain how motivation might impact job and personal resources. This process was termed a gain spiral. Self-undermining behaviors, such as poor communication and relationships, mistakes, and additional conflicts, was used to explain how strain could have an impact on job demands. This process was labeled a loss spiral.

The current research uses the most recent JD-R model (Bakker et al., 2014) with two exceptions. First, burnout and work engagement will be covaried. There is insufficient theoretical or empirical support to limit the direction of this relationship. Studies have examined their independence with inconclusive findings (Demerouti, Mostert, & Bakker, 2010). Second,

interactions effects will not be included in the model. Support for interaction effects has been poor (Schaufeli & Taris, 2014). Few studies have found interaction effects and the effect sizes have been small, suggesting a lack of practical relevance (Taris & Schaufeli, 2015). As such, interaction effects between job demands and resources will not be a focus of this study, but instead will be examined in an exploratory way.

The JD-R model has been supported across countries, occupations, and outcomes (Bakker & Demerouti, 2007; Schaufeli & Taris, 2014; Taris & Schaufeli, 2015). The main effect hypotheses for job demands and job resources on strain and motivation have received the most empirical support (e.g., Airila et al., 2014; Akkermans, Brenninkmeijer, Van Den Bossche, Blonk, & Schaufeli, 2013; Alarcon, 2011; Bakker, Demerouti, de Boer, & Shaufeli, 2003; Barbier, Hansez, Chmiel, & Demerouti, 2013; Bass et al., 2016; Crawford, LePine, & Rich, 2010; Diestel & Schmidt, 2012; Hakanen, Schaufeli, & Ahola, 2008; Hu & Schaufeli, 2011; Korunka, Kubicek, Schaufeli, & Hoonakker, 2009; Lewig, Xanthopoulou, Bakker, Dollard, & Metzer, 2007; Llorens, Schaufeli, Bakker, & Salanova, 2007; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Alarcon (2011) conducted a meta-analysis on job demands (role ambiguity, role conflict, workload), job resources (control, autonomy), and burnout. The authors found positive relationships for specific job demands and burnout dimensions with corrected correlations ranging from .11 to .53, and negative relationships for specific job resources and burnout dimensions with corrected correlations ranging from -.24 to -.39. In a meta-analysis by Crawford et al. (2010), several job resources (e.g., autonomy, feedback, positive workplace climate, support) were found to be positively associated with work engagement with corrected-correlations ranging from .21 to .53. The mediating pathways for health impairment and motivation have also been supported in a variety of studies (Bakker et al., 2003; Hakanen,

Bakker, & Schaufeli, 2006; Hu & Schaufeli, 2011; Hu, Schaufeli, & Taris, 2011; Korunka et al., 2009; Lewig et al., 2007; Schaufeli & Bakker, 2004).

Support from longitudinal studies of the relationships specified in the JD-R model have been mixed. While many studies have found support for the causal relationships (Airila et al., 2014; Akkermans et al., 2013; Barbier et al., 2013; Diestel & Schmidt, 2012; Hakanen et al., 2008; Xanthopoulou et al., 2009), some studies have not (Brough et al., 2013; Seppälä et al., 2015). One explanation for the inconsistent findings is study-specific differences. A wide variety of constructs have been used in the JD-R model, which is a strength of the model, but this can also lead to inconclusive results when constructs and mediators measured are not aligned with the nuances of the sample and outcomes being examined (Taris & Schaufeli, 2015).

Job demands as challenge and hindrance demands. One challenge of early research on job demands was that findings with outcomes (e.g., job performance) were inconsistent (Crawford et al., 2010). Stemming from the transactional theory of stress (Lazarus & Folkman, 1984), research has revealed that job demands can be categorized by how they are generally perceived, which has been either as challenge or hindrance demand (Boswell, Olson-Buchanan, & LePine, 2004; Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Lepine, Podsakoff, & Lepine, 2005). Challenge demands are defined as work conditions that tend to be perceived as opportunities for learning, personal growth, and goal achievement. Examples of challenge demands include workload, job complexity, and pressure. Hindrance demands are work conditions that tend to be perceived as obstacles to personal growth and goal attainment. Examples of hindrance demands include situational constraints, organizational politics, and conflict. The differentiation between challenge and hindrance demands has received substantial, empirical support (Boswell et al., 2004; Cavanaugh et al., 2000; Crawford et al., 2010; Lepine et

al., 2005). LePine et al.'s (2005) meta-analysis found that challenge and hindrance demands both positively related to strain, however, relationships differed for motivation and performance. Challenge demands were positively related to motivation (p = .16) and performance (p = .12) while hindrance demands were negatively related to motivation (p = -.12) and performance (p = -.20). Crawford et al. (2010) examined this distinction by using meta-analytic estimates and different combinations of job demands to predict burnout and engagement. The authors found that the amount of variance explained in burnout and engagement was greater when job demands were separated into challenge and hindrance demands, providing support for their differentiated model. Their research supported challenge demands being positively related to burnout (p = .16) and engagement (p = .16) with hindrance demands being positively related to burnout (p = .30) while negatively related to engagement (p = -.19). In light of these findings, the current research differentiated between challenge and hindrance demands with respect to hypothesis formation and model testing.

Job Demands, Job Resources, and Personal Resources for Creativity and Innovation

The terms creativity and innovation are often used interchangeably, which highlights the challenge in defining and distinguishing these constructs (Anderson et al., 2014; Hammond et al., 2011; Montag et al., 2012). Seminal work by Amabile (1988) defined creativity as ideas that are both contextually novel and useful, whereas innovation is the implementation of these ideas. Creativity precedes innovation because ideas are the starting point to implementations (Amabile, 1988). The current research aligns itself with activity-based stage models of innovation (e.g., Amabile, 1988; Farr, Sin, & Tesluk, 2003). In this type of model, innovation results from the linear process from ideation to implementation. While the innovation process is more complex and recursive in nature (Van de Ven, Polley, Garud, & Venkataraman, 1999), this type of

simplification is more suitable to research (Anderson et al., 2014; Hammond et al., 2011). Creativity involves behaviors such as defining a problem or goal, gathering information, generating ideas, and refining and selecting ideas. Innovation includes behaviors such as gathering support for an idea, planning, testing, and implementing the idea.

Research on creativity and innovation has evolved over several decades across different disciplines resulting in a wide mixture of findings (Anderson et al., 2014). In Anderson et al's (2014) literature review on individual creativity and innovation, the categories of individual factors, task contexts, and social contexts were used to describe previous research topic areas. Individual factors include concepts such as dispositions, knowledge, skills, motivations, goal orientations and cognitive framing, self-concepts, and psychological states. Task context includes features of a job and work, such as complexity and expectations. Social context includes factors such as leadership, climate, social networks, and coworker support. The categorizations of job demands and resources provides a useful organizing framework for previous empirical findings. Table 3 includes a list of constructs that were identified as associated with creativity and innovation through meta-analytic studies. These variables were categorized based on previous conceptualizations (Alarcon, 2011; Crawford et al., 2010; Lepine et al., 2005). Job demands are shown separated into challenge and hindrance demands, and personal resources are included in addition to job resources. It is noticeable that previous research has focused more on job and personal resources in relation to creativity and innovation than on job demands, suggesting a research gap.

Table 3
Meta-analytic Findings for Creativity and Innovation Categorized into Job Demands and Resources

Category		Construct
Job Demands	Challenge	Job complexity, creativity role expectations, job challenge
	Hindrance	Stressors (aggregation across types)
Resources	Job	Autonomy, climate for creativity, climate for innovation, cohesion, creativity-contingent rewards, coworker exchange, coworker support, external communication, initiating structure, internal communication, leader-member exchange, participative safety, positive climate, resources, supervisor support, supervisor empowerment support for innovation, transformational leadership, vision
	Personal	Age, cognitive ability, creative personality, creative self-efficacy, education, general cognitive ability, job self-efficacy, low anxiety, mindfulness, openness, plasticity (openness, extraversion), proactive personality, tenure, trait positive affect

Note. Results based on meta-analytic studies (Byron & Khazanchi, 2011, 2012; Byron, Khazanchi, & Nazarian, 2010; Hammond et al., 2011; Hülsheger et al., 2009; Hunter et al., 2007; Karwowski & Lebuda, 2016; Kim, 2008; Kuncel, Hezlett, & Ones, 2004; Lebuda, Zabelina, & Karwowski, 2016; Ng & Feldman, 2009, 2012, 2013; Rosing, Frese, & Bausch, 2011).

Selection of variables for assessment in this study was based on several criteria. First, the importance to creativity and innovation was evaluated. Taris and Schaufeli (2015) argue that examinations of the JD-R model must include variables that are relevant to the sample and outcomes of focus. Research using meta-analytic methods where relationships across studies were calculated, in addition to results from studies based on samples like the target sample (e.g., research and development, engineering) were prioritized. Second, variables that were somewhat malleable were prioritized. Bearing in mind partner organization needs, variables that could be modified in current employees through training or other interventions were preferred. Third, there were practical considerations given the partner organization and sample. For example, variables that employees may find too intrusive were not assessed in this study. The following sections will provide the theoretical and empirical support for the effects within the model.

Job demands, creativity, and innovation. Given that workload is considered a challenge demand (Lepine et al., 2005), it should have a positive effect on creativity and innovation through increased motivation to employ new ideas and ways of accomplishing a task in order to meet deadlines. Ohly and Fritz (2010) suggested that based on Gardner's (1986) activation theory, higher levels of workload should result in increased task motivation. They also suggested that for occupations that entail creativity (e.g., scientists, engineers), increases in workload result in more energy directed towards creativity. In their study, they found a positive relationship between workload and creativity, and workload was related to an increased sense of challenge.

Fay and Sonnentag (2002) suggested that based on control theory (Carver & Scheier, 1982), pressures from workload can operate as a feedback mechanism indicating a suboptimal condition. Creativity and innovation are then coping responses to find new ways to meet the workload (Bunce & West, 1994; Fay & Sonnentag, 2002). Andrews and Farris (1972) found a positive effect of workload on the performance measures of usefulness, productivity, and innovation in NASA scientists and engineers. They found that high-performing scientists and engineers perceived a higher workload and those that reported a higher workload tended to be more motivated in their work. Wu, Parker, and de Jong (2014) found that workload had a positive relationship with innovation behaviors as rated by peers. The effect of workload on creativity and innovation has been found to be positive (Andrews & Farris, 1972; Ohly & Fritz, 2010; Unsworth & Chang, 2005; Wu et al., 2014), and curvilinear (Baer & Oldham, 2006). Findings suggest that workload, if not extreme (Binnewies & Wörnlein, 2011), should be appraised as a challenge demand and lead to increased creativity and innovation. Therefore, it is expected that:

Hypothesis 1: Workload will be positively related to (a) creativity and (b) innovation.

Employees interpret cues from their environment to determine the impact creativity and innovation behaviors have on their success at work (Ford, 1996; Oldham & Cummings, 1996). Information comes to employees in different ways and from several sources, such as written job requirements, feedback from managers, conversations with coworkers, and organizational priorities. The Pygmalion effect (Rosenthal & Jacobson, 1968) is a type of self-fulfilling prophecy that has been used to describe the phenomenon of how changing performance expectations can result in compensatory performance changes. Within organizational settings, this is usually observed in the context of managers' expectations and subordinates' performance. Meta-analytic studies have supported this effect and estimated a positive performance impact of about one standard deviation (Kierein & Gold, 2000; McNatt, 2000). Applied to creativity and innovation, employee engagement in these behaviors could be partially due to the expectations of those around them. Carmeli and Schaubroeck (2007) found that perceived expectations for creativity, which came from a combination of customer, leader, and family expectations, were positively related to involvement in creative work. Scott and Bruce (1994) found that leader role expectations for innovation were positively related to innovative behaviors. Other research has largely supported the impact of role expectations on creativity and innovation (Anderson et al., 2014; Janssen, 2000; Tierney & Farmer, 2004, 2011; Unsworth & Chang, 2005; Yuan & Woodman, 2010). Consistent with the above research, it is hypothesized that:

Hypothesis 2: Creativity role expectations will be positively related to (a) creativity and (b) innovation.

Individuals must work together to solve complex problems, so disagreements unrelated to the task can hamper creativity and innovation. Interpersonal conflicts are seen as especially

harmful to performance as they result in negative, emotional reactions and take time away from the task (de Wit et al., 2012; Jehn, 1997). Desivilya, Somech, and Lidgoster (2010) found that relationship conflict was negatively associated to the degree a team uses a cooperative approach to conflict management, highlighting the potential for reduced collaboration, which is essential to creativity and innovation (Hülsheger et al., 2009). Consequently, the following hypothesis is proposed:

Hypothesis 3: Interpersonal conflict will be negatively related to (a) creativity and (b) innovation.

Job resources, creativity, and innovation. The three job resources of autonomy, intellectual stimulation, and psychological safety were examined in this research. Autonomy is a central resource in theories of job demands and resources (Demerouti et al., 2001; Karasek, 1979; Karasek & Theorell, 1990). Autonomy provides employees with additional flexibility and opportunities for adaptability, which is important for innovation as it does not always follow a linear and predictable path. Based on job characteristics theory (Hackman & Oldham, 1980), autonomy elevates the sense of responsibility for the success and failure of one's work, which increases motivation. Self-determination theory (Deci & Ryan, 1987) argues that control over one's actions enhances intrinsic motivation, task interest, creativity, cognitive flexibility, learning, self-esteem, and physical and psychological health. Additionally, Ford's (1996) theory of individual creative action predicts that in situations where employee autonomy is low, routine behavior is rewarded and non-routine behaviors, those critical to creativity and innovation, are discouraged. Across studies, autonomy has been found to have a positive relationship with creativity and innovation (Hammond et al., 2011). Based on the above reasoning and aligned with previous research findings, the following hypothesis is proposed:

Hypothesis 4: Autonomy will be positively related to (a) creativity and (b) innovation.

Transformational leadership (Bass, 1985; Burns, 1978) has been found to enhance creativity and innovation, although the relationship strength has varied substantially (Rosing et al., 2011). Intellectual stimulation should be especially potent in stimulating creativity and innovation. Based on Ford's (1996) theory of individual creative action, a leader high in intellectual stimulation would provide strong social cues that new ideas and implementation attempts are encouraged and rewarded. A leader exhibiting intellectual stimulation behaviors incites divergent thinking among employees, which is important to developing solutions to problems (Rafferty & Griffin, 2004; Zhou & Oldham, 2001). In an experiment, Boies, Fiset, and Gill (2015) found that leaders' intellectual stimulation led to higher levels of creative team outcomes as rated by trained judges. Consequently, the following hypothesis is proposed:

Hypothesis 5: Intellectual stimulation will be positively related to (a) creativity and (b) innovation.

Psychological safety impacts the degree to which employees feel they are able to speak up, take risks, and admit mistakes without fear of embarrassment, rejection, or punishment (Edmondson, 1999). Psychological safety is a critical component of a climate for creativity and innovation (Hunter et al., 2007). Stemming from high-quality interpersonal relationships, psychological safety promotes the sharing of ideas and risk-tasking, which enables creativity and innovation as argued by the theory of individual creative action (Ford, 1996). Research findings have supported a positive effect of psychological safety on creativity and innovation across studies (Carmeli, Reiter-Palmon, & Ziv, 2010; Kark & Carmeli, 2009; Koopmann, Lanaj, Wang, Zhou, & Shi, 2016; Liu, Zhang, Liao, Hao, & Mao, 2016; Post, 2012; Zhou & Pan, 2015). Accordingly, the following hypothesis is proposed:

Hypothesis 6: Psychological safety will be positively related to (a) creativity and (b) innovation.

Personal resources, creativity, and innovation. Creative self-efficacy and resiliency are the two personal resources that were examined in this study. Creative self-efficacy is the degree to which individuals perceive themselves to be effective in creative endeavors and has emerged as an important creative self-belief (Gong, Huang, & Farh, 2009; Hammond et al., 2011; Jaussi, Randel, & Dionne, 2007; Richter, Hirst, van Knippenberg, & Baer, 2012; Tierney & Farmer, 2002, 2004). The positive relationship of creative self-efficacy with both creativity and innovation is supported by self-efficacy theory (Bandura, 1977, 1997) and expectancy theory (Vroom, 1964). Self-efficacy theory (Bandura, 1977, 1997) posits that the initiation and persistence of behaviors are based on self-judgments of capability beliefs. In terms of creativity, those individuals who are more confident in their abilities to produce creative outcomes will be more likely to engage in creative behaviors. Similarly, expectancy theory (Vroom, 1964) argues that individuals' motivation is a function of their perception that efforts will result in a desired performance level and that performance level is associated with outcomes that are important to them. Creative self-efficacy encourages motivation through the reframing of difficulties as challenges, setting of more difficult goals related to creativity and innovation, and increased persistence through obstacles and setbacks (Bandura & Locke, 2003; Tierney & Farmer, 2002). Meta-analytic and longitudinal studies show that creative self-efficacy is positively related to creativity and innovation (Hammond et al., 2011; Tierney & Farmer, 2011). Following this research, the following hypothesis is proposed:

Hypothesis 7: Creative self-efficacy will be positively related to (a) creativity and (b) innovation.

Resiliency is the ability of individuals to successfully adapt in the face of adversity (Connor & Davidson, 2003; Luthar, Cicchetti, & Becker, 2000; Masten & Obradovic, 2006). Scholars advocate for its study within the organizational sciences because it promotes positive functioning in the current-day working environment that is increasingly difficult and stressful (APA, 2015; King et al., 2015; Luthans, Youssef, & Avolio, 2007). Luthans and colleagues (Luthans & Youssef, 2004; Luthans et al., 2007) introduced the concept of psychological capital, which is a positive psychological state of development measured by a combination of hope, optimism, efficacy, and resiliency. This higher-order construct has been found to be important in both role and extra-role performance based on meta-analytic estimates (Avey, Reichard, Luthans, & Mhatre, 2011). Employees with higher resiliency are better able to perform under pressure and sustain performance longer in the face of obstacles (Bakker & Xanthopoulou, 2013; Moenkemeyer, Hoegl, & Weiss, 2012). As attempts to innovate are riddled with challenges and failures (Moenkemeyer et al., 2012), resiliency may be particularly important to creativity and innovation. Resiliency has also been associated with positive emotions and openness during difficult situations, which allows for an increased ability to improvise through encouraging new thoughts and behaviors (Philippe, Lecours, & Beaulieu-Pelletier, 2009; Rego, Sousa, Marques, & Cunha, 2012; Tugade, Fredrickson, & Barrett, 2004). In Eschleman, Bowling, and Alarcon's (2010) meta-analysis on hardiness, which included measures of resiliency, it was found to be positively associated with self-esteem and optimism, while negatively associated with neuroticism, and negative affectivity. Findings from initial research on resiliency have supported a positive association with creativity and innovation (Gupta & Singh, 2014; Hsu & Chen, 2015; Sweetman, Luthans, Avey, & Luthans, 2011; Zubair & Kamal, 2015). Following these initial findings, the following hypothesis is proposed:

Hypothesis 8: Resiliency will be positively related to (a) creativity and (b) innovation.

Health impairment process: Burnout as a mediator. The JD-R model posits a health impairment pathway where the effects of job demands and job resources on employee health and performance are mediated by strain (e.g., burnout). The health impairment process is explained by the compensatory regulatory-control model (Hockey, 1997) and conservation of resources theory (Hobfoll, 1989, 2002). The compensatory regulatory-control model (Hockey, 1997) focuses on the maintenance of performance levels during changing demands. Under normal conditions, individuals perform at a certain level to achieve their performance targets. When job demands increase, a choice must be made between increasing effort to maintain performance levels or reducing performance targets to maintain effort levels. If performance levels are maintained, additional effort is required, which comes with physiological (e.g., cortisol excretion increases) and psychological costs (e.g., mental fatigue). Extended periods of increased effort are especially harmful due to buildup of the associated costs, which would explain the longer-term health outcomes in the JD-R model. The negative effect of job demands on burnout applies for both challenge and hindrance demands as they both require the expenditure of effort (Crawford et al., 2010).

Conservation of resources theory (Hobfoll, 1989) argues that people are driven to acquire resources (e.g., money, status, self-esteem), retain them, and protect against their loss. Stress occurs when resources are threatened, lost, or efforts to gain resources are unsuccessful. Burnout occurs as a result of prolonged exposure to resource depletion (Demerouti et al., 2001; Lee & Ashforth, 1996). Individuals with more job and personal resources are going to be better able to adequately handle changes in demands as they are more protected against resource depletion than those with limited resources (Crawford et al., 2010). There is also evidence of a resource

gain spiral (Hobfoll, 2001; Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010), where high job and personal resources increase the chances of acquiring additional job and personal resources.

Burnout should be negatively associated with creativity and innovation due to its potential in harming individuals' ability to engage in exploratory and divergent thinking, which is critical to supporting creativity and innovation (Amabile, Barsade, Mueller, & Staw, 2005). The broaden-and-build theory of positive emotions (Fredrickson, 2001) suggests that positive emotions broaden thought-action repertories, while negative emotions narrow them. When individuals experience positive emotions (e.g., joy, pride), they are more likely to engage in exploration, play, new activities, and an expansion of self through learning and development (Fredrickson, 2001). When individuals experience negative emotions (e.g., fear, anger), their thoughts and behavioral responses are focused on the perceived cause of the emotions. From an evolutionary perspective, focused attention in response to negative emotions from life-threatening situations was critical to survival (Fredrickson, 2001). The impact of this type of response for non-life-threatening daily experiences is less useful. As negative emotions are associated with burnout (e.g., hopelessness, fear, sadness, anxiety), individuals experiencing burnout will be more likely to use tried-and-true methods to meet job demands, which limits their ability for creativity and innovation (Amabile et al., 2005; Fredrickson, 2001; Huhtala & Parzefall, 2007). Studies on the impact of burnout on creativity and innovation are rare, with no studies evaluating it as a mediator for the effect of job demands and job resources on creativity and innovation. Noworol, Zarczynski, Fafrowicz, and Marek (1993) classified managers in three clusters based on their scores across the burnout dimensions. Their findings suggested that those lower on the burnout facets scored much higher on tests of creativity. In a study examining task performance, which is strongly related to creativity and innovation (Harari, Reaves, &

Viswesvaran, 2016), emotional exhaustion was found to be a mediator of the impact of job demands and resources (Bakker, Demerouti, & Verbeke, 2004). Based on the JD-R model and empirical findings, the following hypothesis is proposed:

> *Hypothesis 9*: Workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, and psychological safety will have indirect effects on creativity and innovation through burnout.

Motivational process: Work engagement as a mediator. Meta-analytic research suggests that both job demands and job resources are related to work engagement (Crawford et al., 2010; Lepine et al., 2005). Expectancy theory (Vroom, 1964) has been used to explain the effects of challenge and hindrance demands on work engagement (Lepine et al., 2005). Expectancy theory (Vroom, 1964) proposes that motivation is the result of a combination of multiple perceptions: effort will result in a desired performance level (expectancy), the desired performance level will result in rewards, (instrumentality), and those rewards are valuable (valence) and will encourage further effort. Challenge demands may positively impact work motivation through increasing the belief that effort will result in a desired performance level and that performance level will result in rewards that are valuable (e.g., learning and development, personal accomplishment). Hindrance demands may negatively impact work motivation mainly through reducing the belief that effort will result in a desired performance level. As hindrance demands are usually seen as obstacles to task accomplishment and personal growth, a belief that a desired performance level cannot be reached regardless of effort level, can lead to withdrawal and disengagement (Lepine et al., 2005).

The motivational process for job and personal resources is supported by job characteristics theory (Hackman & Oldham, 1980), expectancy theory (Vroom, 1964), and the effort-recovery model (Meijman & Mulder, 1998). Job and personal resources can impact work engagement through both extrinsic and intrinsic motivating factors. From an extrinsic perspective, job and personal resources increase motivation as they are instrumental in the accomplishment of work goals. Job resources are intrinsically motivating because they assist in the satisfaction of basic psychological needs, such as needs for competence, autonomy, and relatedness (Ryan & Deci, 2000). Job characteristics theory (Hackman & Oldham, 1980) specifies five core job characteristics: skills variety, task identity, task significance, autonomy, and feedback. These five core job characteristics, which would all be considered job resources in the JD-R model, encourage motivation through the three psychological states of experienced meaningfulness, responsibility, and knowledge of results. Additionally, based on effort-recovery model (Meijman & Mulder, 1998), environments that are rich in job resources activate a willingness for employees to devote extra energy towards their tasks. Personal resources are argued to impact engagement through tightening the link between effort and desired performance level (Vroom, 1964), increasing intrinsic motivation (Bakker & Sanz-Vergel, 2013), and encouraging the pursuit of goals aligned with ideals, interests, and values (Judge, Bono, Erez, & Locke, 2005).

Kahn (1990, 1992) argued that engagement was the personal investment in one's work role, leading to a greater investment of resources towards their work, a broader definition of the responsibilities associated with their work role, and creativity. Macey and Schneider (2008) contended that engagement underlies organizational commitment, job involvement, positive affective towards one's job and work setting, and a self-identification and investment in a

person's work. This personal investment and increased commitment to one's work enables creativity and innovation through increased investment of effort and involvement in extra-role behaviors. Research findings support positive relationships for work engagement with creativity and innovation (Agarwal et al., 2012; Bakker & Xanthopoulou, 2013; Carmeli et al., 2014; Demerouti, Bakker, & Gevers, 2015; Gevers & Demerouti, 2013; Park et al., 2013). De Spiegelaere et al. (2014) found that work engagement mediated the relationship between job insecurity and autonomy with innovative work behavior, which was measured used a combination of idea generation and implementation. Aryee, Walumbwa, Zhou, and Hartnell (2012) found that work engagement mediated the relationship between transformational leadership and innovative behavior. Agarwal et al. (2012) found that work engagement mediated the relationship between leadership relationship quality and innovative work behavior. Based on the JD-R model and related research findings, the following hypothesis is proposed:

> *Hypothesis 10*: Workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, and psychological safety will have indirect effects on creativity and innovation through work engagement.

Alternatives to the proposed model. When testing structural models, it is important to compare the hypothesized model with alternative, plausible models (Kline, 2015; Mueller & Hancock, 2008). Accordingly, the hypothesized model depicted in Figure 1 was compared to two alternatives. The first alternative model, shown in Figure 3, includes paths from job resources to personal resources added. The role of personal resources in the JD-R model is not clear and some studies have found they acted as mediators (Llorens et al., 2007; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007). As creative self-efficacy and resiliency are malleable individual differences, it is reasonable that the work environment may play a role in shaping them. The

second alternative model, shown in Figure 4, examined the variables in this study using higher-order representations. Several studies have used higher-order representations of job demands and job resources when examining the JD-R model (e.g., Bakker et al., 2004; Bakker & Xanthopoulou, 2013; Hu et al., 2011). Higher-order constructs have been shown to be valuable additions to the science, such as the higher-order construct of psychological capital (Luthans & Youssef, 2004; Luthans et al., 2007). While using a higher-order representation of a variable is more parsimonious, how job demands and resources can be meaningfully aggregated is unclear. Using varied indicators of higher-order constructs will likely result in poorly specified constructs, which will reduce overall fit of the model. As such, the hypothesized model assesses separate constructs, while the second alternative model groups them into higher-order constructs based on current conceptualizations of the factors within the JD-R model (Crawford et al., 2010; Schaufeli & Taris, 2014).

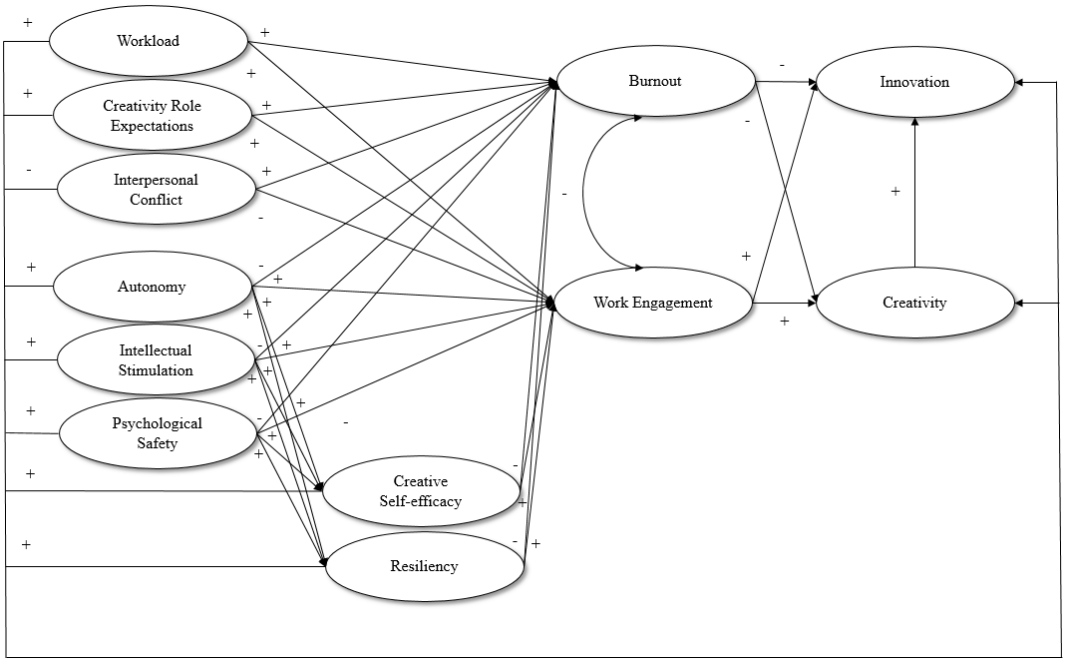

Figure 3. First Alternative Model with Personal Resources as Mediators

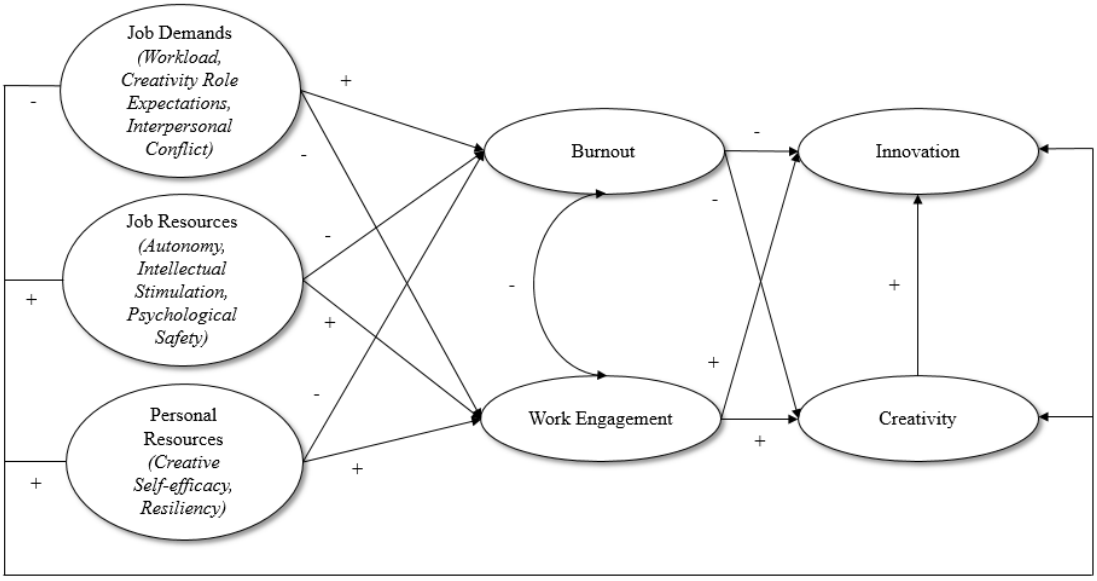

Figure 4. Second Alternative Model with Higher-Order Factors

CHAPTER III

METHOD

Participants

Participants were drawn from a pool of technical-field employees (e.g., scientists, engineers, analysts) within a large aerospace and defense organization. To be eligible to participate, employees had to working within the United States and have at least one year of tenure with the company. The constraint of working in the United States was used to reduce potential confounds associated with cultural differences and eliminate the need for survey translations. The constraint of one year of tenure was used to ensure employees had sufficient time for job training, and their managers had enough time to be able to accurately assess their creativity and innovation. A randomly-selected subset of 4,000 employees were drawn from an eligible pool of roughly 25,000 employees to be invited to participate in the study. Survey invitations were sent to those employees and their manager. Subordinates received a survey that included all measures, and their manager received a survey that contained only the items used to rate the subordinate's creativity and innovation. A total of 857 subordinates (21% response rate) and 1,144 managers (29% response rate) provided responses, yielding an overall response rate of 25%. After subordinate-manager matching, a total of 291 (34%) subordinate-manager matched responses were received.

After data cleaning, the final sample used for analyses contained 817 subordinate responses and 277 subordinate-supervisor matched responses. In the subordinate sample, the largest percentage of tenure reported was for 10 to 19.9 years (33%), followed by three to 9.9 years (25%), 20 or more years (23%), one to 2.9 years (15%), and less than one year (1%). Employees are separated into job grades based on merit from grade 1 (entry-level) to grade 6

(expert). For job grade, many employees were level 4 (26%) or level 5 (25%), followed by level 3 (18%), level 2 (13%), level 6 (6%), and level 1 (5%). Most employees reported they worked at a company location (76%), followed by customer site (8%), partial telecommuter (7%), and full-time telecommuter (5%).

For the matched sample, which included a subset of the subordinates, the demographic distributions were similar. For tenure, the largest percentage of tenure reported was for 10 to 19.9 years (31%), 20 or more years (27%), three to 9.9 years (24%), one to 2.9 years (14%), and less than one year (1%). For job grade, many employees were level 4 (28%) or level 5 (27%), followed by level 3, (19%), level 2 (13%), level 6 (7%), and level 1 (2%). Most employees (77%) reported they worked at a company location, followed by a customer site (8%), full-time telecommuters (6%), and partial telecommuters (7%). Most managers reported that they observed the subordinate on a weekly (43%) or daily (33%) basis. The largest percentage of managers reported acting as a manager to the subordinate for over 24 months (35%), followed by 18 months (18%), 6 months (16%), 24 months (12%), less than 6 months (11%), and 12 months (9%).

Procedure

Approval was acquired from Old Dominion University's Institutional Review Board (Project #: 1025460-3) before collecting data to ensure confidentiality and ethical treatment of participants. A spreadsheet containing pairs of unique survey links hosted on Old Dominion University's network was sent to a company representative. The company representative used the spreadsheet to distribute surveys to subordinates and their managers via email. The email to subordinates contained a study description and unique hyperlink to the survey. The email to managers included a study description, name of subordinate they were being asked to rate, and

unique hyperlink to an online survey hosted on Old Dominion University's network. The survey invitations and reminders are included in Appendix A. Due to overlap in reporting relationships, some manages received more than one survey invitation, although this was rare. Managers were given the option to nominate an alternative manager if they felt that a different manager would be better able to rate the specific employees' daily activities. This was appropriate for this sample because some employees were matrixed and had multiple managers. The survey was open for two weeks and reminders were sent mid-way and before the last day to encourage participation. A total of 1,134 (17%) participants responded before the first reminder and 558 (7%) participants responded before the final reminder. Subordinates were offered an incentive of entering a drawing for one of five $100 Amazon.com gift cards for participating in the survey.

Measures

Online surveys sent to subordinates and their managers were used to collect all measurements. Subordinates rated all measures, whereas managers only rated the subordinate's creativity and innovation. The subordinate survey contained 64 items, a free-response question, and four demographic questions (Appendix B). The manager survey contained 12 items and two items assessing time in manager role and frequency of observation in relation to the target subordinate (Appendix C). All items were rated using a timeframe of the past 90 days. Adequate internal consistency reliability was demonstrated by all scales (Nunnally & Bernstein, 1994). Table 4 provides a summary of the measures used in this study.

Table 4
Description of Measures

Construct	Example Item	Items	α	α	Source
Workload	How often did your job require you to work very hard?	5	.88	.88	(Spector & Jex, 1998)
Creativity Role Expectations	My immediate manager expected me to be creative.	4	.83	.83	(Carmeli & Schaubroeck, 2007)
Interpersonal Conflict	How much friction was there among other employees?	4	.93	.94	(Jehn, 1995)
Autonomy	I decided on my own how to go about doing my work.	3	.84	.86	(Liu, Spector, Liu, & Shi, 2011)
Intellectual Stimulation	My immediate manager challenged me to be innovative in my approach to work assignments.	4	.92	.91	(Wang & Howell, 2010)
Psychological Safety	It was safe to take a risk.	7	.77	.77	(Edmondson, 1999)
Creative Self-efficacy	I had confidence in my ability to solve problems creatively.	3	.79	.76	(Tierney & Farmer, 2002)
Resiliency	I tended to bounce back quickly after hard times.	5	.88	.86	(Smith et al., 2008)
Burnout	Did you feel worn out at the end of the working day?	7	.92	.92	(Kristensen et al., 2005)
Work Engagement	At my work, I felt bursting with energy	9	.89	.89	(Schaufeli, Bakker, & Salanova, 2006)
Creativity	Generated original solutions for problems.	6	.90	.94	(Janssen, 2000; Tierney & Farmer, 2011)
Innovation	Made important organizational members enthusiastic for innovative ideas.	6	.92	.94	(Janssen, 2000; Tierney & Farmer, 2011)

Workload. Workload was measured using the Quantitative Workload Inventory (Spector & Jex, 1998). This five-item measure had a response scale from 1 (*almost never*) to 5 (*several times per day*). An example item was "How often did your job require you to work very hard?" The internal consistency reliability of this scale was .88.

Creativity role expectations. Creativity role expectations were measured using a four-item scale from Carmeli and Schaubroeck (2007) that was originally from Farmer, Tierney, & Kung-McIntyre (2003). The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). The referent of "immediate manager" was used for consistency with terminology used in the

sample. An example item was “My immediate manager expected me to be creative.” The scale was found to have an internal consistency reliability of .83.

Interpersonal conflict. Interpersonal conflict was measured with a four-item scale by Jehn (1995) and the reference of “other employees.” The response scale was from 1 (*none*) to 5 (*a great deal*). An example item was “How much friction was there among other employees?” The internal consistency reliability of the scale was .93.

Autonomy. Autonomy was measured using an adapted version of the Hackman and Oldham (1980) three-item measure as used in Liu et al. (2011). The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). The wording was changed from “the work” to “my work” to reduce ambiguity. An example item was “I decided on my own how to go about doing my work.” The scale had an internal consistency reliability of .84.

Intellectual stimulation. Intellectual stimulation was measured using a four-item measure from Wang and Howell (2010). The referent of “immediate manager” was used for consistency with terminology used in the sample organization. The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item was “My immediate manager challenged me to be innovative in my approach to work assignments.” The internal consistency reliability for the scale was .92.

Psychological safety. Psychological safety was measured using a seven-item measure from Edmondson (1999). The team referent was removed to measure general perceptions of psychological safety. The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). An example question was “It was safe to take a risk.” The internal consistency reliability was .77.

Creative self-efficacy. Creative self-efficacy was measured using a three-item measure from Tierney and Farmer (2002). The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item was "I had confidence in my ability to solve problems creatively." The internal consistency reliability of this measure was .79.

Resiliency. Resiliency was measured using the five-item, brief resilience scale (Smith et al., 2008). The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item was "I tended to bounce back quickly after hard times." The wording was modified made to ensure all items were positively worded. The internal consistency reliability of this scale was .88.

Burnout. Burnout was measured the seven-item Copenhagen Burnout Inventory (Kristensen et al., 2005). The response scale was from 1 (*almost never*) to 5 (*always*). An example item was "Did you feel worn out at the end of the working day?" This measure had an internal consistency reliability of .92.

Work engagement. Work engagement was measured using the Utretcht Work Engagement Scale (Schaufeli et al., 2006). This scale measures a higher-order factor of work engagement using a combination of the three, lower-order factors of vigor (3 items), absorption (3 items), and dedication (3 items). The response scale was from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item was "At my work, I felt bursting with energy." The internal consistency reliability for the scale was .89.

Creativity and innovation. Researchers have struggled to agree on the best way to measure creativity and innovation (Anderson et al., 2014; Hammond et al., 2011; Montag et al., 2012). In a review of the creativity literature, Montag et al. (2012) suggested that variability in conceptualizations and measurement approaches to creativity have contributed to inconsistent findings regarding antecedents. As an example, Ng and Feldman (2013) found that meta-analytic

estimates varied based on the measures of creativity and innovation that were used. This highlights a creativity criterion problem, which is similar to challenges faced in the organizational sciences when measuring job performance (Austin & Villanova, 1992). Montag et al. (2012) described the main concerns with current creativity scales as contaminating items (e.g., George & Zhou, 2001), deficiencies in construct coverage (e.g., George & Zhou, 2001; Scott & Bruce, 1994; Tierney, Farmer, & Graen, 1999), and scales with low fidelity or realism. Montag et al. (2012) recommended that creativity be measured with behavioral statements that assessed different dimensions. They identified four general behavioral dimensions: problem definition (e.g., problem identification), information-gathering (e.g., category search, information search), idea generation (e.g., divergent thinking, conceptual combination), and idea evaluation (e.g., idea selection, idea refinement). Innovation has often been measured using a broad definition that includes the three categories of idea generation, idea promotion, and idea realization (Janssen, 2000; Scott & Bruce, 1994). The concept of idea generation falls within definitions of creativity (Amabile et al., 1996), so there is overlap or contamination with those scales. Recommendations by Montag et al. (2012) were followed to determine the items and mapping in order to more accurately capture creativity and innovation in this study.

Creativity and innovation were measured using items from Tierney and Farmer's (2011) creativity scale and Janssen's (2000) innovative work behavior scale. The items for each scale and their representative constructs and behavioral domains are presented in Table 5. The item of "Demonstrates originality in their work" was removed from Tierney and Farmer's (2011) scale due to behavioral ambiguity. These two scales were completed by both employees and their supervisors. The response scale for both measures varied from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal consistency reliabilities for the subordinate sample were .90 for

creativity and .92 for innovation. For manager ratings in the subordinate-manager matched sample, the internal consistency reliabilities were .94 for creativity and .94 for innovation. Subordinate and manager ratings of creativity and innovation were positively correlated, $r(275) = .16$, $p = .008$, and $r(275) = .15$, $p = .013$, respectively.

Table 5
Items Used to Measure Creativity and Innovation

Item	Construct	Behavioral Dimension	Source
Identified opportunities for new products/processes.	Creativity	Problem definition	Tierney and Farmer (2011)
Searched out new working methods, techniques, or instruments.	Creativity	Information gathering	Janssen (2000)
Tried out new ideas and approaches to problems.	Creativity	Idea evaluation	Tierney and Farmer (2011)
Created new ideas for difficult issues.	Creativity	Idea generation	Janssen (2000)
Generated original solutions for problems.	Creativity	Idea generation	Janssen (2000)
Generated novel, but operable work-related ideas.	Creativity	Idea generation	Tierney and Farmer (2011)
Mobilized support for innovative ideas.	Innovation	Idea promotion	Janssen (2000)
Acquired approval for innovative ideas.	Innovation	Idea promotion	Janssen (2000)
Made important organizational members enthusiastic for innovative ideas.	Innovation	Idea promotion	Janssen (2000)
Transformed innovative ideas into useful application.	Innovation	Idea realization	Janssen (2000)
Introduced innovative ideas into the work environment in a systematic way.	Innovation	Idea realization	Janssen (2000)
Evaluated the utility of innovative ideas.	Innovation	Idea realization	Janssen (2000)

Analysis

To test the hypothesized relationships, a two-step approach was used where the measurement model was first evaluated, followed by the structural model (Anderson & Gerbing, 1988; Mueller & Hancock, 2008). This ensures that issues with poor fit of the structural model are not due to underlying problems with the measurement model. The measurement model was evaluated using confirmatory factor analysis (CFA) in Mplus 8 (Muthen & Muthen, 2017) with maximum likelihood estimation. Specific constructs were first evaluated, where possible, to identify issues with fit before the evaluating the full measurement model. The hypothesized and alternative structural models were then evaluated and compared. Model fit was evaluated by examining multiple fit indices using recommended cutoffs (Hu & Bentler, 1999; Schreiber, Nora, Stage, Barlow, & King, 2006). Model X^2 describes the amount of discrepancy between the sample covariance matrix and model-implied covariance matrix. Evaluations of this measure have focused on statistical significance but due to sensitivity with large samples, evaluating the ratio of X^2 to degrees of freedom is recommended using a 2:1 ratio (Tabachnick & Fidell, 2012). Akaike information index (AIC) assesses fit of the predicted and observed covariance matrices with penalties for model complexity. There is no recommended cutoff for AIC, although smaller values are desired when comparing models. Comparative fit index (CFI) assesses the improvement in model fit comparing the model to an independence model and should be at least .95. Root mean square error of approximation (RMSEA) is a parsimony-adjusted badness-of-fit index and should be no more than .06. Standardized root mean square residual (SRMR) is the mean absolute correlation residual and should be no more than .08.

Indirect effects were tested using bootstrapping as recommended by researchers (Cheung & Lau, 2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008) because it does not assume a multivariate normal sampling distribution. Bootstrapping involves resampling with replacement from the dataset and calculating confidence errors empirically based on many resamples. Indirect effects were examined in Mplus 8 (Muthen & Muthen, 2017) using bootstrapping with 5,000 draws. Bias-corrected confidence intervals were used to evaluate the statistical significance of indirect effects (DiCiccio & Efron, 1996).

Latent variable interactions within the structural model were tested using the XWITH function of Mplus 8 (Muthen & Asparouhoc, 2015; Muthen & Muthen, 2017). This function used the maximum likelihood algorithm and numerical integration to test the interactions. For interaction effects, a comparison model was run first to compare model fit as interactions were added. Due the computational intensity associated with testing multiple interactions using numerical integration, interactions were evaluated individually. Model fit results and the statistical test of the latent variable interaction were used to evaluate support for the specific interaction effect.

CHAPTER IV

RESULTS

Data Cleaning and Preparation

Participant responses were first reviewed for completeness and data quality. Responses were first examined for careless responding, which is when participants complete a survey with insufficient effort, such as answering questions without reading them (Huang, Curran, Keeney, Poposki, & DeShon, 2012; Meade & Craig, 2012). The survey for subordinates was voluntary but a financial incentive was available for completion. Therefore, there was motivation for participants to complete the survey only to get into the incentive drawing. To examine the dataset for careless responders, survey response times and answer patterns were evaluated using procedures that considered response times and patterns (Huang et al., 2012; Meade & Craig, 2012).

The subordinate survey contained a total of 64 questions and had participant response times between 1.60 minutes and 10,431.87 minutes, with a median of 13.64 minutes. The manager survey contained a total of 14 questions and had participant response times between 0.35 minutes to 20,649.43 minutes, with a median of 2.60 minutes. The cases that were lower on the time scale tended to have missing data, which suggested the participant quit the survey mid-way. For the very long response times, this reflects a web browser with an active survey was left open. Response times were evaluated in combination with response patterns.

Response patterns were evaluated by calculating the longest chain of identical question responses for each participant. While answering across multiple questions and constructs, it is unlikely that responses would be identical. Large values of consecutive, identical responses indicate careless responding. For the subordinate sample, the number of consecutive, identical

responses was between 2 and 64, with a median of seven. Four cases were identified as careless responders because they responded identically to all items and were removed, which reduced the maximum of consecutive, identical responses to 23. For the manager survey, the number of consecutive, identical responses was between 0 and twelve, with a median of five. Due to the short nature of this survey and potential single construct, no cases were identified as careless responders.

Missing data. Missing data were evaluated by assessing their type and patterns (Pigott, 2001; Rubin, 1976; Tabachnick & Fidell, 2012). There are three types of missing data: missing completely at random (MCAR), missing at random (MAR), and missing not a random (MNAR). MCAR means that the presence of missing data is unrelated to other variables. MAR means that the presence of missing data can be explained by another study variables that is not of primary interest, such as a control variable. MNAR means that missing data is a function of other study variables that are of primary interest or unmeasured.

For the subordinate sample, the percentage of missing data for items ranged from zero to six percent. Missing data tended to increase with the number of survey items. The highest percentages of missing data were for the demographic questions (e.g., 6% missing for job grade), which is expected given that these were the only potentially identifying questions. Little's MCAR test (Little, 1988) was used to test the type of missing data. The test suggested that missing data was MCAR, $\chi^2(3820, N = 843) = 3874.90$, $p = .263$. For the matched sample, missing data ranged from zero to five percent with the highest percentages for the demographic data (e.g., 5% for job grade). Little's MCAR test suggested data were MCAR, $\chi^2(2480, N = 290) = 2556.46$, $p = .139$. Overall, tests of missing data patterns supported that data were MCAR. As

such, missing data were addressed within the statistical analyses by using the full information maximum likelihood (FIML) estimation method (Enders & Bandalos, 2001).

Outlier analysis. Boxplots for each construct were used to identify univariate outliers. Extreme values, defined as scores more than three time the interquartile range were considered outliers (Tukey, 1977). Six participants were identified as outliers in the subordinate sample. These participants had outlying low scores on creative self-efficacy and resiliency. Due to the unrepresentative nature of these cases compared to the rest of the sample and potential to bias the results, they were removed from the analysis (Aguinis, Gottfredson, & Joo, 2013).

Multivariate outliers were examined using measures of leverage, discrepancy, and influence (Tabachnick & Fidell, 2012). Multiple regressions of study variables on burnout, work engagement, creativity, and innovation were used to examine multivariate outliers. Leverage describes how different a participant's response is from others in the sample and was assessed using Mahalanobis distance. Discrepancy examines how different a predicted outcome for a case is from the actual outcome and was assessed using studentized deleted residuals. Influence describes the degree a response impacts regression lines and was measured using Cooks' D, DFFITS, and DFBETAS. For the subordinate sample, 30 cases were identified as multivariate outliers and removed from analysis. For the matched sample, five subordinates were identified and removed from analysis.

Descriptive Statistics of the Final Sample

Descriptive statistics for the final samples are presented in Table 6 and Table 7. Skewness and kurtosis were examined for both samples. Skewness ranged from -1.01 to 1.06 and kurtosis ranged from -0.95 to 1.41 for the subordinate sample. Skewness ranged from -1.00 to 0.94 and kurtosis ranged from -0.99 to 1.94 for the matched sample. All constructs were within a

reasonable range, defined as between -2.00 and 2.00 (Trochim & Donnelly, 2006). Multicollinearity was assessed using tolerance and variance inflation factor (VIF) estimates. For the subordinate sample, tolerance was between .49 and .87., and VIF was between 1.34 and 2.37. For the matched sample, tolerance was between .46 and .83., and VIF was between 1.20 and 2.16.

The relationships found in the subordinate sample may be influenced by common method variance (CMV) because measures were collected from employees using a single survey (Podsakoff et al., 2003). The potential of CMV was reduced by survey design features for ensuring anonymity of responses, using validated scales, and using a variety of item response formats (Podsakoff, MacKenzie, & Podsakoff, 2012). A CMV factor technique was used to evaluate the presence of CMV (Podsakoff et al., 2003). A latent factor representing CMV was added to the measurement model with the factor's variance set to one and with no correlations specified to other latent factors. The item loadings on the latent factor were set to equality and the standardized estimate was used to estimate the amount of variance explained by the common method factor. The resulting path estimate was -.003 unstandardized with standardized estimates averaging -.004, suggesting that CMV was not a problem in this study. The parameter estimates with and without the common method factor were also compared and differences in findings were not found. Thus, CMV was not found to be an issue in this study.

Table 6

Descriptive Statistics and Correlations Between Observed Variables for the Subordinate Sample

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Workload	3.26	1.00	(.88)											
2. Creativity Role Expectations	3.84	0.82	.07	(.83)										
3. Interpersonal Conflict	1.96	0.83	.28**	-.17**	(.93)									
4. Autonomy	4.26	0.70	.02	.30**	-.09**	(.84)								
5. Intellectual Stimulation	3.49	0.94	.02	.65**	-.22**	.24**	(.92)							
6. Psychological Safety	3.73	0.64	-.21**	.32**	-.51**	.39**	.36**	(.77)						
7. Creative Self-efficacy	3.98	0.62	.10**	.38**	-.02	.28**	.18**	.13**	(.79)					
8. Resiliency	3.68	0.61	.00	.11**	-.10**	.11**	.15**	.21**	.24**	(.88)				
9. Burnout	2.57	0.89	.47**	-.20**	.45**	-.18**	-.27**	-.47**	-.13**	-.25**	(.92)			
10. Work Engagement	3.54	0.66	.02	.45**	-.21**	.35**	.44**	.37**	.36**	.27**	-.53**	(.89)		
11. Creativity	3.30	0.78	.21**	.43**	.02	.25**	.30**	.10**	.50**	.18**	-.08*	.40**	(.90)	
12. Innovation	2.75	0.93	.17**	.42**	-.01	.22**	.37**	.16**	.45**	.20**	-.15**	.43**	.77**	(.92)

Notes. Sample sizes range from 780 to 816. Internal consistency reliability estimates are presented in parentheses.
*$p < .05$, **$p < .01$

Table 7

Descriptive Statistics and Correlations Between Observed Variables for the Matched Sample

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Workload	3.30	1.01	(.88)											
2. Creativity Role Expectations	3.91	0.77	.02	(.83)										
3. Interpersonal Conflict	2.01	0.85	.33**	-.15*	(.94)									
4. Autonomy	4.27	0.69	.09	.22**	-.07	(.86)								
5. Intellectual Stimulation	3.59	0.87	-.01	.63**	-.23**	.11	(.91)							
6. Psychological Safety	3.74	0.64	-.20**	.23**	-.56**	.33**	.29**	(.77)						
7. Creative Self-efficacy	3.99	0.58	.11	.47**	-.06	.30**	.21**	.10	(.76)					
8. Resiliency	3.66	0.55	-.01	.11	-.16**	.16**	.15*	.27**	.28**	(.86)				
9. Burnout	2.51	0.90	.45**	-.12*	.47**	-.11	-.21**	-.48**	-.08	-.26**	(.92)			
10. Work Engagement	3.62	0.63	.07	.36**	-.18**	.37**	.37**	.37**	.30**	.27**	-.47**	(.89)		
11. Creativity	3.54	0.83	.10	.28**	.01	.06	.11	.00	.24**	.04	-.04	.17**	(.94)	
12. Innovation	3.27	0.94	.11	.23**	.03	.07	.13*	.06	.18**	.07	-.07	.18**	.85**	(.94)

Notes. Sample sizes range from 268 to 277. Internal consistency reliability estimates are presented in parentheses.
*$p < .05$, **$p < .01$

Examination of Latent Variables and Measurement Models

Latent structure of creativity and innovation. The structure of creativity and innovation was evaluated comparing CFAs for a one-factor model with a two-factor model. These items were later parceled in the structural model, so determining dimensionality is important to selecting the best parceling strategy. Table 8 presents the results from comparing the measurement models for the subordinate and matched samples. The two-factor measurement model fit better than the one-factor measurement model in the subordinate sample ($\Delta\chi^2[1] = 468.21$, $p < .001$) and the matched sample ($\Delta\chi^2[1] = 144.87$, $p < .001$). The RMSEA values for the models are slightly higher than guidelines, which is likely the result of not evaluating adding error covariances and having relatively few degrees of freedom (Kenny, Kaniskan, & McCoach, 2014). Separate factors for creativity and innovation were used in all subsequent analyses based on the model fit results.

Table 8
Measurement Models for Creativity and Innovation

Model	χ^2	*df*	*p*	$\Delta\chi^2$	AIC	CFI	RMSEA	90% CI	SRMR
Subordinate Sample									
One Factor	760.86	54	<.001		21894.77	.90	.13	[.12, .14]	.05
Two Factors	292.65	53	<.001	468.21**	21428.56	.97	.08	[.07, .08]	.03
Matched Sample									
One Factor	320.91	54	<.001		6399.13	.92	.13	[.12, .15]	.04
Two Factors	176.04	53	<.001	144.87**	6256.26	.96	.09	[.08, .11]	.03

**$p < .01$

Measurement models. A series of measurement models were examined for all individual constructs with more than three items. For the full measurement model, resiliency, burnout, work engagement, creativity, and innovation were modeled using parcels. Parceling was used to reduce psychometric challenges associated with the use of many indicators of latent constructs, such as lower reliability and communalities (Little, Cunningham, Shahar, & Widaman, 2002). For work engagement, domain representative parcels were used, where each parcel contained an item from each facet following recommendations (Kishton & Widaman, 1994; Little et al., 2002). A random assignment approach was used to build the other parcels as recommended (Little et al., 2002).

Measurement models for subordinate sample. For workload, the initial measurement model was not a good fit to the data, $\chi^2(5) = 196.10$, $p < .001$, AIC = 10900.58, CFI = .91, RMSEA = .22 (90% CI = [.19, .25]), SRMR = .05. Inspection of the modification indices suggested that allowing errors between "How often did your job leave you with little time to get things done?" and "How often did you have to do more work than you could do well?" to covary would improve fit ($\Delta\chi^2 = 108.87$). After rerunning the model with the error covariance, modification indices suggested covarying the error terms for "How often did you have to do more work than you could do well?" and "How often did your job leave you with little time to get things done?" to improve fit ($\Delta\chi^2 = 87.13$). With the error terms covaried, the measurement model for workload fit the data well, $\chi^2(3) = 15.12$, $p = .002$, AIC = 10723.60, CFI = .99, RMSEA = .07 (90% CI = [.04, .11]), SRMR = .01. Similarly, for creativity role expectations, the measurement model did not fit the data well, $\chi^2(2) = 109.72$, $p < .001$, AIC = 7239.57, CFI = .93, RMSEA = .26 (90% CI = [.22, .30]), SRMR = .06. Modification indices suggested that allowing the errors for "My immediate manager thought of me as a creative employee" and "My

immediate manager thought that creativity was important to me" to covary would improve fit ($\Delta\chi^2$ = 106.34). The measurement model for creativity role expectations with error covariations fit the data well, $\chi^2(1) = 2.79$, $p = .095$, AIC = 7134.64, CFI = 1.00, RMSEA = .05 (90% CI = [.00, .12]), SRMR = .01. For interpersonal conflict, the measurement model fit the data well, $\chi^2(2) = 15.23$, $p = .001$, AIC = 5802.02, CFI = 1.00, RMSEA = .09 (90% CI = [.05, .14]), SRMR = .01. For interpersonal stimulation, the model fit was adequate, $\chi^2(2) = 54.70$, $p < .001$, AIC = 6902.94, CFI = .98, RMSEA = .18 (90% CI = [.14, .23]), SRMR = .02. Modification indices suggested allowing error terms between "My immediate manager got me to look at problems from many different angles" and "My immediate manager challenged me to think about old problems in new ways" to covary would improve fit ($\Delta\chi^2$ = 47.83). After covarying the error terms, the measurement model for interpersonal stimulation fit the data well, $\chi^2(1) = 8.55$, $p = .004$, AIC = 6858.78, CFI = 1.00, RMSEA = .10 (90% CI = [.05, .16]), SRMR = .01. The full measurement model of constructs fit the data well, $\chi^2(709) = 1571.61$, $p < .001$, AIC = 63207.28, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05. Measurement model statistics are presented in Table 9, and the full measurement model is presented in Figure 5. Latent variable intercorrelations are presented in Table 10, and the indicator intercorrelations are presented in Table 11. The matrix reported in Table 11 was used to test the structural model.

Table 9
Measurement Models for the Subordinate Sample

Model	χ^2	*df*	*p*	AIC	CFI	RMSEA	90% CI	SRMR
Workload	196.10	5	<.001	10900.58	.91	.22	[.19, .25]	.05
Workload_{CE}	15.12	3	.002	10723.60	.99	.07	[.04, .11]	.01
Creativity Role Expectations	109.72	2	<.001	7239.57	.93	.26	[.22, .30]	.06
Creativity Role Expectations_{CE}	2.79	1	.095	7134.64	1.00	.05	[.00, .12]	.01
Interpersonal Conflict	15.23	2	.001	5802.02	1.00	.09	[.05, .14]	.01
Intellectual Stimulation	54.70	2	<.001	6902.94	.98	.18	[.14, .23]	.02
Intellectual Stimulation_{CE}	8.55	1	.004	6858.78	1.00	.10	[.05, .16]	.01
Full Measurement Model	1571.61	709	<.001	63207.28	.96	.04	[.04, .04]	.05

Notes. Workload_{CE} = model with correlated errors, $\text{Creativity Role Expectations}_{CE}$ = model with correlated errors, $\text{Intellectual Stimulation}_{CE}$ = model with correlated errors.

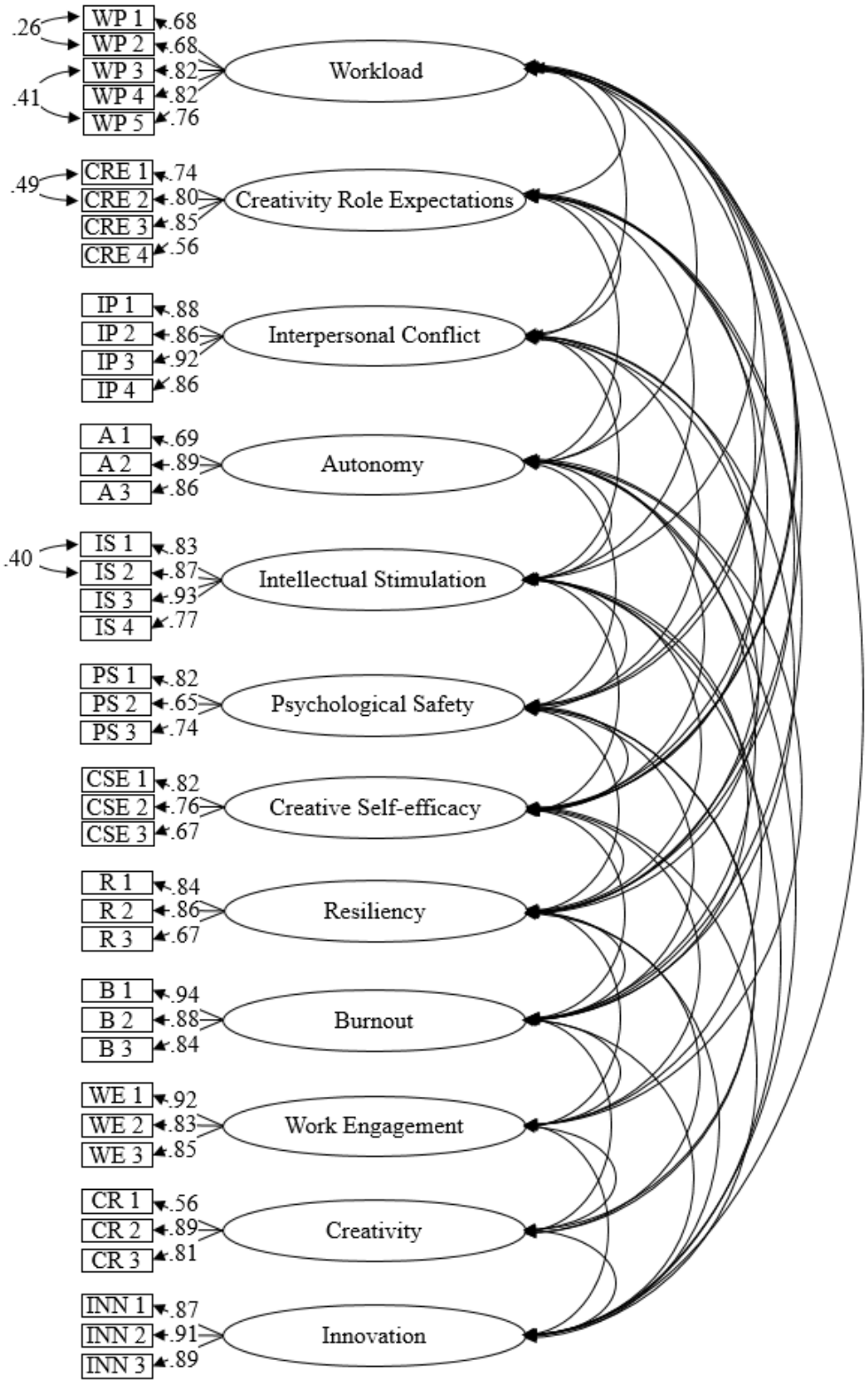

Figure 5. Subordinate Sample Full Measurement Model

Table 10

Intercorrelations Among Latent Factors in the Full Measurement Model for the Subordinate Sample

Construct	1	2	3	4	5	6	7	8	9	10	11	12
1. WL												
2. CRE	.09*											
3. IC	.32**	-.19**										
4. AUT	.02	.36**	-.13*									
5. INTELL	.02	.74**	-.24**	.29**								
6. PSYSAF	-.23**	.41**	-.57**	.52**	.43**							
7. CRSE	.12*	.41**	-.02	.33**	.20**	.19**						
8. RES	.01	.11*	-.10*	.13*	.15**	.26**	.27**					
9. BURN	.54**	-.21**	.49**	-.21**	-.28**	-.54**	-.15**	-.26**				
10. ENGA	.01	.51**	-.24**	.42**	.47**	.49**	.41**	.31**	-.57**			
11. CR	.23**	.46**	.03	.28**	.33**	.14**	.59**	.20**	-.07	.43**		
12. INN	.18**	.46**	-.02	.25**	.40**	.23**	.51**	.22**	-.15**	.47**	.85**	

Notes. Sample size is 817. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation.

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

Table 11

Descriptive Statistics for the Observed Variables in the Structural Model for the Subordinate Sample

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. WL 1	3.47	1.15											
2. WL 2	3.63	1.08	.68**										
3. WL 3	3.02	1.34	.57**	.54**									
4. WL 4	3.63	1.15	.57**	.61**	.67**								
5. WL 5	2.53	1.39	.48**	.46**	.72**	.62**							
6. CRE 1	3.90	0.90	.04	.10**	-.01	.07	-.04						
7. CRE 2	3.78	0.93	.07	.12**	.00	.09**	-.00	.79**					
8. CRE 3	3.83	0.94	.07	.15**	.02	.10**	.01	.62**	.67**				
9. CRE 4	3.26	1.06	.04	.09*	.05	.08*	.08*	.35**	.41**	.55**			
10. IC 1	2.03	0.87	.17**	.09**	.28**	.18**	.27**	-.13**	-.14**	-.17**	-.05		
11. IC 2	2.03	0.96	.16**	.11**	.24**	.18**	.25**	-.12**	-.10**	-.15**	-.00	.77**	
12. IC 3	2.01	0.93	.20**	.11**	.29**	.21**	.29**	-.14**	-.14**	-.17**	-.04	.81**	.78**
13. IC 4	1.76	0.89	.20**	.10**	.26**	.18**	.26**	-.13**	-.13**	-.13**	-.00	.73**	.75**
14. AUT 1	4.28	0.80	.03	.06	.09*	.07	.03	.16**	.13**	.16**	.05	-.03	.02
15. AUT 2	4.32	0.73	.02	.07	.00	.04	-.05	.29**	.26**	.29**	.12**	-.09*	-.07
16. AUT 3	4.18	0.87	-.03	.02	-.04	.04	-.08*	.29**	.25**	.27**	.12**	-.12**	-.10**
17. INTEL 1	3.34	1.03	.08*	.13**	-.06	.06	-.05	.44**	.50**	.51**	.29**	-.18**	-.15**
18. INTEL 2	3.34	1.05	.06	.12**	-.03	.07	-.03	.45**	.51**	.52**	.31**	-.18**	-.16**
19. INTEL 3	3.47	1.04	.04	.09**	-.04	.06	-.05	.49**	.55**	.59**	.34**	-.21**	-.16**
20. INTEL 4	3.81	1.07	.02	.04	-.06	.03	-.06	.53**	.54**	.55**	.30**	-.20**	-.16**
21. PSYSAF 1	3.71	0.67	-.09**	-.02	-.15**	-.06	-.22**	.37**	.32**	.35**	.07*	-.35**	-.37**
22. PSYSAF 2	3.75	0.93	-.18**	-.12**	-.24**	-.14**	-.23**	.10**	.11**	.17**	-.03	-.46**	-.44**
23. PSYSAF 3	3.73	0.74	-.10**	-.06	-.18**	-.09*	-.22**	.24**	.21**	.25**	.04	-.32**	-.32**
24. CRSE 1	3.84	0.76	.08*	.12**	.04	.08*	-.02	.38**	.33**	.22**	.13**	-.02	.00
25. CRSE 2	4.16	0.69	.08*	.15**	.07	.10**	-.02	.34**	.28**	.21**	.13**	-.03	-.03
26. CRSE 3	3.92	0.76	.08*	.14**	.07	.12**	-.01	.31**	.26**	.24**	.15**	-.01	-.00

Table 11 Continued

Variable	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. WL 1														
2. WL 2														
3. WL 3														
4. WL 4														
5. WL 5														
6. CRE 1														
7. CRE 2														
8. CRE 3														
9. CRE 4														
10. IC 1														
11. IC 2														
12. IC 3														
13. IC 4	.80**													
14. AUT 1	-.01	-.02												
15. AUT 2	-.11**	-.09*	.62**											
16. AUT 3	-.15**	-.12**	.58**	.75**										
17. INTEL 1	-.20**	-.14**	.03	.21**	.26**									
18. INTEL 2	-.21**	-.15**	-.01	.21**	.23**	.83**								
19. INTEL 3	-.23**	-.16**	.06	.22**	.25**	.77**	.82**							
20. INTEL 4	-.21**	-.19**	.11**	.30**	.34**	.65**	.64**	.71**						
21. PSYSAF 1	-.40**	-.35**	.26**	.41**	.43**	.33**	.32**	.33**	.39**					
22. PSYSAF 2	-.48**	-.44**	.07*	.19**	.23**	.18**	.18**	.21**	.22**	.51**				
23. PSYSAF 3	-.36**	-.33**	.23**	.35**	.36**	.22**	.25**	.26**	.32**	.61**	.49**			
24. CRSE 1	-.02	-.03	.23**	.22**	.23**	.10**	.14**	.15**	.12**	.14**	-.09*	.11**		
25. CRSE 2	-.02	-.04	.19**	.20**	.19**	.11**	.12**	.12**	.14**	.20**	-.03	.15**	.63**	
26. CRSE 3	.00	-.03	.20**	.18**	.22**	.16**	.15**	.16**	.15**	.16**	-.01	.18**	.53**	.51**

Table 11 Continued

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
27. RES 1	3.65	0.73	.02	.05	-.05	.01	-.12**	.09**	.07	.06	-.04	-.08*	-.08*
28. RES 2	3.76	0.63	.08*	.14**	-.03	.07*	-.09*	.13**	.11**	.10**	-.01	-.09*	-.09*
29. RES 3	3.62	0.68	.04	.11**	-.02	.04	-.08*	.10**	.08*	.07	-.00	-.06	-.08*
30. BURN 1	2.75	0.92	.31**	.25**	.48**	.37**	.54**	-.15**	-.13**	-.15**	-.00	.39**	.39**
31. BURN 2	2.34	0.97	.27**	.22**	.43**	.33**	.51**	-.17**	-.16**	-.17**	-.02	.34**	.35**
32. BURN 3	2.53	1.03	.20**	.13**	.38**	.27**	.44**	-.21**	-.19**	-.20**	-.08*	.37**	.37**
33. ENGA 1	3.67	0.73	.05	.17**	-.06	.04	-.17**	.41**	.40**	.39**	.20**	-.22**	-.19**
34. ENGA 2	3.63	0.65	.06	.18**	-.06	.04	-.16**	.31**	.34**	.32**	.20**	-.16**	-.13**
35. ENGA 3	3.34	0.77	.10**	.18**	.01	.07	-.08*	.37**	.39**	.38**	.20**	-.18**	-.17**
36. CRE 1	3.18	0.86	.16**	.22**	.10**	.15**	.10**	.40**	.38**	.31**	.20**	.00	.04
37. CRE 2	3.27	0.88	.20**	.24**	.13**	.21**	.13**	.40**	.37**	.28**	.21**	.05	.04
38. CRE 3	3.45	0.84	.14**	.20**	.09**	.16**	.11**	.34**	.34**	.29**	.22**	-.02	-.01
39. INN 1	2.76	0.99	.18**	.22**	.14**	.18**	.12**	.36**	.39**	.33**	.24**	.01	.03
40. INN 2	2.66	1.01	.13**	.19**	.08*	.13**	.07*	.35**	.39**	.32**	.20**	-.02	-.01
41. INN 3	2.83	0.99	.13**	.19**	.08*	.13**	.08*	.34**	.36**	.31**	.22**	-.05	-.03

Table 11 Continued

Variable	12	13	14	15	16	17	18	19	20	21	22	23	24	25
27. RES 1	-.08*	-.09*	.07	.07	.10**	.11**	.11**	.09**	.12**	.19**	.13**	.22**	.12**	.18**
28. RES 2	-.07*	-.09*	.09*	.11**	.11**	.15**	.17**	.13**	.16**	.17**	.12**	.18**	.20**	.24**
29. RES 3	-.07	-.10**	.07	.09*	.11**	.11**	.10**	.09**	.10**	.17**	.09**	.18**	.11**	.16**
30. BURN 1	.42**	.38**	-.04	-.13**	-.18**	-.22**	-.20**	-.20**	-.20**	-.37**	-.35**	-.37**	-.13**	-.11**
31. BURN 2	.38**	.36**	-.04	-.16**	-.22**	-.21**	-.20**	-.20**	-.20**	-.39**	-.30**	-.35**	-.12**	-.12**
32. BURN 3	.41**	.36**	-.06	-.19**	-.24**	-.29**	-.28**	-.28**	-.26**	-.41**	-.34**	-.39**	-.12**	-.11**
33. ENGA 1	-.22**	-.21**	.21**	.35**	.36**	.40**	.40**	.40**	.37**	.43**	.21**	.37**	.28**	.32**
34. ENGA 2	-.15**	-.14**	.21**	.32**	.35**	.31**	.32**	.32**	.29**	.33**	.14**	.30**	.33**	.30**
35. ENGA 3	-.19**	-.15**	.16**	.27**	.30**	.39**	.36**	.38**	.34**	.33**	.15**	.29**	.27**	.23**
36. CRE 1	.01	.02	.18**	.21**	.23**	.26**	.28**	.29**	.24**	.17**	-.07	.13**	.48**	.39**
37. CRE 2	.04	.04	.15**	.21**	.21**	.24**	.24**	.24**	.22**	.14**	-.10**	.12**	.43**	.34**
38. CRE 3	-.02	.01	.15**	.20**	.23**	.23**	.24**	.26**	.23**	.17**	-.03	.14**	.40**	.32**
39. INN 1	.01	.02	.15**	.21**	.20**	.32**	.34**	.34**	.26**	.22**	-.04	.15**	.38**	.27**
40. INN 2	-.03	.01	.12**	.19**	.22**	.32**	.36**	.34**	.24**	.23**	-.02	.18**	.38**	.30**
41. INN 3	-.05	-.03	.13**	.18**	.21**	.29**	.31**	.31**	.24**	.22**	-.02	.21**	.40**	.29**

Table 11 Continued

Variable	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
27. RES 1	.19**															
28. RES 2	.24**	.73**														
29. RES 3	.20**	.71**	.72**													
30. BURN 1	-.08*	-.21**	-.17**	-.18**												
31. BURN 2	-.08*	-.23**	-.15**	-.20**	.83**											
32. BURN 3	-.08*	-.25**	-.22**	-.24**	.78**	.72**										
33. ENGA 1	.25**	.23**	.25**	.23**	-.48**	-.48**	-.56**									
34. ENGA 2	.30**	.23**	.26**	.21**	-.38**	-.39**	-.46**	.77**								
35. ENGA 3	.24**	.20**	.24**	.21**	-.41**	-.39**	-.50**	.78**	.73**							
36. CRE 1	.36**	.12**	.16**	.16**	-.03	-.05	-.11**	.32**	.31**	.28**						
37. CRE 2	.36**	.10**	.15**	.16**	-.02	-.05	-.11**	.36**	.33**	.34**	.76**					
38. CRE 3	.31**	.13**	.18**	.15**	-.05	-.07	-.13**	.34**	.35**	.33**	.68**	.74**				
39. INN 1	.36**	.13**	.19**	.19**	-.06	-.09*	-.17**	.39**	.34**	.36**	.66**	.67**	.60**			
40. INN 2	.34**	.13**	.20**	.18**	-.11**	-.14**	-.20**	.40**	.35**	.37**	.67**	.66**	.59**	.80**		
41. INN 3	.38**	.13**	.18**	.17**	-.12**	-.13**	-.18**	.39**	.33**	.35**	.68**	.67**	.63**	.76**	.82**	

Notes. Sample sizes range from 780 to 816. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation.
*$p < .05$, **$p < .01$

Matched sample. In the matched sample, the measurement model for workload did not fit the data well, $\chi^2(5) = 78.93$, $p < .001$, AIC = 3755.93, CFI = .90, RMSEA = .23 (90% CI = [.19, .28]), SRMR = .06. Modification indices suggested that covarying the errors for "How often did your job leave you with little time to get things done?" and "How often did you have to do more work than you could do well?" would improve fit ($\Delta\chi^2 = 66.25$). Modification indices then suggested covarying the errors between "How often did your job require you to work very hard?" and "How often was there a great deal to be done?" to improve fit ($\Delta\chi^2 = 10.64$). The measurement model for workload with covaried errors fit the data well, $\chi^2(3) = 4.57$, $p = .207$, AIC = 3685.57, CFI = 1.00, RMSEA = .04 (90% CI = [.00, .12]), SRMR = .02. For creativity role expectations, the measurement model did not fit the data well, $\chi^2(2) = 20.04$, $p < .001$, AIC = 2399.52, CFI = .96, RMSEA = .18 (90% CI = [.12, .26]), SRMR = .04. Modification indices suggested the errors for "My immediate manager thought of me as a creative employee" and "My immediate manager thought that creativity was important to me" be covaried to improve fit ($\Delta\chi^2 = 20.31$). The final model with the correlated errors for creativity role expectations fit the data well, $\chi^2(1) = 0.00$, $p = .981$, AIC = 2381.48, CFI = 1.00, RMSEA = .00 (90% CI = [.00, .00]), SRMR = .00. For interpersonal conflict, the measurement model fit the data well, $\chi^2(2) = 5.23$, $p = .073$, AIC = 2295.43, CFI = 1.00, RMSEA = .08 (90% CI = [.00, .16]), SRMR = .01. For interpersonal stimulation, the model fit was acceptable for most but not all indicators, $\chi^2(2) = 25.94$, $p < .001$, AIC = 2298.63, CFI = .97, RMSEA = .21 (90% CI = [.14, .29]), SRMR = .03. Modification indices suggested correlated errors between "My immediate manager got me to look at problems from many different angles" and "My immediate manager challenged me to think about old problems in new ways" would improve fit ($\Delta\chi^2 = 26.78$). The final measurement model for intellectual stimulation fit the data well, $\chi^2(2) = 25.94$, $p < .001$, AIC = 2298.63, CFI =

.97, RMSEA = .21 (90% CI = [.14, .29]), SRMR = .03. The measurement model for intellectual stimulation with the covaried errors fit the data well, $\chi^2(1) = 0.42$, $p = .638$, AIC = 2275.11, CFI = 1.00, RMSEA = .00 (90% CI = [.00, .14]), SRMR = .00. The full measurement model fit the data well, $\chi^2(709) = 1130.14$, $p < .001$, AIC = 21132.51, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06. Measurement model statistics are presented in Table 12, and the final measurement model is presented in Figure 6. Latent variable intercorrelations are presented in Table 13, and the indicator intercorrelations are presented in Table 14. The matrix reported in Table 14 was used to test the structural model.

Table 12
Measurement Models for the Matched Sample

Model	χ^2	*df*	*p*	AIC	CFI	RMSEA	90% CI	SRMR
Workload	79.93	5	<.001	3755.93	.90	.23	[.19, .28]	.06
Workload_{CE}	4.57	3	.207	3685.57	1.00	.04	[.00, .12]	.02
Creativity Role Expectations	20.04	2	<.001	2399.52	.96	.18	[.12, .26]	.04
Creativity Role Expectations_{CE}	0.00	1	.981	2381.48	1.00	.00	[.00, .00]	.00
Interpersonal Conflict	5.23	2	.073	2295.43	1.00	.08	[.00, .16]	.01
Intellectual Stimulation	25.94	2	<.001	2298.63	.97	.21	[.14, .29]	.03
Intellectual Stimulation_{CE}	0.42	1	.638	2275.11	1.00	.00	[.00, .14]	.00
Full Measurement Model	1130.14	709	<.001	21132.51	.95	.05	[.04, .05]	.06

Notes. Workload_{CE} = model with correlated errors, Creativity Role Expectations_{CE} = model with correlated errors, Intellectual Stimulation_{CE} = model with correlated errors.

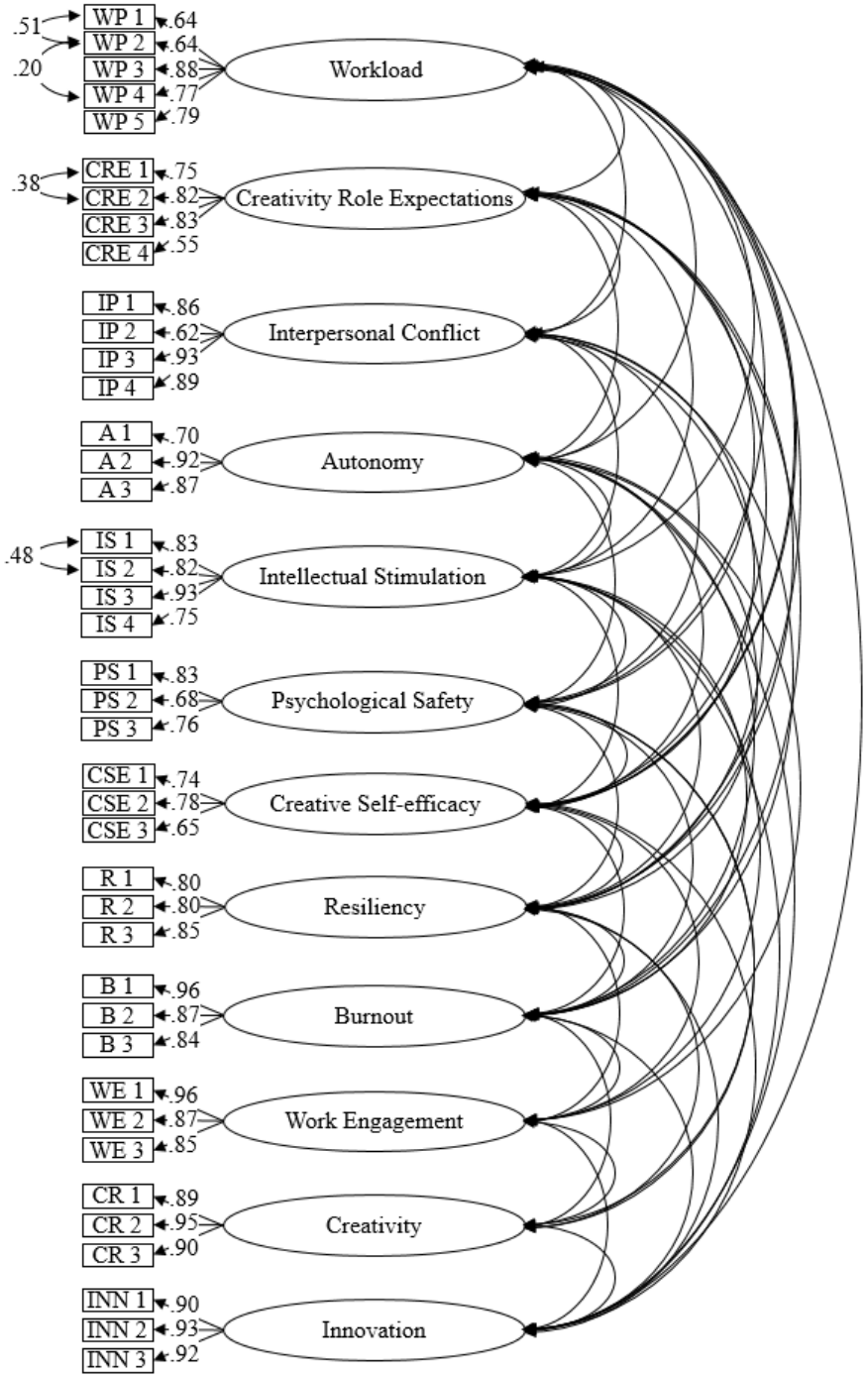

Figure 6. Matched Sample Full Measurement Model

Table 13

Intercorrelations Among Latent Factors in the Full Measurement Model for the Matched Sample

Construct	1	2	3	4	5	6	7	8	9	10	11	12
1. WL												
2. CRE	-.02											
3. IC	.38**	-.17*										
4. AUT	.09	.29**	-.11									
5. INTELL	-.05	.74**	-.26**	.19**								
6. PSYSAF	-.24**	.31**	-.62**	.47**	.36**							
7. CRSE	.09	.53**	-.08	.39**	.25**	.20*						
8. RES	-.05	.12	-.16*	.19**	.13	.34**	.34**					
9. BURN	.56**	-.14*	.50**	-.14*	-.20**	-.55**	-.11	-.27**				
10. ENGA	-.02	.42**	-.22**	.47**	.39**	.51**	.38**	.31**	-.49**			
11. CR	.10	.29**	.01	.06	.12	.02	.27**	.04	-.05	.17**		
12. INN	.10	.24**	.02	.09	.14*	.08	.21**	.07	-.08	.19**	.90**	

Notes. Sample size is 277. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation.

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

Table 14

Descriptive Statistics for the Observed Variables in the Structural Model for the Matched Sample

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. WL 1	3.46	1.16											
2. WL 2	3.64	1.10	.72**										
3. WL 3	3.06	1.36	.57**	.56**									
4. WL 4	3.74	1.17	.54**	.61**	.69**								
5. WL 5	2.59	1.39	.45**	.47**	.70**	.61**							
6. CRE 1	3.97	0.82	.01	.07	-.04	.07	-.06						
7. CRE 2	3.86	0.88	.04	.07	-.02	.10	.00	.76**					
8. CRE 3	3.90	0.90	.04	.11	-.09	.05	-.07	.60**	.69**				
9. CRE 4	3.34	1.08	.03	.03	-.01	.03	.02	.38**	.43**	.52**			
10. IC 1	2.07	0.91	.24**	.14*	.31**	.18**	.26**	-.08	-.13*	-.12	.03		
11. IC 2	2.06	0.95	.22**	.16**	.29**	.19**	.27**	-.09	-.12	-.15*	.04	.75**	
12. IC 3	2.06	0.94	.27**	.18**	.34**	.24**	.30**	-.13*	-.15*	-.15*	-.04	.80**	.78**
13. IC 4	1.84	0.92	.23**	.18**	.28**	.20**	.28**	-.12*	-.13*	-.12	.01	.76**	.79**
14. AUT 1	4.26	0.80	.01	.04	.14*	.09	.09	.13*	.07	.06	.02	.00	.01
15. AUT 2	4.34	0.72	.07	.14*	.09	.14*	.02	.26**	.19**	.23**	.05	-.07	-.09
16. AUT 3	4.22	0.82	-.02	.09	.03	.10	-.03	.23**	.19**	.21**	.03	-.09	-.09
17. INTEL 1	3.47	1.00	.08	.13*	-.11	.04	-.11	.41**	.53**	.51**	.30**	-.14*	-.11
18. INTEL 2	3.41	1.02	.03	.10	-.11	.04	-.09	.38**	.46**	.49**	.31**	-.20**	-.20**
19. INTEL 3	3.58	0.98	.00	.09	-.07	.09	-.06	.44**	.54**	.60**	.39**	-.20**	-.18**
20. INTEL 4	3.90	0.95	-.03	.06	-.09	.05	-.06	.48**	.53**	.56**	.30**	-.24**	-.18**
21. PSYSAF 1	3.74	0.65	-.07	.04	-.12	-.06	-.23**	.27**	.21**	.34**	.05	-.38**	-.43**
22. PSYSAF 2	3.75	0.91	-.21**	-.13*	-.25**	-.14*	-.24**	.04	.10	.13*	-.09	-.49**	-.48**
23. PSYSAF 3	3.72	0.75	-.10	-.03	-.16**	-.07	-.22**	.15*	.13*	.14*	-.02	-.43**	-.41**
24. CRSE 1	3.90	0.71	.07	.07	.02	.10	.00	.45**	.35**	.20**	.11	-.05	-.03
25. CRSE 2	4.17	0.65	.10	.21**	.03	.09	.00	.48**	.33**	.33**	.20**	-.09	-.10
26. CRSE 3	3.90	0.74	.14*	.10	.06	.15*	.01	.39**	.35**	.27**	.18**	-.01	-.05

Table 14 Continued

Variable	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. WL 1														
2. WL 2														
3. WL 3														
4. WL 4														
5. WL 5														
6. CRE 1														
7. CRE 2														
8. CRE 3														
9. CRE 4														
10. IC 1														
11. IC 2														
12. IC 3														
13. IC 4	.84**													
14. AUT 1	.03	-.01												
15. AUT 2	-.10	-.11	.64**											
16. AUT 3	-.11	-.07	.60**	.79**										
17. INTEL 1	-.18**	-.10	-.08	.11	.13*									
18. INTEL 2	-.24**	-.16*	-.13*	.13*	.16**	.83**								
19. INTEL 3	-.25**	-.17**	-.03	.15*	.14*	.78**	.77**							
20. INTEL 4	-.25**	-.21**	.02	.24**	.25**	.59**	.60**	.69**						
21. PSYSAF 1	-.41**	-.36**	.21**	.40**	.41**	.24**	.26**	.26**	.36**					
22. PSYSAF 2	-.53**	-.47**	.03	.17**	.21**	.13*	.19**	.19**	.19**	.55**				
23. PSYSAF 3	-.41**	-.38**	.19**	.30**	.31**	.12*	.19**	.17**	.29**	.63**	.50**			
24. CRSE 1	-.02	-.04	.22**	.21**	.24**	.14*	.16**	.11	.07	.06	-.09	.08		
25. CRSE 2	-.10	-.10	.22**	.31**	.25**	.16**	.18**	.20**	.22**	.21**	-.02	.18**	.58**	
26. CRSE 3	-.02	-.04	.13*	.17**	.21**	.18**	.14*	.17**	.13*	.09	.02	.14*	.49**	.49**

Table 14 Continued

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
27. RES 1	3.62	0.69	-.03	.06	-.04	-.05	-.12	.04	.04	.09	.03	-.07	-.16**
28. RES 2	3.76	0.57	.03	.17**	-.06	.02	-.09	.17**	.11	.11	.01	-.14*	-.22**
29. RES 3	3.60	0.63	.00	.14*	.00	.03	-.08	.08	.04	.08	.03	-.07	-.14*
30. BURN 1	2.70	0.93	.31**	.24**	.48**	.30**	.57**	-.08	-.05	-.13*	-.01	.40**	.41**
31. BURN 2	2.29	0.98	.26**	.22**	.43**	.29**	.53**	-.10	-.11	-.18**	-.06	.35**	.38**
32. BURN 3	2.44	1.03	.16**	.08	.35**	.20**	.43**	-.09	-.07	-.14*	-.08	.34**	.37**
33. ENGA 1	3.73	0.70	.15*	.27**	-.05	.10	-.15*	.32**	.31**	.35**	.18**	-.20**	-.16**
34. ENGA 2	3.69	0.62	.11	.22**	-.07	.06	-.14*	.25**	.27**	.30**	.18**	-.18**	-.13*
35. ENGA 3	3.43	0.73	.21**	.26**	-.03	.12	-.11	.25**	.31**	.32**	.14*	-.18**	-.13*
36. CRE 1	3.45	0.91	.12	.06	.11	.12*	.05	.24**	.18**	.15*	.14*	.04	.05
37. CRE 2	3.53	0.86	.11	.05	.08	.12	.02	.34**	.26**	.18**	.16**	.03	.03
38. CRE 3	3.63	0.87	.11	.09	.05	.15*	.00	.31**	.27**	.20**	.16*	.02	.05
39. INN 1	3.21	1.00	.12	.06	.07	.10	.01	.23**	.17**	.15*	.10	.05	.04
40. INN 2	3.27	1.01	.13*	.12*	.08	.11	.03	.23**	.20**	.14*	.14*	.05	.05
41. INN 3	3.31	0.98	.11	.09	.08	.14*	.02	.25**	.21**	.17**	.13*	.03	.03

Table 14 Continued

Variable	12	13	14	15	16	17	18	19	20	21	22	23	24	25
27. RES 1	-.14*	-.09	.07	.09	.20**	.16**	.12*	.05	.06	.22**	.15*	.26**	.11	.16**
28. RES 2	-.14*	-.16**	.07	.15*	.23**	.19**	.18**	.13*	.16**	.23**	.16**	.25**	.29**	.25**
29. RES 3	-.11	-.12	.05	.07	.17**	.14*	.09	.04	.06	.23**	.11	.22**	.17**	.23**
30. BURN 1	.44**	.43**	-.01	-.10	-.16**	-.15*	-.17**	-.15*	-.17**	-.42**	-.33**	-.42**	-.10	-.10
31. BURN 2	.42**	.39**	.03	-.10	-.17**	-.16**	-.18**	-.16**	-.20**	-.41**	-.28**	-.33**	-.03	-.07
32. BURN 3	.41**	.37**	-.03	-.10	-.19**	-.19**	-.23**	-.19**	-.14*	-.41**	-.34**	-.39**	-.12*	-.10
33. ENGA 1	-.18**	-.19**	.23**	.40**	.39**	.38**	.36**	.33**	.37**	.43**	.23**	.40**	.25**	.35**
34. ENGA 2	-.13*	-.12*	.24**	.38**	.38**	.27**	.27**	.22**	.28**	.34**	.16**	.32**	.28**	.33**
35. ENGA 3	-.14*	-.11	.16**	.27**	.32**	.30**	.27**	.24**	.32**	.31**	.14*	.29**	.23**	.26**
36. CRE 1	-.01	-.01	.06	.11	.07	.01	.01	.04	.11	.05	-.10	-.01	.21**	.17**
37. CRE 2	.00	.00	-.01	.05	.03	.08	.07	.12	.18**	.08	-.11	.02	.22**	.14*
38. CRE 3	-.02	.00	-.03	.11	.04	.11	.11	.14*	.19**	.09	-.03	.02	.22**	.16**
39. INN 1	.00	.02	.03	.08	.07	.12*	.10	.14*	.16**	.11	-.02	.06	.17**	.07
40. INN 2	.00	.05	.00	.08	.04	.10	.12	.11	.17**	.10	-.04	.03	.16**	.11
41. INN 3	-.02	-.01	.05	.10	.10	.03	.04	.10	.12	.12*	-.03	.05	.19**	.16**

Table 14 Continued

Variable	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
27. RES 1	.14*														
28. RES 2	.28**	.64**													
29. RES 3	.23**	.69**	.68**												
30. BURN 1	-.04	-.23**	-.16**	-.21**											
31. BURN 2	.02	-.26**	-.10	-.22**	.84**										
32. BURN 3	-.06	-.24**	-.19**	-.24**	.80**	.71**									
33. ENGA 1	.14*	.26**	.26**	.23**	-.43**	-.40**	-.51**								
34. ENGA 2	.17**	.23**	.23**	.20**	-.36**	-.32**	-.45**	.82**							
35. ENGA 3	.14*	.19**	.19**	.17**	-.38**	-.33**	-.47**	.81**	.76**						
36. CRE 1	.18**	.02	.08	.03	-.03	-.05	-.05	.12*	.12*	.12					
37. CRE 2	.19**	-.02	.07	.00	-.04	-.05	-.01	.12*	.11	.15*	.84**				
38. CRE 3	.21**	.03	.08	.04	-.05	-.08	-.02	.19**	.19**	.19**	.79**	.86**			
39. INN 1	.14*	.06	.11	.08	-.06	-.06	-.07	.17**	.12*	.18**	.75**	.77**	.72**		
40. INN 2	.11	.03	.07	.03	-.04	-.03	-.05	.15*	.15*	.16**	.74**	.78**	.73**	.85**	
41. INN 3	.17**	.02	.10	.05	-.08	-.09	-.09	.17**	.13*	.16**	.80**	.80**	.76**	.81**	.86**

Notes. Sample sizes range from 268 to 277. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, INN = innovation.

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

Examination of Hypothesized and Alternative Model Fit and Estimates of Effects

Model fit results are presented in Table 15. The hypothesized structural model fit the data for both the subordinate sample, $\chi^2(709) = 1571.61$, $p <. 001$, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05, and matched sample, $\chi^2(709) = 1130.14$, $p < .001$, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06. The first alternative model, in which personal resources mediated the relationship of job resources, was found to fit the data for both the subordinate sample, $\chi^2(728) = 1744.25$, $p < .001$, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .06, and matched sample, $\chi^2(728) = 1233.11$, $p < .001$, CFI = .94, RMSEA = .05 (90% CI = [.05, .06]), SRMR = .07. Model fit was significantly worse for this alternative model compared to the hypothesized model for both samples with $\Delta\chi^2(19) = 172.64$, $p < .001$ for the subordinate sample and $\Delta\chi^2(19) = 102.97$, $p < .001$ for the matched sample. The second alternative model, where demands and resources were aggregated into factors of job demands, job resources, and personal resources, had poor fit in the subordinate sample, $\chi^2(746) = 2406.75$, $p <. 001$, CFI = .93, RMSEA = .05 (90% CI = [.05, .06]), SRMR = .12. Model fit was significantly worse compared to the hypothesized model, $\Delta\chi^2(37) = 835.14$, $p < .001$. The second alternative model failed to converge in the matched sample. The number of iterations in the analysis were increased to 10,000, but the model still failed to converge. The convergence problems mainly came from a weak, negative factor loading for creativity role expectations on the job demands factor, suggesting that creativity role expectations may not be best defined as a job demand. Additionally, the relationship of creativity role expectations with burnout was not statistically significant, while the workload and interpersonal conflict had statistically significant, positive relationships. The structural models with path estimates are presented in Figures 7 and 8, as well as in Tables 16 and 17.

Table 15
Model Fit Statistics for the Hypothesized and Alternative Models

Model	χ^2	$\Delta\chi^2$	*df*	*p*	AIC	CFI	RMSEA	90% CI	SRMR
				Subordinate Sample					
Hypothesized Model	1571.61		709	<.001	63207.28	.96	.04	[.04, .04]	.05
First Alt. Model	1744.25	172.64**	728	<.001	63341.92	.96	.04	[.04, .04]	.06
Second Alt. Model	2406.75	835.14**	746	<.001	63968.43	.93	.05	[.05, .06]	.12
				Matched Sample					
Hypothesized Model	1130.14		709	<.001	21132.51	.95	.05	[.04, .05]	.06
First Alt. Model	1233.11	102.97**	728	<.001	21197.48	.94	.05	[.05, .06]	.07

Notes. Alt. = alternative. Second alternative model for matched sample failed to converge.
**$p < .01$

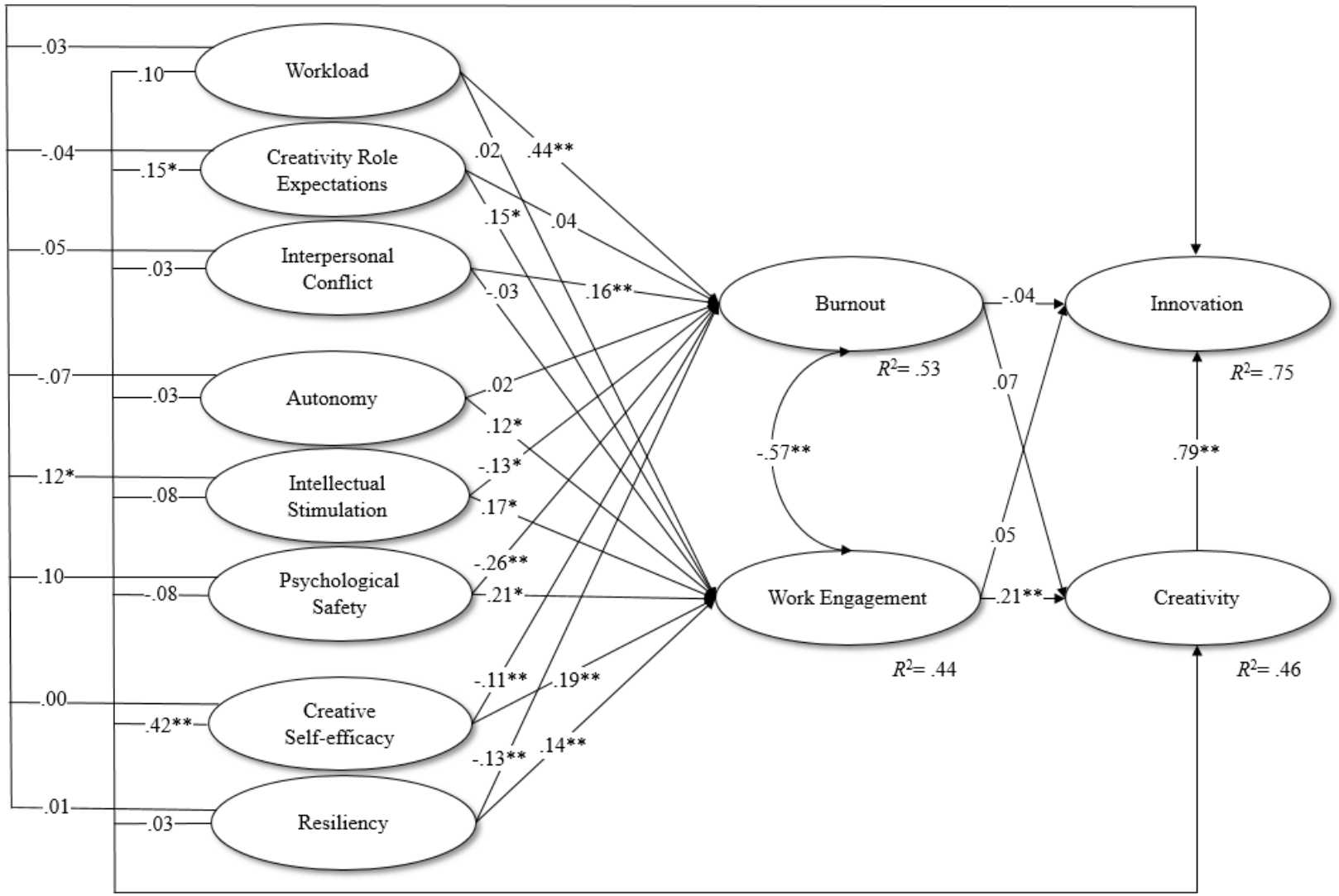

Figure 7. Structural Model with Standardized Paths for the Subordinate Sample

Table 16

Results of Structural Model for the Subordinate Sample

	Burnout			Work Engagement			Creativity			Innovation		
Model	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*
WL	.44**	0.48	0.04	.02	0.02	0.03	.10	0.09	0.05	.03	0.03	0.04
CRE	.04	0.05	0.08	.15*	0.15	0.07	.15*	0.17	0.08	-.04	-0.05	0.07
IC	.16**	0.18	0.05	-.03	-0.02	0.04	.03	0.03	0.04	.05	0.06	0.04
AUT	.02	0.02	0.07	.12*	0.15	0.06	.03	0.04	0.06	-.07	-0.11	0.06
INTEL	-.13*	-0.13	0.05	.17*	0.13	0.05	.08	0.07	0.05	.12*	0.12	0.05
PSYSAF	-.26**	-0.40	0.09	.21*	0.25	0.08	-.08	-0.11	0.09	.10	0.16	0.08
CRSE	-.11**	-0.15	0.06	.19**	0.21	0.05	.42**	0.51	0.06	.00	0.00	0.05
RES	-.13**	-0.18	0.05	.14**	0.15	0.04	.03	0.04	0.05	.01	0.02	0.04
BURN							.07	0.06	0.06	-.04	-0.04	0.05
ENGA							.21**	0.23	0.06	.05	0.07	0.06
CR										.79**	0.92	0.05

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity.

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

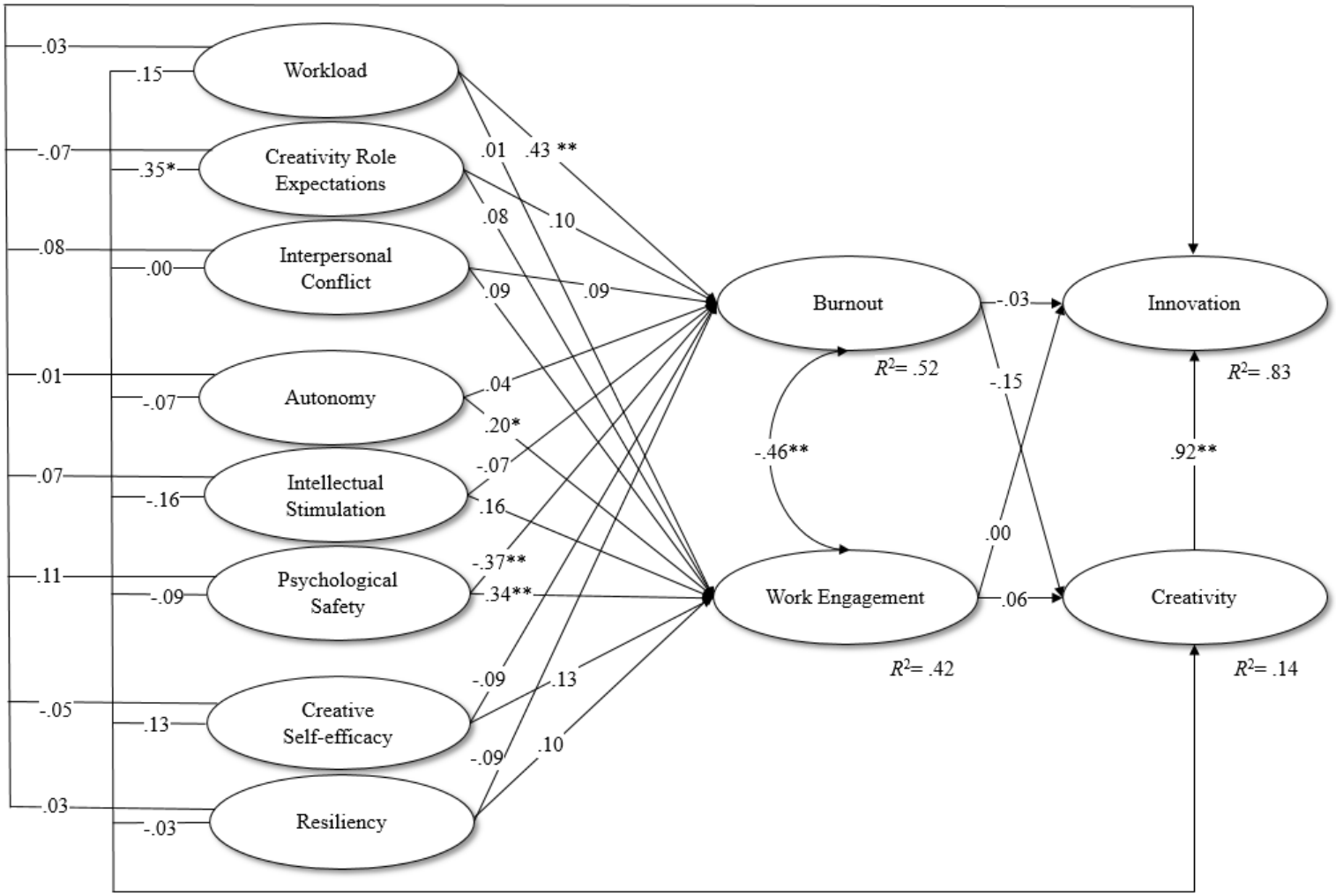

Figure 8. Structural Model with Standardized Paths for the Matched Sample

Table 17

Results of Structural Model for the Matched Sample

	Burnout			Work Engagement			Creativity			Innovation		
Model	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*
WL	.43**	0.52	0.08	.01	0.01	0.06	.15	0.16	0.10	.03	0.04	0.06
CRE	.10	0.15	0.18	.08	0.08	0.14	.35*	0.47	0.20	-.07	-0.11	0.13
IC	.09	0.10	0.09	.09	0.08	0.07	.00	0.00	0.10	.08	0.10	0.06
AUT	.04	0.06	0.12	.20*	0.24	0.09	-.07	-0.11	0.13	.01	0.02	0.08
INTEL	-.07	-0.08	0.11	.16	0.13	0.09	-.16	-0.16	0.12	.07	0.07	0.07
PSYSAF	-.37**	-0.61	0.09	.34*	0.41	0.14	-.09	-0.14	0.20	.11	0.18	0.12
CRSE	-.09	-0.15	0.15	.13	0.17	0.12	.13	0.20	0.18	-.05	-0.09	0.11
RES	-.09	-0.15	0.11	.10	0.12	0.08	-.03	-0.05	0.12	.03	0.04	0.07
BURN							-.15	-0.13	0.10	-.03	-0.03	0.06
ENGA							.06	0.07	0.12	.00	-0.01	0.07
CR										.92**	1.03	0.06

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement.

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

Direct Effects of Individual and Contextual Factors on Creativity and Innovation

Hypotheses 1-8 predicted relationships for the antecedent variables measured in this study (workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, psychological safety, creative self-efficacy, resiliency) with creativity and innovation. Direct effects were examined using a model excluding the mediators of burnout and work engagement. Table 18 presents the results of this analysis.

Table 18
Direct Effects for Both Samples on Creativity and Innovation

	Creativity						Innovation					
	Subordinate Sample			Matched Sample			Subordinate Sample			Matched Sample		
Variable	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*	*β*	*B*	*S.E.*
WL	.13**	0.12	0.04	.09	0.10	0.08	.11**	0.12	0.04	.10	0.12	0.09
CRE	.19**	0.21	0.08	.34**	0.45	0.20	.12	0.16	0.09	.24	0.35	0.23
IC	.04	0.04	0.04	-.01	-0.01	0.10	.08	0.09	0.05	.07	0.08	0.12
AUT	.06	0.08	0.06	-.06	-0.09	0.13	-.02	-0.03	0.07	-.05	-0.08	0.15
INTEL	.10	0.09	0.05	-.14	-0.14	0.12	.22**	0.22	0.06	-.06	-0.07	0.14
PSYSAF	-.06	-0.07	0.09	-.02	-0.03	0.19	.08	0.12	0.10	.10	0.16	0.22
CRSE	.46**	0.55	0.06	.15	0.23	0.18	.38**	0.52	0.06	.09	0.16	0.20
RES	.05	0.06	0.05	-.01	-0.02	0.12	.06	0.08	0.05	.02	0.02	0.14

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency.
*$p < .05$, **$p < .01$

Hypothesis 1 postulated that workload would be positively related to creativity and innovation. In the subordinate sample, workload had positive, direct effects on creativity (β = .13, p < .001) and innovation (β = .11, p = .002). In the matched sample, workload had positive, direct effects on creativity (β = .09, p = .215) and innovation (β = .10, p = .168), although neither effect was statistically significant. Therefore, Hypothesis 1 was not supported.

Hypothesis 2 predicted that creativity role expectations would be positively related to creativity and innovation. Creativity role expectations had a positive, direct effect on creativity (β = .19, p = .006) and innovation (β = .12, p = .074), although the effect for innovation was not statistically significant. In the matched sample, a positive effect was found on creativity (β = .34, p = .026) and innovation (β = .24, p = .121), but was not statistically significant for innovation. Hypothesis 2 received mixed support.

Hypothesis 3 postulated positive relationships for interpersonal conflict with creativity and innovation. In the subordinate sample, interpersonal conflict had positive effects on creativity (β = .04, p = .410) and innovation (β = .08, p = .097), although these effects were not statistically significant. In the matched sample, a direct effect to creativity was not found (β = -.01, p = .916), whereas a positive, but not statistically significant, effect was found for innovation (β = .07, p = .474). Thus, Hypothesis 3 was not supported.

Hypothesis 4 stated that autonomy would be positively related to creativity and innovation. In the subordinate sample, autonomy had a positive effect on creativity (β = .06, p = .224), and a negative effect on innovation (β = -.02, p = .715), although neither of these effects were statistically significant. In the matched sample, autonomy had a negative effect on creativity (β = -.06, p = .499) and positive effect on innovation (β = -.05, p = .571), but these effects were not statistically significant. Therefore, Hypothesis 4 was not supported.

Hypothesis 5 proposed that intellectual stimulation would be positively related to creativity and innovation. In the subordinate sample, intellectual stimulation had positive effect on creativity (β = .10, p = .077) and innovation (β = .22, p < .001), although only the effect on innovation was statistically significant. In the matched sample, intellectual stimulation had a negative effect on creativity (β = -.14, p = .245) and positive effect on innovation (β = -.06, p = .603). Hypothesis 5 received mixed support.

Hypothesis 6 stated that psychological safety would be positively related to creativity and innovation. In the subordinate sample, psychological safety had a negative effect on creativity (β = -.06, p = .402) and positive effect on innovation (β = .08, p = .247), although neither effect was statistically significant. In the matched sample, psychological safety had a negative effect on creativity (β = -.02, p = .884) and positive effect on innovation (β = .10, p = .451), but these effects were not statistically significant. Hypothesis 6 was not supported.

Hypothesis 7 predicted that creative self-efficacy would be positively related to creativity and innovation. In the subordinate sample, creative self-efficacy had a positive effect on creativity (β = .46, p < .001) and innovation (β = .38, p < .001). In the matched sample, creative self-efficacy had a positive effect on creativity (β = .15, p = .184) and innovation (β = .09, p = .428), but neither effect was statistically significant. Hypothesis 7 received mixed support.

Finally, Hypothesis 8 postulated that resiliency would be positively related to creativity and innovation. In the subordinate sample, resiliency had positive effects on creativity (β = .05, p = .216) and innovation (β = .06, p = .105), although neither effect was statistically significant. In the matched sample, resiliency had a negative, direct effect on creativity (β = -.01, p = .869) and positive, direct effect on innovation (β = .02, p = .858), but the effects were not statistically significant. Hypothesis 8 was not supported.

Tests of Burnout and Work Engagement as Mediators

Although examining work engagement and burnout in the same structural model was planned, the strong relationship between burnout and work engagement (r = -.53, p < .001) caused attenuation problems (Preacher & Hayes, 2008). Therefore, indirect effects were examined using separate models for burnout and work engagement. Total and specific indirect effects are provided as standardized estimates with 95% bootstrapped confidence intervals for the subordinate sample in Table 19 for creativity and Table 20 for innovation. The estimates and confidence intervals for the matched sample are provided in Table 21 for creativity and Table 22 for innovation.

Hypothesis 9 stated that workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, and psychological safety would have indirect effects on creativity and innovation through burnout. For the subordinate sample, no indirect effects were significant with burnout as a mediator for creativity nor innovation. For the matched sample, burnout was not supported as a mediator for creativity nor innovation as no indirect effects were statistically significant. Hypothesis 9 was therefore not supported.

Hypothesis 10 predicted that workload, creativity role expectations, interpersonal conflict, autonomy, intellectual stimulation, and psychological safety would have indirect effects on creativity and innovation through work engagement. For the subordinate sample, creativity role expectations (β = .026, 95% CI = [.001, .060]), autonomy (β = .021, 95% CI = [.003, .046]), intellectual stimulation (β = .030, 95% CI = [.007, .060]), psychological safety (β = .036, 95% CI = [.008, .076]), creative self-efficacy (β = .034, 95% CI = [.011, .064]), and resiliency (β = .024, 95% CI = [.006, .050]) had significant indirect effects on creativity. Indirect effects on innovation were found for autonomy (β = .017, 95% CI = [.002, .037]), intellectual stimulation

(β = .023, 95% CI = [.005, .048]), psychological safety (β = .028, 95% CI = [.006, .060]), creative self-efficacy (β = .027, 95% CI = [.009, .051]), and resiliency (β = .019, 95% CI = [.005, .039]), through work engagement and then creativity. For the matched sample, work engagement was not supported as a mediator for creativity or innovation as no indirect effects were statistically significant. Therefore, was partial support for Hypothesis 10 only in the subordinate sample. Table 23 provides a summary of the findings related to the hypotheses.

Table 19
Indirect Effects through Burnout on Creativity and Innovation for the Subordinate Sample

		95% CI	
Effect	Estimate	LL	UL
WL → BURN → CR	-.024	-.074	.026
CRE → BURN → CR	-.002	-.017	.007
IC → BURN → CR	-.008	-.029	.009
AUT → BURN→ CR	-.001	-.010	.006
INTEL → BURN → CR	.007	-.007	.026
PSYSAF → BURN → CR	.013	-.015	.046
CRSE → BURN→ CR	.006	-.007	.022
RES → BURN → CR	.007	-.007	.023
WL → BURN → INN	-.030	-.068	.006
WL → BURN → CR → INN	-.019	-.059	.021
CRE → BURN → INN	-.002	-.014	.007
CRE → BURN → CR → INN	-.002	-.013	.005
IC → BURN → INN	-.011	-.027	.002
IC → BURN → CR → INN	-.007	-.023	.008
AUT → BURN → INN	-.001	-.010	.006
AUT → BURN → CR → INN	-.001	-.008	.005
INTEL → BURN → INN	.008	-.002	.023
INTEL → BURN → CR → INN	.005	-.006	.021
PSYSAF → BURN → INN	.017	-.003	.043
PSYSAF → BURN → CR → INN	.011	-.012	.037
CRSE → BURN → INN	.007	-.002	.020
CRSE → BURN → CR → INN	.005	-.006	.017
RES → BURN → INN	.009	-.002	.021
RES → BURN → CR → INN	.005	-.006	.019

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation. $\chi^2(709) = 1571.61$, $p < .001$, AIC = 63207.28, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05.
*95% confidence interval does not include zero.

Table 20
Indirect Effects through Work Engagement on Creativity and Innovation for the Subordinate Sample

		95% CI	
Effect	Estimate	LL	UL
WL → ENGA → CR	.005	-.009	.021
CRE → ENGA → CR	.026*	.001	.060
IC → ENGA → CR	-.005	-.025	.014
AUT → ENGA→ CR	.021*	.003	.046
INTEL → ENGA → CR	.030*	.007	.060
PSYSAF → ENGA → CR	.036*	.008	.076
CRSE → ENGA→ CR	.034*	.011	.064
RES → ENGA → CR	.024*	.006	.050
WL → ENGA → INN	.002	-.004	.009
WL → ENGA → CR → INN	.004	-.007	.017
CRE → ENGA → INN	.011	-.001	.030
CRE → ENGA → CR → INN	.021	.000	.048
IC → ENGA → INN	-.002	-.011	.006
IC → ENGA → CR → INN	-.004	-.020	.011
AUT → ENGA → INN	.009	-.001	.022
AUT → ENGA → CR → INN	.017*	.002	.037
INTEL → ENGA → INN	.012	-.001	.028
INTEL → ENGA → CR → INN	.023*	.005	.048
PSYSAF → ENGA → INN	.014	-.001	.034
PSYSAF → ENGA → CR → INN	.028*	.006	.060
CRSE → ENGA → INN	.014	-.001	.030
CRSE → ENGA → CR → INN	.027*	.009	.051
RES → ENGA → INN	.010	-.001	.022
RES → ENGA → CR → INN	.019*	.005	.039

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation. $\chi^2(709) = 1571.61$, $p < .001$, AIC = 63207.28, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05.
*95% confidence interval does not include zero.

Table 21
Indirect Effects through Burnout on Creativity and Innovation for the Matched Sample

		95% CI	
Effect	Estimate	LL	UL
WL → BURN → CR	-.075	-.162	.013
CRE → BURN → CR	-.019	-.095	.057
IC → BURN → CR	-.015	-.054	.024
AUT → BURN→ CR	-.006	-.045	.033
INTEL → BURN → CR	.013	-.039	.065
PSYSAF → BURN → CR	.063	-.031	.158
CRSE → BURN→ CR	.017	-.041	.075
RES → BURN → CR	.015	-.021	.050
WL → BURN → INN	-.010	-.064	.044
WL → BURN → CR → INN	-.069	-.151	.013
CRE → BURN → INN	-.003	-.033	.028
CRE → BURN → CR → INN	-.018	-.087	.052
IC → BURN → INN	-.002	-.018	.014
IC → BURN → CR → INN	-.014	-.050	.023
AUT → BURN → INN	-.001	-.016	.014
AUT → BURN → CR → INN	-.006	-.041	.030
INTEL → BURN → INN	.002	-.019	.023
INTEL → BURN → CR → INN	.012	-.036	.059
PSYSAF → BURN → INN	.008	-.043	.060
PSYSAF → BURN → CR → INN	.059	-.028	.146
CRSE → BURN → INN	.002	-.022	.027
CRSE → BURN → CR → INN	.015	-.038	.069
RES → BURN → INN	.002	-.015	.019
RES → BURN → CR → INN	.013	-.018	.045

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation. $\chi^2(709) = 1130.14$, $p <. 001$, AIC = 21132.51, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06.
*95% confidence interval does not include zero.

Table 22
Indirect Effects through Work Engagement on Creativity and Innovation for the Matched Sample

		95% CI	
Effect	Estimate	LL	UL
WL → ENGA → CR	.002	-.022	.026
CRE → ENGA → CR	.010	-.051	.070
IC → ENGA → CR	.011	-.027	.050
AUT → ENGA→ CR	.024	-.025	.073
INTEL → ENGA → CR	.019	-.038	.076
PSYSAF → ENGA → CR	.043	-.042	.127
CRSE → ENGA→ CR	.016	-.034	.066
RES → ENGA → CR	.012	-.016	.039
WL → ENGA → INN	.000	-.008	.008
WL → ENGA → CR → INN	.002	-.021	.024
CRE → ENGA → INN	.000	-.022	.022
CRE → ENGA → CR → INN	.009	-.048	.066
IC → ENGA → INN	.000	-.016	.017
IC → ENGA → CR → INN	.011	-.025	.047
AUT → ENGA → INN	.001	-.022	.024
AUT → ENGA → CR → INN	.022	-.024	.068
INTEL → ENGA → INN	.001	-.023	.025
INTEL → ENGA → CR → INN	.017	-.037	.071
PSYSAF → ENGA → INN	.002	-.041	.045
PSYSAF → ENGA → CR → INN	.040	-.040	.119
CRSE → ENGA → INN	.001	-.022	.024
CRSE → ENGA → CR → INN	.015	-.032	.063
RES → ENGA → INN	.001	-.012	.013
RES → ENGA → CR → INN	.011	-.015	.037

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity.
$\chi^2(709) = 1130.14$, $p <. 001$, AIC = 21132.51, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06.
*95% confidence interval does not include zero.

Table 23

Summary of Support for Direct and Indirect Effects in Hypothesized Model

	Subordinate-rated						Manager-rated					
	Outcome	Indirect Effects Via		Outcome	Indirect Effects Via		Outcome	Indirect Effects Via		Outcome	Indirect Effects Via	
	CR	BURN	ENGA	INN	BURN	ENGA	CR	BURN	ENGA	INN	BURN	ENGA
WL	Y			Y								
CRE	Y		Y				Y					
IC												
AUT			Y			Y						
INTEL			Y	Y		Y						
PSYSAF			Y			Y						
CRSE	Y		Y	Y		Y						
RES			Y			Y						

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, ENGA = engagement, CR = creativity, INN = innovation.

Exploratory Analyses

Interactions within the JD-R model (Bakker & Demerouti, 2007, 2016; Bakker et al., 2014) were examined across combinations of demands and resources on burnout and work engagement. While historically the focus has been on interactions between job demands and job resources, recent research has explored other combinations, such as job demand by job demand interactions (Bakker & Demerouti, 2016). Results of the interaction tests on burnout are presented in Table 24. For job demand by job demand interactions on burnout, zero of three (0%) were statistically significant. For resource by resource interactions on burnout, two of ten (20%) were statistically significant. For job demand by resource interactions on burnout, one of 15 (7%) was statistically significant. Overall, there were few interactive effects found for the job demands and resources examined in this study on burnout.

Results of the interaction tests on work engagement are presented in Table 25. For job demand by job demand interactions on work engagement, zero of three (0%) were statistically significant. For resource by resource interactions on work engagement, two of ten (20%) were statistically significant. For job demand by resource interactions on work engagement, two of 15 (13%) were statistically significant. Similar to burnout, support for interaction effects on work engagement was weak. Taken together, interaction effects on both mediators were rare, although an interaction between psychological safety and creative self-efficacy was significant for both outcomes. There was a positive effect for the interaction on burnout (β = .07, p = .026) and negative effect on work engagement (β = -.11, p = .001).

Table 24
Interaction Effects of Demands and Resources on Burnout

	Loglikelihood	AIC	β	SE
Basic Model	-25537.87	51347.73		
Demand x Demand				
WL x CRE	-25537.76	51349.52	.02	.04
WL x IC	-25537.65	51349.30	.02	.03
CRE x IC	-25536.53	51347.06	.04	.03
Resource x Resource				
AUT x INTELL	-25537.39	51348.77	.03	.03
AUT x PSYSAF	-25536.13	51346.26	.04*	.02
AUT x CRSE	-25537.79	51349.57	.01	.04
AUT x RES	-25537.05	51348.10	.04	.03
INTELL x PSYSAF	-25537.86	51349.72	.00	.03
INTELL x CRSE	-25537.13	51348.27	.04	.04
INTELL x RES	-25537.68	51349.35	.02	.03
PSYSAF x CRSE	-25535.31	51344.63	.07*	.03
PSYSAF x RES	-25536.32	51346.63	.05	.03
CRSE x RES	-25536.50	51347.00	.05	.03
Demand x Resource				
WL x AUT	-25537.63	51349.27	-.04	.07
WL x INTELL	-25537.31	51348.62	.03	.03
WL x PSYSAF	-25537.77	51349.55	-.01	.03
WL x CRSE	-25537.10	51348.21	.00	.04
WL x RES	-25536.01	51346.01	-.11	.06
CRE x AUT	-25537.82	51349.63	-.01	.03
CRE x INTELL	-25537.87	51349.73	.00	.03
CRE x PSYSAF	-25537.86	51349.73	.00	.03
CRE x CRSE	-25537.35	51348.70	.03	.04
CRE x RES	-25537.70	51349.40	.02	.03
IC x AUT	-25537.63	51349.26	-.02	.03
IC x INTELL	-25534.70	51343.40	.06*	.03
IC x PSYSAF	-25537.09	51348.17	.07	.05
IC x CRSE	-25537.31	51348.62	-.03	.03
IC x RES	-25537.65	51349.30	-.02	.03

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency.
*p <.05, **p < .001

Table 25
Interaction Effects of Demands and Resources on Work Engagement

	Loglikelihood	AIC	*β*	SE
Basic Model	-24949.59	50171.17		
Demand x Demand				
WL x CRE	-24949.22	50172.44	-.04	.06
WL x IC	-24949.42	50172.84	-.02	.05
CRE x IC	-24948.09	50170.18	.05	.04
Resource x Resource				
AUT x INTELL	-24948.80	50171.61	-.04	.04
AUT x PSYSAF	-24948.21	50170.41	-.04	.03
AUT x CRSE	-24947.68	50169.35	-.07	.04
AUT x RES	-24949.55	50173.10	.01	.04
INTELL x PSYSAF	-24949.19	50172.37	-.03	.04
INTELL x CRSE	-24945.65	50165.30	-.09*	.03
INTELL x RES	-24948.49	50170.98	-.04	.04
PSYSAF x CRSE	-24943.53	50161.05	-.11**	.03
PSYSAF x RES	-24948.54	50171.07	-.04	.04
CRSE x RES	-24949.57	50173.14	-.01	.04
Demand x Resource				
WL x AUT	-24949.36	50172.71	.02	.04
WL x INTELL	-24947.40	50168.79	-.07	.04
WL x PSYSAF	-24949.59	50173.17	.00	.04
WL x CRSE	-24943.36	50160.72	.12**	.04
WL x RES	-24948.23	50170.46	.06	.04
CRE x AUT	-24949.22	50172.45	-.03	.04
CRE x INTELL	-24949.57	50173.13	-.01	.03
CRE x PSYSAF	-24948.61	50171.22	-.04	.04
CRE x CRSE	-24948.08	50170.15	-.06	.04
CRE x RES	-24949.28	50172.57	-.02	.04
IC x AUT	-24947.41	50168.81	.06	.04
IC x INTELL	-24949.58	50173.15	.00	.04
IC x PSYSAF	-24949.33	50172.66	.02	.04
IC x CRSE	-24941.18	50156.37	.13**	.03
IC x RES	-24948.24	50170.48	.05	.05

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency.
*$p < .05$, **$p < .001$

Exploratory analyses were run examining a model with creativity and innovation combined due to their high intercorrelations (.85 in the subordinate sample and .90 in the matched sample). Aligned with previous research, this combined construct was labeled innovative work behavior (Janssen, 2000). High correlations can indicate conceptual overlap between these variables (Shaffer, DeGeest, & Li, 2016). The subordinate model with innovative work behavior fit the data well, χ^2 (606) = 1401.84, p <. 001, AIC = 57663.56, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05. The matched sample also revealed a good fitting model when using innovative work behavior, χ^2 (606) = 1007.32, p <. 001, AIC = 19191.64, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06. These models are non-nested, so AIC differences were used to evaluate relative fit of these models to the hypothesized model (Wagenmakers & Farrell, 2004). The ΔAIC was 5543.72 for the subordinate sample and 1940.87 for the matched sample, which is larger than representing that the model with innovative work behavior is very likely the better models for each sample (Wagenmakers & Farrell, 2004).

Indirect effects were examined using the model with innovation work behavior and are presented in Tables 26 and 27 for the subordinate sample and Tables 29 and 30 for the matched sample. In the subordinate sample, there were no indirect effects found through burnout. For work engagement, there were indirect effects found for creativity role expectations (β = .029, 95% CI = [.003, .071]), autonomy (β = .024, 95% CI = [.007, .054]), intellectual stimulation (β = .034, 95% CI = [.012, .069]), psychological safety (β = .040, 95% CI = [.013, .086]), creative self-efficacy (β = .039, 95% CI = [.018, .073]), and resiliency (β = .027, 95% CI = [.010, .057]). In the matched sample, there were no indirect effects found for burnout or work engagement.

The indirect effects tests using innovative work behavior were nearly identical to the findings with the hypothesized model with creativity and innovation separated.

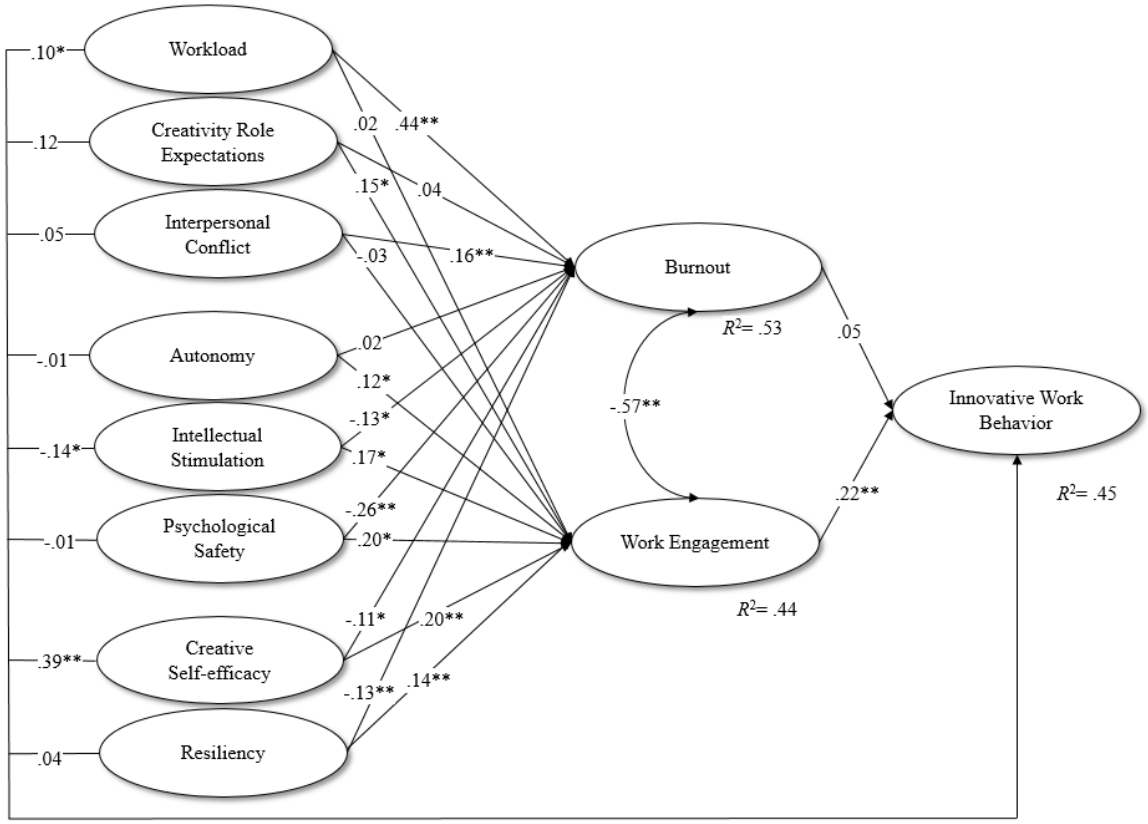

Figure 9. Structural Model for Innovative Work Behavior in the Subordinate Sample

Table 26
Indirect Effects through Burnout on Innovation Work Behavior for the Subordinate Sample

		95% CI	
Effect	Estimate	LL	UL
WL → BURN → IWB	-.038	-.091	.007
CRE → BURN → IWB	-.003	-.026	.005
IC → BURN → IWB	-.013	-.039	.001
AUT → BURN→ IWB	-.001	-.016	.005
INTEL → BURN → IWB	.010	-.001	.036
PSYSAF → BURN → IWB	.021	-.002	.059
CRSE → BURN→ IWB	.009	.000	.030
RES → BURN → IWB	.011	-.001	.030

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, IWB = innovative work behavior.
*95% confidence interval does not include zero.

Table 27
Indirect Effects through Work Engagement on Innovative Work Behavior for the Subordinate Sample

		95% CI	
Effect	Estimate	LL	UL
WL → ENGA → IWB	.006	-.009	.024
CRE → ENGA → IWB	.029*	.003	.071
IC → ENGA → IWB	-.006	-.029	.013
AUT → ENGA → IWB	.024*	.007	.054
INTEL → ENGA → IWB	.034*	.012	.069
PSYSAF → ENGA → IWB	.040*	.013	.086
CRSE → ENGA → IWB	.039*	.018	.073
RES → ENGA → IWB	.027*	.010	.057

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, ENGA = engagement, IWB = innovative work behavior.
*95% confidence interval does not include zero.

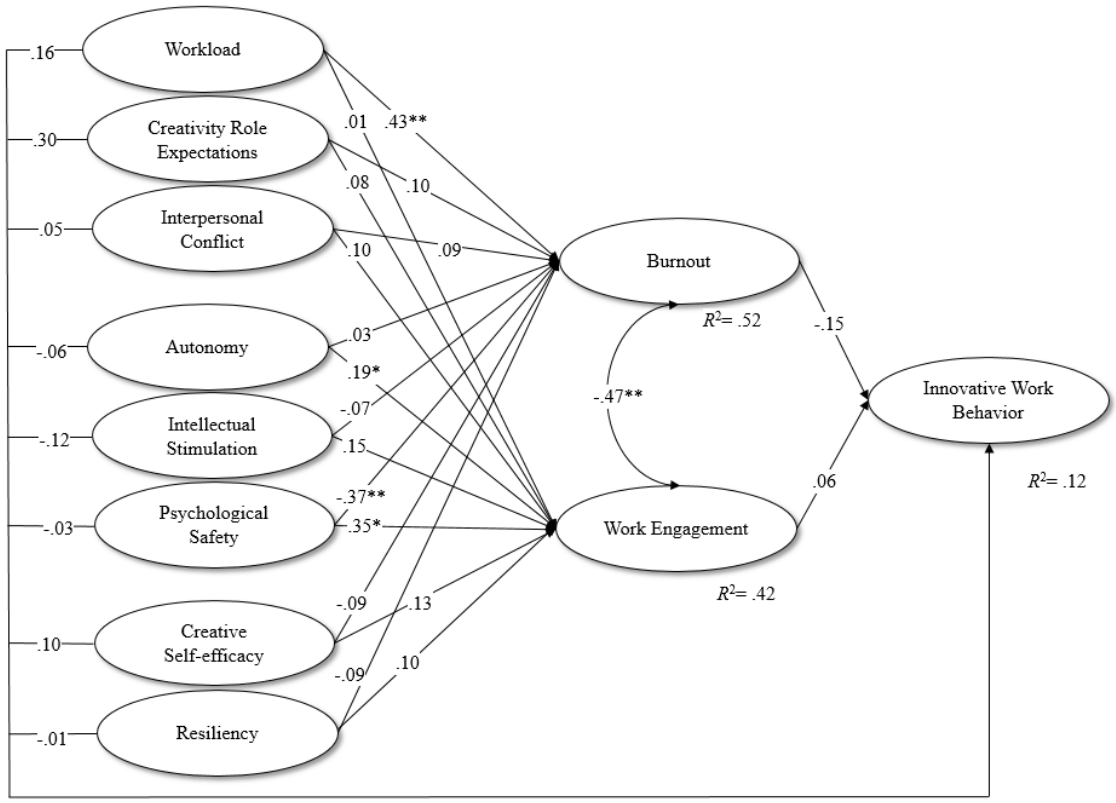

Figure 10. Structural Model for Innovative Work Behavior in the Matched Sample

Table 28
Indirect Effects through Burnout on Innovative Work Behavior for the Matched Sample

		95% CI	
Effect	Estimate	LL	UL
WL → BURN → CR	-.079	-.167	.009
CRE → BURN → CR	-.020	-.163	.122
IC → BURN → CR	-.016	-.061	.028
AUT → BURN→ CR	-.006	-.049	.036
INTEL → BURN → CR	.013	-.073	.100
PSYSAF → BURN → CR	.067	-.040	.173
CRSE → BURN→ CR	.017	-.095	.130
RES → BURN → CR	.015	-.045	.076

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, BURN = burnout, IWB = innovative work behavior.
*95% confidence interval does not include zero.

Table 29
Indirect Effects through Work Engagement on Innovative Work Behavior for the Matched Sample

		95% CI	
Effect	Estimate	LL	UL
WL → ENGA → CR	.002	-.023	.026
CRE → ENGA → CR	.010	-.051	.072
IC → ENGA → CR	.014	-.026	.054
AUT → ENGA → CR	.025	-.021	.071
INTEL → ENGA → CR	.020	-.035	.074
PSYSAF → ENGA → CR	.046	-.039	.132
CRSE → ENGA → CR	.018	-.031	.066
RES → ENGA → CR	.013	-.015	.040

Notes. WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency, ENGA = engagement, IWB = innovative work behavior.
*95% confidence interval does not include zero.

Additional exploratory analyses were conducted to refine the hypothesized model through model trimming. Following guidelines from Kline (2015), paths were removed from the model based on the significance of the χ^2 difference. Paths were removed individually until the aggregate change had a significantly lower χ^2 value than the hypothesized model. In general, the modeling trimming focused on the paths of antecedents to the mediators of burnout and work engagement, followed by evaluating paths for the direct effects on creativity and innovation.

In the subordinate sample, paths were removed between creativity role expectations and burnout ($\Delta\chi^2[1] = 0.37$, $p = .543$), autonomy and burnout ($\Delta\chi^2[2] = 0.53$, $p = .767$), workload and work engagement ($\Delta\chi^2[3] = 0.80$, $p = .849$), interpersonal conflict and work engagement ($\Delta\chi^2[4] = 1.17$, $p = .883$), autonomy and innovative work behavior ($\Delta\chi^2[5] = 1.24$, $p = .941$), psychological safety and innovative work behavior Δ ($\chi^2[6] = 1.42$, $p = .965$), resiliency and

innovative work behavior ($\Delta\chi^2[7] = 2.39$, $p = .935$), burnout and innovative work behavior ($\Delta\chi^2[7] = 2.23$, $p = .946$), creativity role experience and innovative work behavior ($\Delta\chi^2[8] = 5.24$, $p = .732$), and interpersonal conflict and innovative work behavior ($\Delta\chi^2[9] = 9.10$, $p = .428$). The resulting model fit the data, $\chi^2(615) = 1410.94$, $p < .001$, CFI = .96, RMSEA = .04 (90% CI = [.04, .04]), SRMR = .05, and is presented in Figure 11. In the matched sample, paths were removed between workload and work engagement ($\chi^2[1] = 0.03$, $p = .862$), role experience and work engagement ($\chi^2[2] = 0.35$, $p = .839$), autonomy and burnout ($\chi^2[3] = 0.60$, $p = .896$), intellectual stimulation and burnout ($\chi^2[4] = 1.65$, $p = .800$), resiliency and burnout ($\chi^2[5] = 4.41$, $p = .492$), interpersonal conflict and burnout ($\chi^2[6] = 6.09$, $p = .413$), creativity role expectations and burnout ($\chi^2[7] = 7.38$, $p = .390$), resiliency and work engagement ($\chi^2[8] = 7.72$, $p = .461$), creative self-efficacy and work engagement ($\chi^2[9] = 16.63$, $p = .055$), creative self-efficacy and burnout ($\chi^2[10] = 16.66$, $p = .082$), interpersonal conflict and innovative work behavior ($\chi^2[11] = 16.80$, $p = .114$), autonomy and innovative work behavior ($\chi^2[12] = 17.20$, $p = .142$), psychological safety and innovative work behavior ($\chi^2[13] = 18.55$, $p = .138$), resiliency and innovative work behavior ($\chi^2[14] = 18.60$, $p = .181$), work engagement and innovative work behavior ($\chi^2[14] = 18.08$, $p = .203$), intellectual stimulation and innovative work behavior ($\chi^2[15] = 19.31$, $p = .200$), creative self-efficacy and innovative work behavior ($\chi^2[16] = 21.02$, $p = .178$), burnout and innovative work behavior ($\chi^2[16] = 19.74$, $p = .232$), workload and innovative work behavior ($\chi^2[17] = 22.70$, $p = .159$), and interpersonal conflict and work engagement ($\chi^2[18] = 26.87$, $p = .081$). The model fit for the trimmed model was good, $\chi^2(624) = 1034.19$, $p < .001$, CFI = .95, RMSEA = .05 (90% CI = [.04, .05]), SRMR = .06, and is presented in Figure 12.

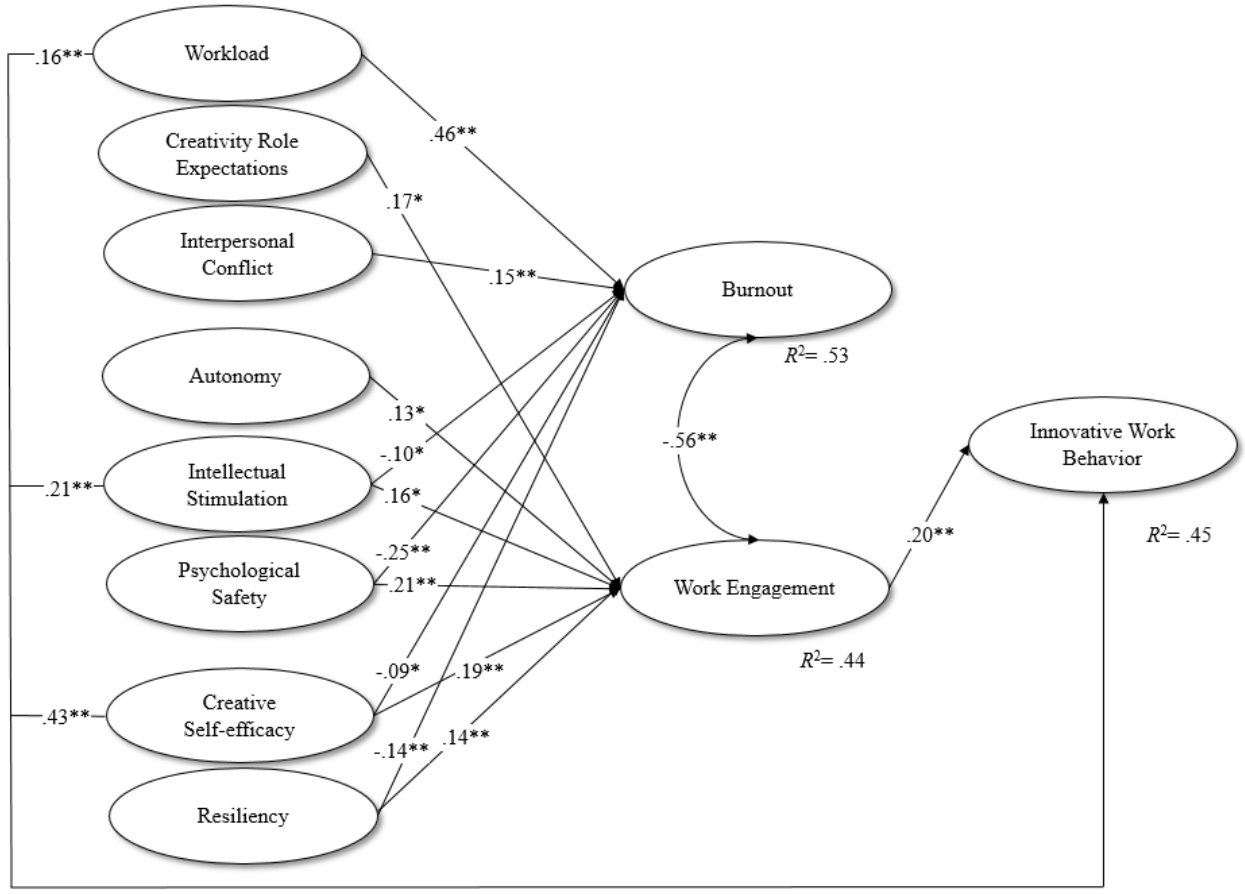

Figure 11. Trimmed Structural Model for the Subordinate Sample

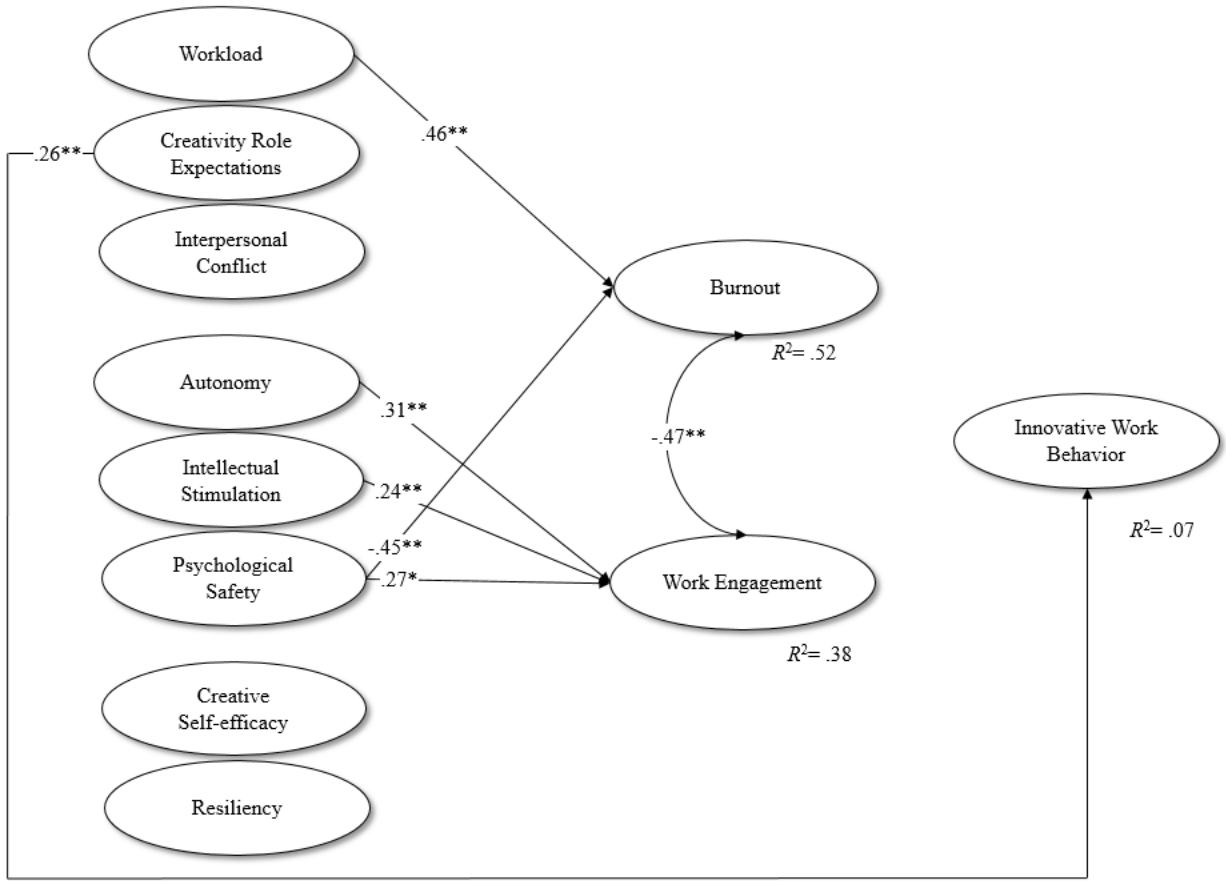

Figure 12. Trimmed Structural Model for the Matched Sample

Participants were given an opportunity to provide open-ended responses to a question asking them to identify the factors that would most accelerate creativity and innovation at their organization. A total of 609 responses were received. Comments were reviewed and thematically coded into up to three categories. Table 30 provides the most comment themes, percentages, and additional details from the comment review.

Table 30
Thematic Comment Summary

Theme	Percentage	Additional Details
Culture	20%	Reduce fear of failure and mistakes, cultural resistance to change, close-mindedness, and risk-avoidance
Teamwork & Collaboration	15%	Remove obstacles to working across organizational boundaries, create tools and processes that support collaboration, incentivize teamwork and collaboration
Funding	14%	Make more research funds available, provide billing code for innovation activities, reduce funding reliance on contracts
Time	14%	Provide more time to brainstorm and pursue ideas, reduce workload and schedule pressures
Manager Support	13%	Improve openness, encouragement, listening, feedback, and idea championing
Upper Management Support	12%	Reduce focus on financial metrics, give innovation more than lip service, reduce leaders' risk aversion
Bureaucracy & Process Constraints	9%	Lighten process hurdles to implementation, reduce management layers required for approvals
Training & Development	9%	Increase rotational opportunities, mentoring, support for technical training, relationships with customers and research universities
Autonomy & Flexibility	8%	Provide more decision-making involvement and latitude, work schedule flexibility, reduce micro-management
Recognition & Rewards	8%	Increase recognition for ideas, provide financial rewards based on idea impact
Computers, Software, & Tools	7%	Improve access to new technologies, test environments, equipment, and tools
Opportunities	7%	Communicate that everyone can be innovative, support diversity in thought, create more opportunities to innovative
Communications	5%	Increase communication across the organization, be more open and transparent with communications, set clear directives and strategy around innovation
Conflicting Priorities	5%	Reduce emphasis on schedule and cost, make innovation more of a priority

N = 609

CHAPTER V

DISCUSISON

The purpose of this research was to test the ability of the JD-R model to explain the mediating mechanisms linking individual and contextual factors to creativity and innovation. The JD-R model is important to test because it holds promise across contexts and outcomes (Bakker & Demerouti, 2016) but has been applied incompletely and inconsistently in relation to creativity and innovation. The hypothesized model was found to be superior to plausible, alternative models. The explanatory power of the model was quite good for creativity (R^2 = .46), innovation (R^2 = .75), burnout (R^2 = .53), and work engagement (R^2 = .44). For manager-ratings, the explained variance was 14% for creativity and 83% for innovation. The alternative model, where job resources were mediated by personal resources was found to have significantly poorer fit. While the fit was poorer, the impact of job resources on personal resources should not be ruled out. There were only two personal resources examined in this study and their roles within the JD-R model may be idiosyncratic to the two constructs, the outcomes of creativity and innovation, and the sample. Resiliency and creative self-efficacy, while malleable (Grant, Curtayne, & Burton, 2009; Mathisen & Bronnick, 2009; Tierney & Farmer, 2011), may take a long time to change as a result of job resources resulting in smaller effect sizes. Other personal resources that are more malleable (e.g., optimism, positive affect) may receive more support for playing a mediating role in job resources' impact on performance-related outcomes.

The second alternative model, where job demands, job resources, and personal resources were aggregated into second-order factors, had poor fit in the subordinate sample and encountered model convergence issues in the matched sample. Several studies have used an

aggregation approach to job demands and job resources (e.g., Bakker, Van Emmerik, & Van Riet, 2008; Balducci, Schaufeli, & Fraccaroli, 2011; Boyd et al., 2011). The problems of fit in the aggregated structure suggests that care should be taken when examining job demands and resources as higher-order factors. Creating composite scores without sufficiently evaluating the structural integrity of the higher-order conceptualization can lead to erroneous findings. A tenet of the JD-R model is that it is flexibility in contexts and job demands and resources (Bakker & Demerouti, 2016), which makes a core of constructs slightly contradictive.

Direct Effects on Creativity and Innovation

Hypotheses 1-8 made predictions about the relationships of specific individual and contextual factors with creativity and innovation. Although these hypotheses were based on theoretical frameworks and previous findings, not all relationships were supported by the data. The constructs that received the most empirical support were workload, creativity role expectations, intellectual stimulation, and creative-self efficacy.

Workload was supported as a positive predictor of creativity and innovation in the subordinate sample. The direction of the relationship in the matched sample was positive, but the effect size was smaller. Workload likely acts as a signal to employees that creativity and innovation are required to meet workload demands. Another explanation is that workload may be interpreted as more intense for those individuals completing working on innovation projects, due to the difficult associated with this type of work (Moenkemeyer et al., 2012). The findings for workload are consistent with previous research across measures of workload (Andrews & Farris, 1972; Baer & Oldham, 2006; Bunce & West, 1994; Fay & Sonnentag, 2002; Ohly & Fritz, 2010; Unsworth & Chang, 2005; Wu et al., 2014)

Creativity role expectations had a significant, positive effect on creativity in the subordinate and matched samples. Creativity role expectations likely drive increased engagement in creativity and innovation activities and the development of goals that are aligned with these outcomes. The findings from this study were consistent with previous research (Anderson et al., 2014; Carmeli & Schaubroeck, 2007; Janssen, 2000; Scott & Bruce, 1994; Tierney & Farmer, 2011).

Surprisingly, interpersonal conflict was not related to creativity and innovation, although it was strongly related to burnout (r = .45) and psychological safety (r = -.51). One reason for the lack of relationship with creativity and innovation may have been a mismatch of levels of analysis. This study focused on individual-level creativity and innovation, but interpersonal conflict may have more of an impact of team-level creativity and innovation due to the interdependencies and collaboration required in that type of work (Hülsheger et al., 2009). Individual-level creativity and innovation may not be impacted by interpersonal conflict as individual work does not require intensive interaction and cooperation with others. Additionally, the referent used in this study of "other employees" may have been too broad. Employees may have interpreted this to mean conflict with other employees in the organization versus conflict that impacts them personally, which could have biased the results.

For autonomy, there were positive relationships to creativity and innovation in both samples, although the relationships were not statistically significant. This was surprising given that autonomy is theorized as an important job resource since early theories of work stress, such as Karseak's (1979) JD-C theory. One reason this relationship may have been smaller was that this sample had high levels of autonomy. The average autonomy score was 4.25 out of 5.00 with

a standard deviation of 0.70. This suggests that respondents scored very high on the scale and there was not much variability, which would have attenuated the relationships.

This research provides support for intellectual stimulation being an important to innovation. The role of leadership in creativity and innovation is complex with varied relationships across analysis levels, outcome measurements, and rater source (Rosing et al., 2011). In Rosing et al.'s (2011) meta-analysis, transformational leadership was related to creativity and innovation but this relationship was not exceptionally strong (p = .17, 95% CI [.10, .24]). While not examined separately in their meta-analysis or many other studies, the intellectual stimulation component of transformational leadership may be especially salient to encouraging creativity and innovation.

It was slightly surprising that the relationship of psychological safety with creativity and innovation was not stronger. Psychological safety is seen as a core component of a climate for creativity (Hunter et al., 2007). One empirical reason for this smaller relationship is that the scale had lower reliability (α = .77) compared to other scales. The lower reliability likely occurred due to psychological safety being the only scale with positively and negatively worded items. Research has found that the presence of differently oriented items can cause psychometric challenges (Schriesheim & Eisenbach, 1995). Results still indicated that psychological safety generally had a positive impact on creativity and innovation, which supports previous research findings (Binyamin, Friedman, & Carmeli, 2017; Carmeli et al., 2010; Liu et al., 2016; Post, 2012).

Efficacy beliefs concerning creativity were an important predictor of both creativity and innovation in the subordinate sample. Creative self-efficacy is likely instrumental to original

thinking, engagement in creative tasks, and persisting in the face of the challenges inherent in creative work. These findings add to the growing body of research supporting creative self-efficacy as important for creativity across samples (Hammond et al., 2011; Ng & Feldman, 2012) and specifically within research and development samples (Richter et al., 2012; Tierney & Farmer, 2004).

Resiliency was not supported as having direct effects in either sample. This was surprising given that previous research has found resiliency is an important individual predictor to performance and its correlates (Eschleman et al., 2010). An explanation for the smaller relationships may be that resiliency is too general of an individual characteristic for the context of creativity and innovation. The other personal resource, creative self-efficacy, was found to be important and this may be due to its context-specific nature. The difference in findings may be due to the specific versus general conceptualizations of the constructs.

Indirect Effects through Burnout and Work Engagement

A surprising finding was that burnout was not supported as a mediator to creativity and innovation. While burnout was related to all the measured job demands and resources, burnout had a small, negative relationship with creativity and innovation in both samples. There are a couple likely reasons for this. First, the simplest answer is that burnout may not be particularly important to creativity and innovation. Individual and contextual factors may primarily have an impact on creativity and innovation through other factors, such as work engagement. Aligned with this explanation, some researchers have argued that for duties outside of someone's normal job requirements, which innovation often is (Axtell et al., 2000), burnout is less important than motivation (Bakker et al., 2004; Demerouti, Bakker, & Leiter, 2014; Motowildo, Borman, &

Schmit, 1997). Burnout may therefore be important when looking at in-role as opposed to extra-role performance behaviors.

Second, other individual difference factors may influence the strength of this relationship. Demerouti et al. (2014) tried to better understand why burnout and its component parts tended to have lower relationships with performance than engagement. They hypothesized that employees can maintain performance levels despite burnout by enacting adaptive, self-protective strategies. As performance is instrumental to self-identity, and maintaining one's job is important to resource conservation (Hobfoll, 1989), employees are likely motivated to enact compensatory behaviors when burnout is experienced. Demerouti et al. (2014) examined the three general strategies of selection (prioritizing or changing goals), optimization (optimizing resources, learning new skills or procedures, modeling other colleagues, investing more time into challenging tasks), and compensation (seeking resources from others). These different strategies were examined as moderators for the relationship of burnout with task performance and adaptability to change. Their findings supported a compensation strategy as important to buffering the relationship of exhaustion with adaptivity to change.

To explore the support for this explanation using the current dataset, latent variable interactions for burnout with the two individual differences measured in this study, creative self-efficacy and resiliency, were examined for their impact on creativity and innovation. Comparison models were run with the antecedents and burnout on creativity and innovation, separately, to compare model fit after adding interaction effects. Interaction effects were added individually and tested separately. Results from this analysis are in Table 31. Across subordinate and manager ratings, only one interaction was supported, creative self-efficacy and burnout (β = -.07, *SE* =

.03), to manager-rated innovation. Generally, support was limited for individual differences interacting with burnout on creativity and innovation.

Table 31
Interaction Effects of Individual Differences with Burnout on Creativity and Innovation

Model	Loglikelihood	AIC	*β*	*SE*
Base Model: Subordinate-rated Creativity	-27764.46	55836.93		
CRSE x BURN	-27762.95	55835.91	-.06	.04
RES x BURN	-27764.25	55838.50	-.02	.04
Base Model: Subordinate-rated Innovation	-27932.91	56173.82		
CRSE x BURN	-27930.58	56171.17	-.07*	.03
RES x BURN	-27932.83	56175.66	.01	.04
Base Model: Manager-rated Creativity	-9320.15	18948.30		
CRSE x BURN	-9320.06	18950.13	.03	.06
RES x BURN	-9319.37	18948.74	.08	.06
Base Model: Manager-rated Innovation	-9415.23	19138.46		
CRSE x BURN	-9415.23	19140.47	.01	.10
RES x BURN	-9414.87	19139.74	.06	.06

WL = workload, CRE = creativity role expectations, IC = interpersonal conflict, AUT = autonomy, INTEL = intellectual stimulation, PSYSAF = psychological safety, CRSE = creative self-efficacy, RES = resiliency.
*p <.05

Work engagement was supported in the subordinate sample for most variables that had significant direct effects on creativity and innovation, as hypothesized. Indirect effects through work engagement were found for creativity role expectations, autonomy, intellectual stimulation, psychological safety, creative self-efficacy, and resiliency in the subordinate sample. For innovation, the direct path from creativity to innovation made this relationship more complicated. Indirect effects through work engagement and then creativity were found for autonomy, intellectual stimulation, psychological safety, creative self-efficacy and resiliency.

These results support the generalizability of the JD-R model path to the context of creativity and innovation. This finding is aligned with previous research indicating the importance of work engagement as a mediator to creativity and innovation (De Spiegelaere et al., 2014; Slatten & Mehmetoglu, 2011).

In the matched sample, work engagement was not supported as a mediator, which was likely a result of lower power from a smaller sample size and reduced strength of relationships. Comparing creativity and innovation ratings in the matched sample for subordinates and managers, correlations were found to be small with .16 (p = .008) for creativity and .15 (p = .013) for innovation. Managers rated subordinates' creativity (M = 3.54, SD = 0.83) and innovation (M = 3.27, SD = 0.94) higher than the subordinates rated themselves (M = 3.38, SD = 0.72; M = 2.86, SD = 0.90; respectively).

Creativity role expectations, intellectual stimulation, and creative-self efficacy had indirect effects and remaining direct effects, suggesting the presence of additional mediators that were not included in this study. For intellectual stimulation, previous research suggests additional mediators of self-efficacy beliefs (Gong et al., 2009), creativity role identification (Wang, Tsai, & Tsai, 2014), and risk-taking behavior (Dewett, 2007). Similarly, for creativity role expectations, research suggests the mediator of self-expectations for creativity (Carmeli & Schaubroeck, 2007). For creative self-efficacy, this variable is usually as a mediator itself (Puente-Díaz, 2016), but expectancy theory (Vroom, 1964) and self-efficacy theory (Bandura, 1977) argue the mediating role of outcome expectations. These additional mediators may explain the remaining variance for the effects of intellectual stimulation, creativity role expectations, and creative self-efficacy on creativity and innovation.

There is evidence that subordinates and managers are not well aligned in their ratings of workplace behaviors. In a meta-analysis looking at performance rating correlations between sources, Conway and Huffcutt (1997) found that supervisors and subordinate ratings had a small relationship with a mean correlation of .22. In a meta-analysis by Carpenter, Berry, and Houston (2014), self-rated and other-rated organizational citizenship was found to have a mean correlation of .19, which is a set of behaviors with similarities to innovation (Axtell et al., 2000). Consistent with this research, other studies have found correlations of individual and contextual factors with manager-rated creativity and innovation tend to be smaller (Ng & Feldman, 2012). Lack of agreement in ratings is not always an indicator of poor rating quality. In the case of leader-member exchange, research has shown that managers and subordinates have moderate agreement but still display meaningful relationships without outcomes (Dulebohn, Bommer, Liden, Brouer, & Ferris, 2012; Matta, Scott, Koopman, & Conlon, 2015).

The subordinate sample was examined separated into those in the matched sample and those not in the matched sample to determine if there were any differences that could have impacted the results. Table 32 describes that differences between the samples. The subordinates in the matched sample had significantly higher intellectual stimulation, work engagement, creativity, and innovation scores. An examination of the pattern of results from the matched sample versus the matched sample revealed no substantial differences that would have impacted the findings in the matched sample.

While manager ratings are usually seen as the most reliable rating source (Conway & Huffcutt, 1997; Viswesvaran, Ones, & Schmidt, 1996), in this sample and the context of creativity and innovation, self-ratings are likely a more accurate representation of reality. So

much of what goes into the innovation process is unobservable to managers (e.g., ideation), making it difficult for them to rate these behaviors accurately. Subordinates tend to know their day-to-day activities and have insight into their own cognitions, which makes them most aware of their own creativity (Janssen, 2000; Shalley, Gilson, & Blum, 2009). There may be times when a subordinate has ideas that are not shared with their manager due to fears of being ignored, resistance of ideas, or retaliation (Ng & Feldman, 2012). In these cases, those behaviors would only be visible to the subordinate. Additionally, this study collected data from a highly-technical sample, and it was likely there were cases where the subordinate was working on complex or domain-specific tasks that the manager did not have the appropriate level of technical expertise to evaluate the creative merit of employee ideas. While creativity and innovation are argued to be most accurately measured using self-report in this sample, this may not be true in other samples and contexts, so data should always be collected from multiple sources.

Table 32
Differences Between the Matched and Non-matched Subordinate Sample

Variable	Sample	*N*	*M*	*SD*	*t*
Creativity Role Expectations	Matched	269	3.91	0.77	1.83
	Non-Matched	520	3.80	0.85	
Workload	Matched	270	3.30	1.01	0.91
	Non-Matched	524	3.23	1.00	
Intellectual Stimulation	Matched	270	3.59	0.87	2.17*
	Non-Matched	523	3.44	0.96	
Autonomy	Matched	268	4.27	0.69	0.42
	Non-Matched	521	4.25	0.71	
Psychological Safety	Matched	269	3.74	0.64	0.40
	Non-Matched	521	3.72	0.64	
Interpersonal Conflict	Matched	270	2.01	0.85	1.25
	Non-Matched	520	1.93	0.82	
Burnout	Matched	269	2.51	0.90	1.30
	Non-Matched	521	2.60	0.89	
Work Engagement	Matched	269	3.62	0.63	2.24*
	Non-Matched	521	3.51	0.66	
Creative Self-efficacy	Matched	269	3.99	0.58	0.43
	Non-Matched	516	3.97	0.64	
Resiliency	Matched	269	3.66	0.55	0.57
	Non-Matched	521	3.69	0.64	
Creativity	Matched	277	3.38	0.72	2.02*
	Non-Matched	539	3.26	0.80	
Innovation	Matched	277	2.86	0.90	2.44*
	Non-Matched	538	2.70	0.93	

*$p < .05$

Study Limitations

As with any study, this research has some limitations. First, the hypothesized model and relationships were tested using employees from a single sample, which limits the generalizability of the findings. Although using a single sample may reduce generalizability, the sample aligns with the type of careers and skillsets that are becoming increasingly important for the future of work. Klaus Schwab, chairman of the World Economic Forum argues that we are entering the Fourth Industrial Revolution, where advances in technology (e.g., genetics, artificial intelligence, autonomous transportation, machine learning), will cause changes in the way humans live and

work (Schwab, 2016). This shift is predicted to drive growth in job categories related to engineering, computer science, and mathematics. Additionally, the United States is experiencing a labor shortage in fields similar to the sample examined (e.g., computer engineering, process engineering) making the understanding of how best to support the creativity and innovation of this group important (Xue & Larson, 2015).

Second, this study focused on creativity and innovation across individuals as opposed to across teams or organizations. The decision to study individual creativity and innovation was aligned with the trends in how work is performed (Manyika et al., 2016). In addition, this individual-level focus was pragmatic in that the sample organization did not organize their work neatly into distinct teams. Talent has become exceptionally mobile due to technological advancements, and dynamic working arraignments (e.g., contract work) have become more common (Manyika et al., 2016). In these types of situations, individuals must be able to move in and out of collaborative work easily, which makes their individual abilities to think creativity and be innovative important to understand.

Third, a limitation of this study was that data were collected during a single administration. In models testing mediation and casual paths, it is recommended that measures are captured at multiple time points to better assess causal relationships. With the current sample, collection of data across multiple timepoints was not possible. The evaluation of causal relationships was reasonable given previous theory and empirical findings related to the JD-R model (Bakker & Demerouti, 2016), in addition to research on creativity and innovation (Amabile, 1988; Hammond et al., 2011; Woodman et al., 1993).

Theoretical Contributions

The results of this study contribute to a deeper understanding of creativity, innovation, and the JD-R model. This study found mixed support for the generalizability of the JD-R model to creativity and innovation. An espoused strength of the JD-R model is that it can be applied across occupations and outcomes (Bakker & Demerouti, 2016). While this research provided support for the motivational pathway to creativity and innovation, the health impairment process was not supported, suggesting additional refinement of the model to be used in this context. The findings of this study also support continued research on personal resources in the JD-R model. Personal resources are a good way to integrate individual differences into the JD-R model and provide a framework to examine interactions between individual differences and job characteristics. Creative self-efficacy and resiliency were both supported as impacting burnout and work engagement, in addition to having indirect effects on creativity via work engagement. While creative self-efficacy is a personal resource specific to the context of creativity, the results of this study suggest that self-efficacy beliefs are likely important within the model. Resiliency beliefs, which are much broader in nature than self-efficacy, are likely to be generalizable as a personal resource across contexts.

Additional analyses exploring interactions generally did not support the interaction hypotheses specified in the JD-R model (Bakker & Demerouti, 2016). While some interactions were found, the patterns did not fit the JD-R model hypotheses well. The results suggest that interactions should be evaluated construct by construct as interactions were also found for resource by resource and demand by demand, which is currently an open area of inquiry with the JD-R model (Bakker & Demerouti, 2016).

This research contributes to the study of creativity and innovation through a refined understanding of how specific constructs relate to creativity and innovation, in addition to supplementing the research on the relative importance of these constructs. The findings about the impact of job demands on creativity and innovation were particularly important, as previous research has focused primarily on job resources (Hammond et al., 2011). Workload and creativity role expectations were found to be positive predictors of creativity and innovation. Interpersonal conflict was not supported, suggesting that it may not be an important variable to individual creativity and innovation. While creativity role expectations was found to be mediated by work engagement, workload was not supported as mediated by burnout or work engagement. Researchers have argued that workload causes stress and exhaustion, which reduces creativity (De Dreu, 2003; Ordonez & Benson, 1997). The current research suggests the relationships for workload with creativity and innovation is more complex, although support for an indirect effect through was nearly statistically significant. This research also contributes to a better understanding of the mediating mechanisms to creativity and innovation (Hennessey & Amabile, 2010). Work engagement was supported as an intervening variable for all job and personal resources to creativity and innovation in the subordinate sample, whereas burnout was not supported as an intervening variable in either sample.

The results of the measurement models suggested that the current measures used to assess creativity and innovation can be improved. This research examined creativity and innovation by combining items from two scales (Janssen, 2000; Tierney & Farmer, 2011) mapped to the two dimensions of creativity and innovation. The findings suggested that a two-factor model fit the data best. Janssen's (2000) scale of innovative work behavior may confound the measurement of

both creativity and innovation, which can negatively impact the consistency of relationships with other variables (Montag et al., 2012). Additional work in this area is needed as the accurate measurement of creativity and innovation is essential to research progress.

Practical Implications

The findings of this study suggested that organizations should focus their efforts on managers if they want to increase employee creativity and innovation. Managers play a central role in influencing the behavior of their employees and were found to be able to positively influence subordinate creativity and innovation through encouraging, supporting, and expecting new ideas from their employees. Organizations can leverage selection systems, training interventions, and reward systems to enhance manager behaviors associated with intellectual stimulation. Managers can be hired or promoted based on these behaviors or traits associated with them. Managers can be trained to perform specific behaviors, such as techniques to encourage unconventional ideas, ways to challenge assumptions, and set goals and expectations for creative work (Barling, Weber, & Kelloway, 1996). Organizational leaders can also hold managers accountable for an environment supportive of creativity and innovation. Financial and non-financial rewards can be used but caution should be taken when using large financial rewards as they may negatively impact intrinsic motivation, and subsequently, innovation efforts (Deci, Koestner, & Ryan, 1999).

The results of this study suggest that organizations should work to enhance employee creative self-efficacy to encourage creativity and innovation. Bandura (1997) postulated that efficacy beliefs can be developed through personal experiences and learning from others. There are a couple ways that creative self-efficacy can be encouraged relatively easily within an

organization. First, training interventions directed at education, discussion, and demonstration of creative thinking have shown promise in impacting creative self-efficacy (Mathisen & Bronnick, 2009). Second, hands-on experience with others who are successful at innovation efforts can help build efficacy beliefs. Mentoring, rotational assignments into innovative groups, and manager feedback may be particularly suited for building experience and self-efficacy perceptions related to creativity.

This research can help organizational leaders and managers develop a more nuanced understanding of the complex interrelationships among demands, resources, and innovation in the workplace, and thus make more informed decisions. Oftentimes employees and leaders see lack of innovation as primarily coming from a lack of resources (e.g., financial support, access to latest technology and equipment). While increased funding may elicit increased innovation activities, it does not guarantee increased innovation outcomes. The impact of the work environment and individual are sometimes overlooked, although they play an important role in influencing employee motivation to engage in creativity and innovation efforts (Ford, 1996; Hammond et al., 2011). This research supported the importance of the manager, the individual, and work engagement, as important to influencing the frequency of creativity and innovation activities.

Organizations should seek to better understand the work environment across their employees through measuring predictors of creativity and innovation, such as those supported in this study. Many organizations currently assess employee attitudes (e.g., job satisfaction, engagement, commitment) and behaviors (e.g., job performance) but may not assess the wide range of individual and contextual factors that creativity and innovation. This study suggests that

perceptions of one's work requirements and expectations are important, such as the degree to which one is expected to be creative. Additionally, organizations can seek to measure the degree managers display behaviors associated with intellectual stimulation can help identify risks for business areas not conducive to creative thinking and potential targets for interventions. Measuring employees and their individual perceptions of efficacy and resiliency can also provide guidance on training and development needs.

Future Research

Future research should explore additional mediators to better understanding how individual and contextual factors impact creativity and innovation. This study supported work engagement, but not burnout, as an important mediator across antecedents to creativity. However, there were remaining direct effects for several constructs on creativity and innovation after including work engagement in the model. This suggests that there are likely additional mediators that were not measured in this study. Future research should investigate mediators that would supplement work engagement. Work engagement and burnout tend to be more energetic and affective in nature, so future research should consider of other types of constructs. For example, consideration of cognitive-related mediators, such as goals and goal orientations may hold value (Shalley & Koseoglu, 2013).

Future research should work to improve the measurement of creativity and innovation. Based on the results of this study, a more nuanced approach to creativity and innovation is recommended. Aligned with Montag et al. (2012), researchers should focus on specific behaviors that map to creativity and innovation dimensions. Additional work is needed around defining the structure of these behaviors and creating items used to measure them. Additionally, the scales for

creativity and innovation should do a better job at discerning among types, such as process and product innovations. These outcomes come with different levels of perceived importance by organizational leaders, so being able to parse them apart and the conditions that encourage each would provide valuable insights.

Future research should look further into creativity role expectations and their impact by source, including the job (e.g., job description, title, department reputation), managers and coworkers (e.g., communicated expectations and roles), and the individual (e.g., self-identity, preferences, values). Understanding the source driving creativity role expectations can help determine the best intervention strategies. A focus on the individual driven expectations also aligns with an emerging area of research for the JD-R model of personal demands (Bakker & Demerouti, 2016), which are self-set requirements for performance and behaviors that result in physical and psychological costs (Barbier et al., 2013).

Research should continue to focus on personal resources and the role they play within the JD-R model, in addition to better understanding their relative importance and generalizability. Previous research has conceptualized their impact in several ways: (a) a separate antecedent to strain and motivation (Prieto, Soria, Martínez, & Schaufeli, 2008; Xanthopoulou et al., 2009), (b) a mediator for job demands and job resources on strain and motivation (Llorens et al., 2007; Simbula, Guglielmi, & Schaufeli, 2011), (c) a moderator for the impact of job demands and job resources on strain and motivation, (d) an antecedent to job demands and job resources (Xanthopoulou et al., 2007), and (e) a confounding variable for job demands and job resources in JD-R model. This research was able to compare models with personal resources as separate antecedents and mediators for job resources, but longitudinal and experimental designs are

needed to fully understand the single or multiple roles personal resources play in the JD-R model. Additionally, research should consider examining the differences between narrow (e.g., creative self-efficacy) and broad (e.g., generalized self-efficacy) personal resources play. This will allow comparisons of relationship strength, most supported causal role in the JD-R model, and generalizability of specific personal resources occupations and outcomes.

CHAPTER V

CONCLUSIONS

Organizations must continually exploit opportunities for innovation to be successful in the highly-competitive and global business environment. Leveraging the creativity and innovation of their employees is necessary to help organizations meet the challenges of the future. To better understand the mediating mechanisms to creativity and innovation, this study examined burnout and work engagement within the JD-R model framework. Work engagement was supported as an important mediator for multiple individual and contextual factors on creativity and innovation, whereas burnout was not supported as a mediator. The results of this study suggest that organizations should focus their efforts on ensuring managers encourage, support, and expect creativity and innovation from employees, in addition to developing employee confidence in their abilities to be creative.

REFERENCES

Agarwal, Upasna A. (2014a). Examining the impact of social exchange relationships on innovative work behaviour: Role of work engagement. *Team Performance Management: An International Journal, 20*(3/4), 102-120. doi: 10.1108/TPM-01-2013-0004

Agarwal, Upasna A. (2014b). Linking justice, trust and innovative work behaviour to work engagement. *Personnel Review, 43*(1), 41-73. doi: 10.1108/PR-02-2012-0019

Agarwal, Upasna A., Datta, Sumita, Blake-Beard, Stacy, & Bhargava, Shivganesh. (2012). Linking LMX, innovative work behaviour and turnover intentions: The mediating role of work engagement. *The Career Development International, 17*(3), 208-230. doi: 10.1108/13620431211241063

Aguinis, Herman, Gottfredson, Ryan K., & Joo, Harry. (2013). Best-practice recommendations for defining, identifying, and handling outliers. *Organizational Research Methods, 16*(2), 270-301. doi: 10.1177/1094428112470848

Airila, Auli, Hakanen, Jari J., Schaufeli, Wilmar B., Luukkonen, Ritva, Punakallio, Anne, & Lusa, Sirpa. (2014). Are job and personal resources associated with work ability 10 years later? The mediating role of work engagement. *Work & Stress, 28*(1), 87-105. doi: 10.1080/02678373.2013.872208

Akkermans, Jos, Brenninkmeijer, Veerle, Van Den Bossche, Seth N. J., Blonk, Roland W. B., & Schaufeli, Wilmar B. (2013). Young and going strong?: A longitudinal study on occupational health among young employees of different educational levels. *The Career Development International, 18*(4), 416-435. doi: 10.1108/CDI-02-2013-0024

Alarcon, Gene M. (2011). A meta-analysis of burnout with job demands, resources, and attitudes. *Journal of Vocational Behavior, 79*(2), 549-562. doi: 10.1016/j.jvb.2011.03.007

Amabile, Teresa M, Conti, Regina, Coon, Heather, Lazenby, Jeffrey, & Herron, Michael. (1996). Assessing the work environment for creativity. *Academy of Management Journal, 39*(5), 1154-1184. doi: 10.2307/256995

Amabile, Teresa M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior, 10,* 123-167.

Amabile, Teresa M., Barsade, Sigal G., Mueller, Jennifer S., & Staw, Barry M. (2005). Affect and creativity at work. *Administrative Science Quarterly, 50*(3), 367-403. doi: 10.2189/asqu.2005.50.3.367

Amason, Allen C., & Schweiger, David M. (1994). Resolving the paradox of conflict, strategic decision making, and organizational performance. *International Journal of Conflict Management, 5*(3), 239-253. doi: 10.1108/eb022745

Anderson, James C., & Gerbing, David W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-423. doi: 10.1037/0033-2909.103.3.411

Anderson, Neil, De Dreu, Carsten K. W., & Nijstad, Bernard A. (2004). The routinization of innovation research: A constructively critical review of the state-of-the-science. *Journal of Organizational Behavior, 25*(2), 147-173. doi: 10.1002/job.236

Anderson, Neil, Potočnik, Kristina, & Zhou, Jing. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management, 40*(5). doi: 10.1177/0149206314527128

Andrews, Frank M., & Farris, George F. (1972). Time pressure and performance of scientists and engineers: A five-year panel study. *Organizational Behavior & Human Performance, 8*(2), 185-200. doi: 10.1016/0030-5073(72)90045-1

2015. Stress in America: The impact of discrimination. Retrieved from http://www.apa.org/news/press/releases/stress/

Aryee, Samuel, Walumbwa, Fred O., Zhou, Qin, & Hartnell, Chad A. (2012). Transformational leadership, innovative behavior, and task performance: Test of mediation and moderation processes. *Human Performance, 25*(1), 1-25. doi: 10.1080/08959285.2011.631648

Austin, James T., & Villanova, Peter. (1992). The criterion problem: 1917–1992. *Journal of Applied Psychology, 77*(6), 836-874. doi: 10.1037/0021-9010.77.6.836

Avey, James B., Reichard, Rebecca J., Luthans, Fred, & Mhatre, Ketan H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. *Human Resource Development Quarterly, 22*(2), 127-152. doi: 10.1002/hrdq.20070

Axtell, Carolyn M., Holman, D. J., Unsworth, K. L., Wall, T. D., Waterson, P. E., & Harrington, E. (2000). Shopfloor innovation: Facilitating the suggestion and implementation of ideas. *Journal of Occupational and Organizational Psychology, 73*(3), 265-285. doi: 10.1348/096317900167029

Baer, Markus, & Oldham, Greg R. (2006). The curvilinear relation between experienced creative time pressure and creativity: Moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology, 91*(4), 963-970. doi: 10.1037/0021-9010.91.4.963

Bakker, Arnold B., & Demerouti, Evangelia. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309-328. doi: 10.1108/02683940710733115

Bakker, Arnold B., & Demerouti, Evangelia. (2014). *Job demands–resources theory*. New York, NY: John Wiley & Sons, Ltd.

Bakker, Arnold B., & Demerouti, Evangelia. (2016). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273-285. doi: 10.1037/ocp0000056

Bakker, Arnold B., Demerouti, Evangelia, de Boer, Elpine, & Shaufeli, Wilmar B. (2003). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior, 62*(2), 341-356. doi: 10.1016/S0001-8791(02)00030-1

Bakker, Arnold B., Demerouti, Evangelia, & Sanz-Vergel, Ana Isabel. (2014). Burnout and work engagement: The JD–R approach. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 389-411. doi: 10.1146/annurev-orgpsych-031413-091235

Bakker, Arnold B., Demerouti, Evangelia, & Verbeke, Willem. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management, 43*(1), 83-104. doi: 10.1002/hrm.20004

Bakker, Arnold B., & Sanz-Vergel, Ana Isabel. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior, 83*(3), 397-409. doi: 10.1016/j.jvb.2013.06.008

Bakker, Arnold B., Van Emmerik, Hetty, & Van Riet, Pim. (2008). How job demands, resources, and burnout predict objective performance: A constructive replication. *Anxiety, Stress, & Coping, 21*(3), 309-324. doi: 10.1080/10615800801958637

Bakker, Arnold B., & Xanthopoulou, Despoina. (2013). Creativity and charisma among female leaders: The role of resources and work engagement. *The International Journal of Human Resource Management*, *24*(14), 2760-2779. doi: 10.1080/09585192.2012.751438

Balducci, Cristian, Schaufeli, Wilmar B., & Fraccaroli, Franco. (2011). The job demands–resources model and counterproductive work behaviour: The role of job-related affect. *European Journal of Work and Organizational Psychology*, *20*(4), 467-496. doi: 10.1080/13594321003669061

Bandura, Albert. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215. doi: 10.1037/0033-295X.84.2.191

Bandura, Albert. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, Albert, & Locke, Edwin A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, *88*(1), 87-99. doi: 10.1037/0021-9010.88.1.87

Barbier, Marie, Hansez, Isabelle, Chmiel, Nik, & Demerouti, Evangelia. (2013). Performance expectations, personal resources, and job resources: How do they predict work engagement? *European Journal of Work and Organizational Psychology*, *22*(6), 750-762. doi: 10.1080/1359432X.2012.704675

Barling, Julian, Weber, Tom, & Kelloway, E. Kevin. (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology*, *81*(6), 827-832. doi: 10.1037/0021-9010.81.6.827

Bass, Benjamin I., Cigularov, Konstantin P., Chen, Peter Y., Henry, Kimberly L., Tomazic, Rocco G., & Li, Yiqiong. (2016). The effects of student violence against school employees on employee burnout and work engagement: The roles of perceived school unsafety and transformational leadership. *International Journal of Stress Management, 23*(3), 318-336. doi: 10.1037/str0000011

Bass, Bernard M. (1985). *Leadership and performance beyond expectations*. New York, NY: Free Press.

Binnewies, Carmen, & Wörnlein, Sarah C. (2011). What makes a creative day? A diary study on the interplay between affect, job stressors, and job control. *Journal of Organizational Behavior, 32*(4), 589-607. doi: 10.1002/job.731

Binyamin, Galy, Friedman, Anat, & Carmeli, Abraham. (2017). Reciprocal care in hierarchical exchange: Implications for psychological safety and innovative behaviors at work. *Psychology of Aesthetics, Creativity, and the Arts*. doi: 10.1037/aca0000129

Boies, Kathleen, Fiset, John, & Gill, Harjinder. (2015). Communication and trust are key: Unlocking the relationship between leadership and team performance and creativity. *The Leadership Quarterly,* 1080-1094. doi: 10.1016/j.leaqua.2015.07.007

Boswell, Wendy R., Olson-Buchanan, Julie B., & LePine, Marcie A. (2004). Relations between stress and work outcomes: The role of felt challenge, job control, and psychological strain. *Journal of Vocational Behavior, 64*(1), 165-181. doi: 10.1016/S0001-8791(03)00049-6

Bowen, Frances E., Rostami, Mahdi, & Steel, Piers. (2010). Timing is everything: A meta-analysis of the relationships between organizational performance and innovation. *Journal of Business Research, 63*(11), 1179-1185. doi: 10.1016/j.jbusres.2009.10.014

Boyd, Carolyn M., Bakker, Arnold B., Pignata, Silvia, Winefield, Anthony H., Gillespie, Nicole, & Stough, Con. (2011). A longitudinal test of the job demands-resources model among Australian university academics. *Applied Psychology: An International Review, 60*(1), 112-140. doi: 10.1111/j.1464-0597.2010.00429.x

Brough, Paula, Timms, Carolyn, Siu, Oi-ling, Kalliath, Thomas, O'Driscoll, Michael P., Sit, Cindy H. P., . . . Lu, Chang-qin. (2013). Validation of the job demands-resources model in cross-national samples: Cross-sectional and longitudinal predictions of psychological strain and work engagement. *Human Relations, 66*(10), 1311-1335. doi: 10.1177/0018726712472915

Bunce, David, & West, Michael. (1994). Changing work environments: Innovative coping responses to occupational stress. *Work & Stress, 8*(4), 319-331. doi: 10.1080/02678379408256539

Burns, James M. (1978). *Leadership*. New York, NY: Harper & Row.

Byron, Kris, & Khazanchi, Shalini. (2011). A meta-analytic investigation of the relationship of state and trait anxiety to performance on figural and verbal creative tasks. *Personality and Social Psychology Bulletin, 37*(2), 269-283. doi: 10.1177/0146167210392788

Byron, Kris, & Khazanchi, Shalini. (2012). Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses. *Psychological Bulletin, 138*(4), 809-830. doi: 10.1037/a0027652

Byron, Kristin, Khazanchi, Shalini, & Nazarian, Deborah. (2010). The relationship between stressors and creativity: A meta-analysis examining competing theoretical models. *Journal of Applied Psychology, 95*(1), 201-212. doi: 10.1037/a0017868

Carmeli, Abraham, McKay, Alexander S., & Kaufman, James C. (2014). Emotional intelligence and creativity: The mediating role of generosity and vigor. *The Journal of Creative Behavior, 48*(4), 290-309. doi: 10.1002/jocb.53

Carmeli, Abraham, Reiter-Palmon, Roni, & Ziv, Enbal. (2010). Inclusive leadership and employee involvement in creative tasks in the workplace: The mediating role of psychological safety. *Creativity Research Journal, 22*(3), 250-260. doi: 10.1080/10400419.2010.504654

Carmeli, Abraham, & Schaubroeck, John. (2007). The influence of leaders' and other referents' normative expectations on individual involvement in creative work. *The Leadership Quarterly, 18*(1), 35-48. doi: 10.1016/j.leaqua.2006.11.001

Carpenter, Nichelle C., Berry, Christopher M., & Houston, Lawrence. (2014). A meta-analytic comparison of self-reported and other-reported organizational citizenship behavior. *Journal of Organizational Behavior, 35*(4), 547-574. doi: 10.1002/job.1909

Carver, Charles S., & Scheier, Michael F. (1982). Control theory: A useful conceptual framework for personality–social, clinical, and health psychology. *Psychological Bulletin, 92*(1), 111-135. doi: 10.1037/0033-2909.92.1.111

Cavanaugh, Marcie A., Boswell, Wendy R., Roehling, Mark V., & Boudreau, John W. (2000). An empirical examination of self-reported work stress among U.S. managers. *Journal of Applied Psychology, 85*(1), 65-74. doi: 10.1037/0021-9010.85.1.65

Chang, Huo-Tsan, Hsu, Hung-Ming, Liou, Jia-Wen, & Tsai, Chi-Tung. (2013). Psychological contracts and innovative behavior: A moderated path analysis of work engagement and job resources. *Journal of Applied Social Psychology, 43*(10), 2120-2135. doi: 10.1111/jasp.12165

Cheung, Gordon W., & Lau, Rebecca S. (2008). Testing mediation and suppression effects of latent variables. *Organizational Research Methods, 11*(2), 296-325. doi: 10.1177/1094428107300343

Connor, Kathryn M., & Davidson, Jonathan R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76-82. doi: 10.1002/da.10113

Conway, James M., & Huffcutt, Allen I. (1997). Psychometric properties of multisource performance ratings: A meta-analysis of subordinate, supervisor, peer, and self-ratings. *Human Performance, 10*(4), 331-360. doi: 10.1207/s15327043hup1004_2

Crawford, Eean R., LePine, Jeffery A., & Rich, Bruce Louis. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834-848. doi: 10.1037/a0019364

De Dreu, Carsten K. W. (2003). Time pressure and closing of the mind in negotiation. *Organizational Behavior and Human Decision Processes, 91*(2), 280-295. doi: 10.1016/S0749-5978(03)00022-0

De Dreu, Carsten K. W., & Weingart, Laurie R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology, 88*(4), 741-749. doi: 10.1037/0021-9010.88.4.741

De Spiegelaere, Stan, Van Gyes, Guy, De Witte, Hans, Niesen, Wendy, & Van Hootegem, Geert. (2014). On the relation of job insecurity, job autonomy, innovative work behaviour and the mediating effect of work engagement. *Creativity and Innovation Management, 23*(3), 318-330. doi: 10.1111/caim.12079

de Wit, Frank R. C., Greer, Lindred L., & Jehn, Karen A. (2012). The paradox of intragroup conflict: A meta-analysis. *Journal of Applied Psychology, 97*(2), 360-390. doi: 10.1037/a0024844

Deci, Edward L., Koestner, Richard, & Ryan, Richard M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*(6), 627-668. doi: 10.1037/0033-2909.125.6.627

Deci, Edward L., & Ryan, Richard M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53*(6), 1024-1037. doi: 10.1037/0022-3514.53.6.1024

Demerouti, Evangelia, Bakker, Arnold B, & Leiter, Michael. (2014). Burnout and job performance: The moderating role of selection, optimization, and compensation strategies. *Journal of Occupational Health Psychology, 19*(1), 96.

Demerouti, Evangelia, Bakker, Arnold B., & Gevers, Josette M. P. (2015). Job crafting and extra-role behavior: The role of work engagement and flourishing. *Journal of Vocational Behavior, 91*, 87-96. doi: 10.1016/j.jvb.2015.09.001

Demerouti, Evangelia, Bakker, Arnold B., Nachreiner, Friedhelm, & Schaufeli, Wilmar B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499-512. doi: 10.1037/0021-9010.86.3.499

Demerouti, Evangelia, Mostert, Karina, & Bakker, Arnold B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology, 15*(3), 209-222. doi: 10.1037/a0019408

Desivilya, Helena Syna, Somech, Anit, & Lidgoster, Helena. (2010). Innovation and conflict management in work teams: The effects of team identification and task and relationship conflict. *Negotiation and Conflict Management Research, 3*(1), 28-48. doi: 10.1111/j.1750-4716.2009.00048.x

Dewett, Todd. (2007). Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment. *R&D Management, 37*(3), 197-208. doi: 10.1111/j.1467-9310.2007.00469.x

DiCiccio, Thomas J., & Efron, Bradley. (1996). Bootstrap confidence intervals. *Statist. Sci., 11*(3), 189-228. doi: 10.1214/ss/1032280214

Diestel, Stefan, & Schmidt, Klaus-Helmut. (2012). Lagged mediator effects of self-control demands on psychological strain and absenteeism. *Journal of Occupational and Organizational Psychology, 85*(4), 556-578. doi: 10.1111/j.2044-8325.2012.02058.x

Dulebohn, James H., Bommer, William H., Liden, Robert C., Brouer, Robyn L., & Ferris, Gerald R. (2012). A meta-analysis of antecedents and consequences of leader-member exchange. *Journal of Management, 38*(6), 1715-1759. doi: 10.1177/0149206311415280

Edmondson, Amy. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350-383. doi: 10.2307/2666999

Enders, Craig K., & Bandalos, Deborah L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural*

Equation Modeling: A Multidisciplinary Journal, 8(3), 430-457. doi: 10.1207/S15328007SEM0803_5

Eschleman, Kevin J., Bowling, Nathan A., & Alarcon, Gene M. (2010). A meta-analytic examination of hardiness. *International Journal of Stress Management, 17*(4), 277-307. doi: 10.1037/a0020476

Farr, James L., Sin, Hock-Peng, & Tesluk, Paul E. (2003). Knowledge management processes and work group innovation *The international handbook on innovation* (pp. 574-586). New York, NY: Elsevier Science.

Fay, Doris, & Sonnentag, Sabine. (2002). Rethinking the effects of stressors: A longitudinal study on personal initiative. *Journal of Occupational Health Psychology, 7*(3), 221-234. doi: 10.1037/1076-8998.7.3.221

Fisher, Greg, & Aguinis, Herman. (2017). Using theory elaboration to make theoretical advancements. *Organizational Research Methods, 20*(3), 438-464. doi: 10.1177/1094428116689707

Ford, Cameron M. (1996). A theory of individual creative action in multiple social domains. *Academy of Management Review, 21*(4), 1112-1142. doi: 10.5465/amr.1996.9704071865

Fredrickson, Barbara L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218-226. doi: 10.1037/0003-066X.56.3.218

Gardner, Donald G. (1986). Activation theory and task design: An empirical test of several new predictions. *Journal of Applied Psychology, 71*(3), 411-418. doi: 10.1037/0021-9010.71.3.411

George, Jennifer M. (2007). Creativity in organizations. *The Academy of Management Annals, 1*(1), 439-477. doi: 10.1080/078559814

George, Jennifer M., & Zhou, Jing. (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology, 86*(3), 513-524. doi: 10.1037/0021-9010.86.3.513

Gevers, Josette M.P., & Demerouti, Evangelia. (2013). How supervisors' reminders relate to subordinates' absorption and creativity. *Journal of Managerial Psychology, 28*(6), 677-698. doi: 10.1108/JPM-09-2011-0055

Gong, Yaping, Huang, Jia-Chi, & Farh, Jiing-Lih. (2009). Employee learning orientation, transformational leadership, and employee creativity: The mediating role of employee creative self-efficacy. *Academy of Management Journal, 52*(4), 765-778. doi: 10.5465/AMJ.2009.43670890

Grant, Anthony M., Curtayne, Linley, & Burton, Geraldine. (2009). Executive coaching enhances goal attainment, resilience and workplace well-being: A randomised controlled study. *The Journal of Positive Psychology, 4*(5), 396-407. doi: 10.1080/17439760902992456

Gupta, Vishal, & Singh, Shailendra. (2014). Psychological capital as a mediator of the relationship between leadership and creative performance behaviors: Empirical evidence from the Indian R&D sector. *The International Journal of Human Resource Management, 25*(10), 1373-1394. doi: 10.1080/09585192.2013.870311

Hackman, J R, & Oldham, Greg R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.

Hakanen, Jari J., Bakker, Arnold B., & Schaufeli, Wilmar B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology, 43*(6), 495-513. doi: 10.1016/j.jsp.2005.11.001

Hakanen, Jari J., Schaufeli, Wilmar B., & Ahola, Kirsi. (2008). The job demands-resources model: A three-year cross-lagged study of burnout, depression, commitment, and work engagement. *Work & Stress, 22*(3), 224-241. doi: 10.1080/02678370802379432

Hammond, Michelle M., Neff, Nicole L., Farr, James L., Schwall, Alexander R., & Zhao, Xinyuan. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts, 5*(1), 90-105. doi: 10.1037/a0018556

Harari, Michael B., Reaves, Angela C., & Viswesvaran, Chockalingam. (2016). Creative and innovative performance: A meta-analysis of relationships with task, citizenship, and counterproductive job performance dimensions. *European Journal of Work and Organizational Psychology, 25*(4), 495-511. doi: 10.1080/1359432X.2015.1134491

Hennessey, B. A., & Amabile, T. M. (2010). Creativity. *Annual Review of Psychology, 61*, 569-598. doi: 10.1146/annurev.psych.093008.100416

Hobfoll, Stevan E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513-524. doi: 10.1037/0003-066X.44.3.513

Hobfoll, Stevan E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology: An International Review, 50*(3), 337-370. doi: 10.1111/1464-0597.00062

Hobfoll, Stevan E. (2002). Social and psychological resources and adaptation. *Review of General Psychology, 6*(4), 307-324. doi: 10.1037/1089-2680.6.4.307

Hobfoll, Stevan E., Johnson, Robert J., Ennis, Nicole, & Jackson, Anita P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology, 84*(3), 632-643. doi: 10.1037/0022-3514.84.3.632

Hockey, G. R. (1997). Compensatory control in the regulation of human performance under stress and high workload; a cognitive-energetical framework. *Biol Psychol, 45*(1-3), 73-93. doi: 10.1016/S0301-0511(96)05223-4

Hsu, Michael L. A., & Chen, Forrence Hsinhung. (2015). The cross-level mediating effect of psychological capital on the organizational innovation climate–employee innovative behavior relationship. *The Journal of Creative Behavior*, No Pagination Specified. doi: 10.1002/jocb.90

Hu, Li-tze, & Bentler, Peter M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. doi: 10.1080/10705519909540118

Hu, Qiao, & Schaufeli, Wilmar B. (2011). Job insecurity and remuneration in Chinese family-owned business workers. *The Career Development International, 16*(1), 6-19. doi: 10.1108/13620431111107784

Hu, Qiao, Schaufeli, Wilmar B., & Taris, Toon W. (2011). The Job demands–resources model: An analysis of additive and joint effects of demands and resources. *Journal of Vocational Behavior, 79*(1), 181-190. doi: 10.1016/j.jvb.2010.12.009

Huang, Jason L., Curran, Paul G., Keeney, Jessica, Poposki, Elizabeth M., & DeShon, Richard P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business and Psychology, 27*(1), 99-114. doi: 10.1007/s10869-011-9231-8

Huhtala, Hannele, & Parzefall, Marjo-Riitta. (2007). A review of employee well-being and innovativeness: An opportunity for a mutual benefit. *Creativity and Innovation Management, 16*(3), 299-306. doi: 10.1111/j.1467-8691.2007.00442.x

Hülsheger, Ute R., Anderson, Neil, & Salgado, Jesus F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, *94*(5), 1128-1145. doi: 10.1037/a0015978

Hunter, Samuel T., Bedell, Katrina E., & Mumford, Michael D. (2007). Climate for creativity: A quantitative review. *Creativity Research Journal, 19*(1), 69-90. doi: 10.1080/10400410709336883

Janssen, Onne. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology, 73*(3), 287-302. doi: 10.1348/096317900167038

Jaussi, Kimberly S., Randel, Amy E., & Dionne, Shelley D. (2007). I am, I think I can, and I do: The role of personal identity, self-efficacy and cross-application of experiences in creativity at work. *Creativity Research Journal, 19*(2-3), 247-258. doi: 10.1080/10400410701397339

Jehn, Karen A. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly, 40*(2), 256-282. doi: 10.2307/2393638

Jehn, Karen A. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly, 42*(3), 530-557. doi: 10.2307/2393737

Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health, 78*(10), 1336-1342. doi: 10.2105/AJPH.78.10.1336

Judge, Timothy A., Bono, Joyce E., Erez, Amir, & Locke, Edwin A. (2005). Core self-evaluations and job and life satisfaction: The role of self-concordance and goal attainment. *Journal of Applied Psychology, 90*(2), 257-268. doi: 10.1037/0021-9010.90.2.257

Kahn, William A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal, 33*(4), 692-724. doi: 10.2307/256287

Kahn, William A. (1992). To be fully there: Psychological presence at work. *Human Relations, 45*(4), 321-349. doi: 10.1177/001872679204500402

Karasek, Robert A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*(2), 285-308. doi: 10.2307/2392498

Karasek, Robert A., & Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. New York, NY: Basic Books.

Karatepe, Osman M. (2012). Job resources, work engagement, and hotel employee outcomes: A time-lagged analysis. *Economic Research-Ekonomska Istraživanja, 25*(3), 644-665. doi: 10.1080/1331677X.2012.11517527

Kark, Ronit, & Carmeli, Abraham. (2009). Alive and creating: The mediating role of vitality and aliveness in the relationship between psychological safety and creative work

involvement. *Journal of Organizational Behavior, 30*(6), 785-804. doi: 10.1002/job.v30:610.1002/job.571

Karwowski, Maciej, & Lebuda, Izabela. (2016). The big five, the huge two, and creative self-beliefs: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts, 10*(2), 214-232. doi: 10.1037/aca0000035

Kenny, David A., Kaniskan, Burcu, & McCoach, D. Betsy. (2014). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486-507. doi: 10.1177/0049124114543236

Kierein, Nicole M., & Gold, Michael A. (2000). Pygmalion in work organizations: A meta-analysis. *Journal of Organizational Behavior, 21*(8), 913-928. doi: 10.1002/1099-1379(200012)21:8<913::AID-JOB62>3.0.CO;2-#

Kim, Kyung Hee. (2008). Meta-analyses of the relationship of creative achievement to both IQ and divergent thinking test scores. *The Journal of Creative Behavior, 42*(2), 106-130. doi: 10.1002/j.2162-6057.2008.tb01290.x

King, Danielle D., Newman, Alexander, & Luthans, Fred. (2015). Not if, but when we need resilience in the workplace. *Journal of Organizational Behavior*, 1-5. doi: 10.1002/job.2063

Kishton, Joseph M., & Widaman, Keith F. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and Psychological Measurement, 54*(3), 757-765. doi: 10.1177/0013164494054003022

Kline, Rex B. (2015). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.

Koopmann, Jaclyn, Lanaj, Klodiana, Wang, Mo, Zhou, Le, & Shi, Junqi. (2016). Nonlinear effects of team tenure on team psychological safety climate and climate strength: Implications for average team member performance. *Journal of Applied Psychology, 101*(7), 940-957. doi: 10.1037/apl0000097

Korunka, Christian, Kubicek, Bettina, Schaufeli, Wilmar B., & Hoonakker, Peter. (2009). Work engagement and burnout: Testing the robustness of the job demands-resources model. *The Journal of Positive Psychology, 4*(3), 243-255. doi: 10.1080/17439760902879976

Kristensen, Tage S., Borritz, Marianne, Villadsen, Ebbe, & Christensen, Karl B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress, 19*(3), 192-207. doi: 10.1080/02678370500297720

Kuncel, Nathan R., Hezlett, Sarah A., & Ones, Deniz S. (2004). Academic performance, career potential, creativity, and job performance: Can one construct predict them all? *Journal of Personality and Social Psychology, 86*(1), 148-161. doi: 10.1037/0022-3514.86.1.148

Lazarus, Richard S, & Folkman, Susan. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.

Lebuda, Izabela, Zabelina, Darya L., & Karwowski, Maciej. (2016). Mind full of ideas: A meta-analysis of the mindfulness–creativity link. *Personality and Individual Differences, 93*, 22-26. doi: 10.1016/j.paid.2015.09.040

Lee, Raymond T., & Ashforth, Blake E. (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology, 81*(2), 123-133. doi: 10.1037/0021-9010.81.2.123

Lepine, Jeffery A., Podsakoff, Nathan P., & Lepine, Marcie A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal, 48*(5), 764-775. doi: 10.5465/AMJ.2005.18803921

Lewig, Kerry A., Xanthopoulou, Despoina, Bakker, Arnold B., Dollard, Maureen F., & Metzer, Jacques C. (2007). Burnout and connectedness among Australian volunteers: A test of the job demands-resources model. *Journal of Vocational Behavior, 71*(3), 429-445. doi: 10.1016/j.jvb.2007.07.003

Little, Roderick J A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198-1202. doi: 10.2307/2290157

Little, Todd D., Cunningham, William A., Shahar, Golan, & Widaman, Keith F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 151-173. doi: 10.1207/S15328007SEM0902_1

Liu, Cong, Spector, Paul E., Liu, Ying, & Shi, Lin. (2011). The interaction of job autonomy and conflict with supervisor in China and the United States: A qualitative and quantitative comparison. *International Journal of Stress Management, 18*(3), 222-245. doi: 10.1037/a0024752

Liu, Wenxing, Zhang, Pengcheng, Liao, Jianqiao, Hao, Po, & Mao, Jianghua. (2016). Abusive supervision and employee creativity: The mediating role of psychological safety and

organizational identification. *Management Decision, 54*(1), 130-147. doi: 10.1108/MD-09-2013-0443

Llorens, Susana, Schaufeli, Wilmar, Bakker, Arnold, & Salanova, Marisa. (2007). Does a positive gain spiral of resources, efficacy beliefs and engagement exist? *Computers in Human Behavior, 23*(1), 825-841. doi: 10.1016/j.chb.2004.11.012

Luthans, Fred, & Youssef, Carolyn M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. *Organizational Dynamics, 33*(2), 143-160. doi: 10.1016/j.orgdyn.2004.01.003

Luthans, Fred, Youssef, Carolyn M., & Avolio, Bruce J. (2007). *Psychological capital: Developing the human competitive edge*. New York, NY: Oxford University Press.

Luthar, Suniya S., Cicchetti, Dante, & Becker, Bronwyn. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543-562. doi: 10.1111/1467-8624.00164

Macey, William H., & Schneider, Benjamin. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 1*(1), 3-30. doi: 10.1111/j.1754-9434.2007.0002.x

MacKinnon, David P., Lockwood, Chondra M., Hoffman, Jeanne M., West, Stephen G., & Sheets, Virgil. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods, 7*(1), 83-104. doi: 10.1037/1082-989X.7.1.83

MacKinnon, David P., Lockwood, Chondra M., & Williams, Jason. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*(1), 99-128. doi: 10.1207/s15327906mbr3901_4

Maden, Ceyda. (2015). Linking high involvement human resource practices to employee proactivity: The role of work engagement and learning goal orientation. *Personnel Review, 44*(5), 720-738. doi: 10.1108/PR-01-2014-0030

Manyika, James, Lund, Susan, Bughin, Jacques, Robinson, Kelsey, Mischke, Jan, & Mahajan, Deepa. (2016). Independent work: Choice, necessity, and the gig economy: McKinsey Global Institute.

Maslach, Christina, Jackson, Susan E, & Leiter, Michael P. (1997). Maslach burnout inventory. *Evaluating stress: A book of resources, 3*, 191-218.

Masten, Ann S., & Obradovic, Jelena. (2006). Competence and resilience in development. *Annals of the New York Academy of Sciences, 1094*(1), 13-27. doi: 10.1196/annals.1376.003

Mathisen, Gro Ellen, & Bronnick, Kolbjorn S. (2009). Creative self-efficacy: An intervention study. *International Journal of Educational Research, 48*(1), 21-29. doi: 10.1016/j.ijer.2009.02.009

Matta, Fadel K., Scott, Brent A., Koopman, Joel, & Conlon, Donald E. (2015). Does seeing "eye to eye" affect work engagement and organizational citizenship behavior? A role theory perspective on LMX agreement. *Academy of Management Journal, 58*(6), 1686-1708. doi: 10.5465/amj.2014.0106

McNatt, D. Brian. (2000). Ancient Pygmalion joins contemporary management: A meta-analysis of the result. *Journal of Applied Psychology, 85*(2), 314-322. doi: 10.1037/0021-9010.85.2.314

Meade, Adam W., & Craig, S. Bartholomew. (2012). Identifying careless responses in survey data. *Psychological Methods, 17*(3), 437-455. doi: 10.1037/a0028085

Meijman, Theo F., & Mulder, Gijsbertus. (1998). Psychological aspects of workload. In P. J. D. Drenth, H. Thierry & C. J. d. Wolff (Eds.), *Handbook of work and organizational: Work psychology* (pp. 5-33). Hove, England: Psychology Press.

Moenkemeyer, Gisa, Hoegl, Martin, & Weiss, Matthias. (2012). Innovator resilience potential: A process perspective of individual resilience as influenced by innovation project termination. *Human Relations, 65*(5), 627-655. doi: 10.1177/0018726711431350

Montag, Tamara, Maertz Jr, Carl P., & Baer, Markus. (2012). A critical analysis of the workplace creativity criterion space. *Journal of Management, 38*(4), 1362-1386. doi: 10.1177/0149206312441835

Motowildo, Stephan J, Borman, Walter C, & Schmit, Mark J. (1997). A theory of individual differences in task and contextual performance. *Human Performance, 10*(2), 71-83. doi: 10.1207/s15327043hup1002_1

Mueller, Ralph O., & Hancock, Gregory R. (2008). Best practices in structural equation modeling. In J. Osborne (Ed.), *Best practices in quantitative methods* (pp. 488-508). Thousand Oaks, CA: SAGE Publications, Inc.

Muthen, Bengt O., & Asparouhoc, Tihomir. (2015). Latent variables interactions.

Muthen, Linda K., & Muthen, Bengt O. (2017). *Mplus User's Guide. Eighth Edition*. Los Angeles, CA: Muthen & Muthen.

Ng, Thomas W. H., & Feldman, Daniel C. (2009). How broadly does education contribute to job performance? *Personnel Psychology, 62*(1), 89-134. doi: 10.1111/j.1744-6570.2008.01130.x

Ng, Thomas W. H., & Feldman, Daniel C. (2012). A comparison of self-ratings and non-self-report measures of employee creativity. *Human Relations, 65*(8), 1021-1047. doi: 10.1177/0018726712446015

Ng, Thomas W. H., & Feldman, Daniel C. (2013). A meta-analysis of the relationships of age and tenure with innovation-related behaviour. *Journal of Occupational and Organizational Psychology, 86*(4), 585-616.

Noworol, Czeslaw, Zarczynski, Zbigniew, Fafrowicz, Magdalena, & Marek, Tadeusz. (1993). Impact of professional burnout on creativity and innovation. In W. B. Schaufeli, C. Maslach & T. Marek (Eds.), *Professional Burnout: Recent Development in Theory and Research* (pp. 163-175). Washington, D.C.: Taylor & Francis.

Nunnally, Jum C, & Bernstein, Ira H. (1994). *Psychometric Theory* (3rd ed.). New York, NY: McGraw-Hill.

Ohly, Sandra, & Fritz, Charlotte. (2010). Work characteristics, challenge appraisal, creativity, and proactive behavior: A multi-level study. *Journal of Organizational Behavior, 31*(4), 543-565. doi: 10.1002/job.633

Oldham, Greg R., & Cummings, Anne. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal, 39*(3), 607-634. doi: 10.2307/256657

Ordonez, Lisa, & Benson, Lehman. (1997). Decisions under time pressure: How time constraint affects risky decision making. *Organizational Behavior and Human Decision Processes, 71*(2), 121-140. doi: 10.1006/obhd.1997.2717

Park, Yu Kyoung, Song, Ji Hoon, Yoon, Seung Won, & Kim, Jungwoo. (2013). Learning organization and innovative behavior: The mediating effect of work engagement. *European Journal of Training and Development, 38*(1/2), 75-94. doi: 10.1108/EJTD-04-2013-0040

Philippe, Frederick L., Lecours, Serge, & Beaulieu-Pelletier, Geneviève. (2009). Resilience and positive emotions: Examining the role of emotional memories. *Journal of Personality, 77*(1), 139-176. doi: 10.1111/j.1467-6494.2008.00541.x

Pigott, Therese D. (2001). A review of methods for missing data. *Educational Research and Evaluation, 7*(4), 353-383. doi: 10.1076/edre.7.4.353.8937

Podsakoff, Philip M., MacKenzie, Scott B., Lee, Jeong-Yeon, & Podsakoff, Nathan 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. doi: 10.1037/0021-9010.88.5.879

Podsakoff, Philip M., MacKenzie, Scott B., & Podsakoff, Nathan P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*(1), 539-569. doi: 10.1146/annurev-psych-120710-100452

Post, Corinne. (2012). Deep-level team composition and innovation: The mediating roles of psychological safety and cooperative learning. *Group & Organization Management, 37*(5), 555-588. doi: 10.1177/1059601112456289

Preacher, Kristopher J., & Hayes, Andrew F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879-891. doi: 10.3758/brm.40.3.879

Prieto, Laura Lorente, Soria, Marisa Salanova, Martínez, Isabel Martinez, & Schaufeli, Wilmar. (2008). Extension of the job demands-resources model in the prediction of burnout and engagement among teachers over time. *Psicothema, 20*(3), 354-360.

Puente-Díaz, Rogelio. (2016). Creative self-efficacy: An exploration of its antecedents, consequences, and applied implications. *The Journal of Psychology, 150*(2), 175-195. doi: 10.1080/00223980.2015.1051498

Rafferty, Alannah E., & Griffin, Mark A. (2004). Dimensions of transformational leadership: Conceptual and empirical extensions. *The Leadership Quarterly, 15*(3), 329-354. doi: 10.1016/j.leaqua.2004.02.009

Rego, Arménio, Sousa, Filipa, Marques, Carla, & Cunha, Miguel Pina. (2012). Authentic leadership promoting employees' psychological capital and creativity. *Journal of Business Research, 65*(3), 429-437. doi: 10.1016/j.jbusres.2011.10.003

Richter, Andreas W., Hirst, Giles, van Knippenberg, Daan, & Baer, Markus. (2012). Creative self-efficacy and individual creativity in team contexts: Cross-level interactions with team informational resources. *Journal of Applied Psychology, 97*(6), 1282-1290. doi: 10.1037/a0029359

Rosenthal, Robert, & Jacobson, Lenore. (1968). *Pygmalion in the classroom: Teacher expectation and pupils' intellectual development*. New York, NY: Holt, Rinehart, & Winston.

Rosing, Kathrin, Frese, Michael, & Bausch, Andreas. (2011). Explaining the heterogeneity of the leadership-innovation relationship: Ambidextrous leadership. *The Leadership Quarterly, 22*(5), 956-974. doi: 10.1016/j.leaqua.2011.07.014

Rubin, Donald B. (1976). Inference and missing data. *Biometrika, 63*(3), 581-592. doi: 10.1093/biomet/63.3.581

Ryan, Richard M., & Deci, Edward L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi: 10.1006/ceps.1999.1020

Salanova, Marisa, Schaufeli, Wilmar B., Xanthopoulou, Despoina, & Bakker, Arnold B. (2010). The gain spiral of resources and work engagement: Sustaining a positive worklife *Work engagement: A handbook of essential theory and research* (pp. 118-131). New York, NY: Psychology Press.

Schaufeli, Wilmar B., & Bakker, Arnold B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*(3), 293-315. doi: 10.1002/job.248

Schaufeli, Wilmar B., Bakker, Arnold B., & Salanova, Marisa. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701-716. doi: 10.1177/0013164405282471

Schaufeli, Wilmar B., Salanova, Marisa, González-romá, Vicente, & Bakker, Arnold B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*(1), 71-92. doi: 10.1023/a:1015630930326

Schaufeli, Wilmar B., & Taris, Toon W. (2014). A critical review of the job demands-resources model: Implications for improving work and health *Bridging Occupational, Organizational and Public Health: A Transdisciplinary Approach* (pp. 43-68). Dordrecht: Springer Netherlands.

Schreiber, James B., Nora, Amaury, Stage, Frances K., Barlow, Elizabeth A., & King, Jamie. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research, 99*(6), 323-338. doi: 10.3200/JOER.99.6.323-338

Schriesheim, Chester A., & Eisenbach, Regina J. (1995). An exploratory and confirmatory factor-analytic investigation of item wording effects on the obtained factor structures of survey questionnaire measures. *Journal of Management, 21*(6), 1177-1193. doi: 10.1177/014920639502100609

2016. The fourth industrial revolution: What it means, how to respond. Retrieved from https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

Scott, Susanne G., & Bruce, Reginald A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal, 37*(3), 580-607. doi: 10.2307/256701

Office of the Press Secretary. 2015. FACT SHEET: The White House Releases New Strategy for American Innovation, Announces Areas of Opportunity from Self-Driving Cars to Smart Cities. Retrieved from https://www.whitehouse.gov/the-press-office/2015/10/21/fact-sheet-white-house-releases-new-strategy-american-innovation

Seppälä, Piia, Hakanen, Jari, Mauno, Saija, Perhoniemi, Riku, Tolvanen, Asko, & Schaufeli, Wilmar. (2015). Stability and change model of job resources and work engagement: A seven-year three-wave follow-up study. *European Journal of Work and Organizational Psychology, 24*(3), 360-375. doi: 10.1080/1359432X.2014.910510

Shaffer, Jonathan A., DeGeest, David, & Li, Andrew. (2016). Tackling the problem of construct proliferation. *Organizational Research Methods, 19*(1), 80-110. doi: 10.1177/1094428115598239

Shalley, Christina E., Gilson, Lucy L., & Blum, Terry C. (2009). Interactive effects of growth need strength, work context, and job complexity on self-reported creative performance. *Academy of Management Journal, 52*(3), 489-505. doi: 10.5465/AMJ.2009.41330806

Shalley, Christina E., & Koseoglu, Gamze. (2013). Goals and creativity *New developments in goal setting and task performance.* (pp. 343-356). New York, NY: Routledge/Taylor & Francis Group.

Siegrist, Johannes. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology, 1*(1), 27-41. doi: 10.1037/1076-8998.1.1.27

Simbula, Silvia, Guglielmi, Dina, & Schaufeli, Wilmar B. (2011). A three-wave study of job resources, self-efficacy, and work engagement among Italian schoolteachers. *European Journal of Work and Organizational Psychology, 20*(3), 285-304. doi: 10.1080/13594320903513916

Slatten, Terje, & Mehmetoglu, Mehmet. (2011). Antecedents and effects of engaged frontline employees: A study from the hospitality industry. *Managing Service Quality: An International Journal, 21*(1), 88-107. doi: 10.1108/09604521111100261

Smith, Bruce W., Dalen, Jeanne, Wiggins, Kathryn, Tooley, Erin, Christopher, Paulette, & Bernard, Jennifer. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*(3), 194-200. doi: 10.1080/10705500802222972

Smith, Ronald E. (1989). Effects of coping skills training on generalized self-efficacy and locus of control. *Journal of Personality and Social Psychology, 56*(2), 228-233. doi: 10.1037/0022-3514.56.2.228

Spector, Paul E., & Jex, Steve M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3*(4), 356-367. doi: 10.1037/1076-8998.3.4.356

Sweetman, David, Luthans, Fred, Avey, James B., & Luthans, Brett C. (2011). Relationship between positive psychological capital and creative performance. *Canadian Journal of Administrative Sciences, 28*(1), 4-13. doi: 10.1002/cjas.175

Tabachnick, Barbara G, & Fidell, Linda S. (2012). *Using Multivariate Statistics* (6th ed.). New York, NY: Pearson.

Taris, Toon W., & Schaufeli, Wilmar B. (2015). The job demands-resources model *The Wiley Blackwell Handbook of the Psychology of Occupational Safety and Workplace Health* (pp. 155-180): John Wiley & Sons, Ltd.

Tierney, Pamela, & Farmer, Steven M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal, 45*(6), 1137-1148. doi: 10.2307/3069429

Tierney, Pamela, & Farmer, Steven M. (2004). The Pygmalion process and employee creativity. *Journal of Management, 30*(3), 413-432. doi: 10.1016/j.jm.2002.12.001

Tierney, Pamela, & Farmer, Steven M. (2011). Creative self-efficacy development and creative performance over time. *Journal of Applied Psychology, 96*(2), 277-293. doi: 10.1037/a0020952

Tierney, Pamela, Farmer, Steven M., & Graen, George B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology, 52*(3), 591-620. doi: 10.1111/j.1744-6570.1999.tb00173.x

Trochim, W. M., & Donnelly, J. P. . (2006). *The research methods knowledge base* (3rd ed.). Cincinnati, OH: Atomic Dog.

Tugade, Michele M., Fredrickson, Barbara L., & Barrett, Lisa Feldman. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality, 72*(6), 1161-1190. doi: 10.1111/j.1467-6494.2004.00294.x

Tukey, John W. (1977). *Exploratory data analysis*. Reading, MA: Addison-Wesley.

Unsworth, Kerrie L., & Chang, Artemis. (2005). *The Renaissance or the cuckoo clock? The differential effects of workload and work demands on employee innovation*. Paper presented at the Academy of Management Annual Meeting, Honolulu, Hawaii. http://eprints.qut.edu.au/3030/

Unsworth, Kerrie L., Wall, Toby D., & Carter, Angela. (2005). Creative requirement: A neglected construct in the study of employee creativity? *Group & Organization Management, 30*(5), 541-560. doi: 10.1177/1059601104267607

Van de Ven, Andrew H, Polley, Douglas E, Garud, Raghu, & Venkataraman, Sankaran. (1999). *The innovation journey*. Oxford, England: Oxford University Press.

Viswesvaran, Chockalingam, Ones, Deniz S., & Schmidt, Frank L. (1996). Comparative analysis of the reliability of job performance ratings. *Journal of Applied Psychology, 81*(5), 557-574. doi: 10.1037/0021-9010.81.5.557

Vroom, V. H. (1964). *Work and motivation*. Oxford, England: Wiley.

Wagenmakers, Eric-Jan, & Farrell, Simon. (2004). AIC model selection using Akaike weights. *Psychonomic Bulletin & Review, 11*(1), 192-196. doi: 10.3758/BF03206482

Wang, Chung-Jen, Tsai, Huei-Ting, & Tsai, Ming-Tien. (2014). Linking transformational leadership and employee creativity in the hospitality industry: The influences of creative role identity, creative self-efficacy, and job complexity. *Tourism Management, 40*(Supplement C), 79-89. doi: 10.1016/j.tourman.2013.05.008

Wang, Xiao-Hua, & Howell, Jane M. (2010). Exploring the dual-level effects of transformational leadership on followers. *Journal of Applied Psychology, 95*(6), 1134-1144. doi: 10.1037/a0020754

West, Michael A., & Farr, James L. (1990). Innovation at work. In M. A. West & J. L. Farr (Eds.), *Innovation and creativity at work: Psychological and organizational strategies* (pp. 3-13). Oxford, England: John Wiley & Sons.

Woodman, Richard W., Sawyer, John E., & Griffin, Ricky W. (1993). Toward a theory of organizational creativity. *The Academy of Management Review, 18*(2), 293-321. doi: 10.2307/258761

Wrzesniewski, Amy, & Dutton, Jane E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review, 26*(2), 179-201. doi: 10.5465/amr.2001.4378011

Wu, Chia-Huei, Parker, Sharon K., & de Jong, Jeroen P. J. (2014). Need for cognition as an antecedent of individual innovation behavior. *Journal of Management, 40*(6), 1511-1534. doi: 10.1177/0149206311429862

Xanthopoulou, Despoina, Bakker, Arnold B., Demerouti, Evangelia, & Schaufeli, Wilmar B. (2007). The role of personal resources in the job demands-resources model. *International Journal of Stress Management, 14*(2), 121-141. doi: 10.1037/1072-5245.14.2.121

Xanthopoulou, Despoina, Bakker, Arnold B., Demerouti, Evangelia, & Schaufeli, Wilmar B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behavior, 74*(3), 235-244. doi: 10.1016/j.jvb.2008.11.003

Xue, Yi, & Larson, Richard. (2015). STEM crisis or STEM surplus? Yes and yes. *Monthly Labor Review, 138*. doi: 10.21916/mlr.2015.14

Yuan, Fierong, & Woodman, Richard W. (2010). Innovative behavior in the workplace: The role of performance and image outcome expectations. *Academy of Management Journal, 53*(2), 323-342. doi: 10.5465/AMJ.2010.49388995

Zhou, Jing, & Oldham, Greg R. (2001). Enhancing creative performance: Effects of expected developmental assessment strategies and creative personality. *The Journal of Creative Behavior, 35*(3), 151-167. doi: 10.1002/j.2162-6057.2001.tb01044.x

Zhou, Jing, & Shalley, Christina E. (2003). Research on employee creativity: A critical review and directions for future research. In J. J. M. G. R. Ferris (Ed.), *Research in personnel and human resources management, Vol 22* (pp. 165-217). Oxford, England: Elsevier Science Ltd.

Zhou, Qin, & Pan, Wen. (2015). A cross-level examination of the process linking transformational leadership and creativity: The role of psychological safety climate. *Human Performance, 28*(5), 405-424. doi: 10.1080/08959285.2015.1021050

Zubair, Aisha, & Kamal, Anila. (2015). Authentic leadership and creativity: Mediating role of work-related flow and psychological capital. *Journal of Behavioural Sciences, 25*(1), 150-171. doi: 10.1016/j.sbspro.2010.03.109

APPENDIX A

EMAIL INVITATIONS AND REMINDERS

Email Invitation to Employees

At Company X, we are building the best culture by supporting the innovative thoughts and ideas our employees contribute to our company. Part of building the best culture is encouraging our employees to identify novel ways to solve problems, take calculated risks and connect new ideas to current work and customer needs.

You are invited to participate in a survey examining how the work environment impacts employee innovation and creativity. The results of this research will help guide future actions by Company X to encourage and support innovation.

Survey Information

- The survey includes questions about your work, the people you work with, and yourself
- The survey should take about 10 minutes to complete
- Your responses are confidential
- For participating in this survey, you can enter a drawing for one of five $100 Amazon gift cards

This research is conducted by investigators at Old Dominion University and not Company X. Your choice to participate in this research will not affect your position at Company X.

Please follow the link below for more information and access to the survey.

Survey Link: < insert unique survey link >

Thank you in advance for your participation.

Email Invitation to Managers

At Company X, we are building the best culture by supporting the innovative thoughts and ideas our employees contribute to our company. Part of building the best culture is encouraging our employees to identify novel ways to solve problems, take calculated risks and connect new ideas to current work and customer needs.

You are invited to participate in a survey examining how the work environment impacts employee innovation and creativity. The results of this research will help guide future actions by Company X to encourage and support innovation.

Survey Information

- The survey includes questions about the creativity and innovation of one of your direct reports (name listed below)
- The survey contains 14 questions on 1 page
- The survey should take less than 5 minutes to complete
- Your responses are confidential

Managers of Matrix Employees

- If the employee listed below interacts more regularly with a different manager (e.g., a program manager), please "Reply" to this email with that manager's contact information
- The survey will then be sent to them instead because they can more accurately assess that employee's day-to-day activities

This research is conducted by investigators at Old Dominion University and not Company X. Your choice to participate in this research will not affect your position at Company X.

Please follow the link below for more information and to complete the survey.

Name of Direct Report to Rate: <insert name>
Survey Link: <insert unique survey link>

Thank you in advance for your participation.

Reminder Email to Subordinates and Managers

Please consider participating in this survey. It will remain open until April 21st.

If you have already completed the survey, thank you for your participation and you can ignore this reminder.

Original Invitation:
<insert invitation with unique link and name if manager email>

APPENDIX B

EMPLOYEE SURVEY

Please review the consent form before proceeding with the survey.

Informed Consent Form
Old Dominion University

Project Title: Creativity and Innovation Through the Job Demands-Resources Model

Introduction
The purpose of this form is to give you information that may affect your decision whether to say YES or NO to participation in this research.

Researchers
The Responsible Project Investigator (RPI) for this study is Konstantin Cigularov, Ph.D. (Old Dominion University). Konstantin is supervising Nathan Bjornberg, M.S., A.B.D. (Old Dominion University; Company X) as he completes his dissertation. If you have any questions or concerns, please contact Konstantin Cigularov at kcigular@odu.edu or Nathan Bjornberg at nbjornbe@odu.com.

Description of Research Study
This research examines how factors of the work environment relate to employee creativity and innovation. In this survey, you will be asked to respond to questions about your job, the people you work with, and yourself. Your manager will also complete survey questions about your creativity and innovation behaviors.
- You were invited to participate in this study as part of a randomly-selected subset of technical-grade employees at Company X.
- The survey contains a total of 64 questions across 4 pages with an opportunity at the end to provide a comment.
- The survey should take approximately 10 minutes to complete.

Risk and Benefits
RISKS: There is a minimal risk for the identification of survey responses. To reduce this risk, anonymity will be ensured by keeping employee identifiable information, such as email addresses, completely separate from survey responses. Employee information will not be shared with Old Dominion researchers and individual survey responses will not be shared with Company X. As with any research, there is some possibility that you may be subject to risks that have not yet been identified.
BENEFITS: There are no personal benefits for participating in this study. There are potential benefits to Company X from the results of this study, such as providing information on ways to enable and support innovation.

Costs and Payments
The researchers want your decision about participating in this study to be absolutely voluntary. For completing the survey, you will have the option to enter a drawing for one of five $100 Amazon.com gift cards.

New Information
If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

Confidentiality
The researchers will take reasonable steps to keep private information confidential. Individual survey responses will never be shared with Company X. The aggregated results of this study may be used in reports, presentations, and publications; but your individual responses will never be shared.

Withdrawal Privilege
It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled. Your decision to withdraw will also not impact your position at Company X.

Compensation for Illness and Injury
If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Konstantin Cigularov at 757-683-6159, Dr. Tancy Vandecar-Burdin the current IRB chair at 757-683 3802 at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

Voluntary Consent
By accepting this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them. If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. Tancy Vandecar-Burdin, the current IRB chair, at 757-683-3802, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by clicking "Accept and Begin Survey", you are telling the researcher YES, that you agree to participate in this study. If you would like a copy of this form for your records, please print it now or contact the researchers.

Accept and Begin Survey

Accelerating Innovation and Creativity at Company X

Instructions:
Please respond to the following items when thinking about **yourself** at work during the past 90 days (January 1st - March 31st).

Definitions:
"Creativity" is the generation of ideas that are unique and useful within the context of your job. These ideas can be for things such as new processes, products, services, or solutions.

"Innovation" is the actual implementation of these ideas. This can include things such as applying a process improvement, solving a workplace challenge, or developing a new product or service for a customer.

Please rate the frequency in which you performed the following activities:

	Almost Never	Rarely	Sometimes	Often	Almost Always
Identified opportunities for new products/processes.	○	○	○	○	○
Searched out new working methods, techniques, or instruments.	○	○	○	○	○
Tried out new ideas and approaches to problems.	○	○	○	○	○
Created new ideas for difficult issues.	○	○	○	○	○
Generated original solutions for problems.	○	○	○	○	○
Generated novel, but operable work-related ideas.	○	○	○	○	○
Mobilized support for innovative ideas.	○	○	○	○	○
Acquired approval for innovative ideas.	○	○	○	○	○
Made important organizational members enthusiastic for innovative ideas.	○	○	○	○	○
Transformed innovative ideas into useful applications.	○	○	○	○	○
Introduced innovative ideas into the work environment in a systematic way.	○	○	○	○	○
Evaluated the utility of innovative ideas.	○	○	○	○	○

Back Next

Accelerating Innovation and Creativity at Company X

Instructions:
Please respond to the following items when thinking about your **job** and **immediate manager** during the past 90 days (January 1st - March 31st).

Definition:
"Immediate manager" is the person who completes your performance review.

Please rate the frequency in which the below occured as part of your **job** from *almost never* to *several times a day.*

	Almost never	Once or twice per month	Once or twice per week	Once or twice per day	Several times a day
How often did your job require you to work very fast?	○	○	○	○	○
How often did your job require you to work very hard?	○	○	○	○	○
How often did your job leave you with little time to get things done?	○	○	○	○	○
How often was there a great deal to be done?	○	○	○	○	○
How often did you have to do more work than you could do well?	○	○	○	○	○

Please rate your agreement with the following statements about your **immediate manager** from *strongly disagree* to *strongly agree.*

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My immediate manager thought of me as a creative employee.	○	○	○	○	○
My immediate manager thought that creativity was important to me.	○	○	○	○	○
My immediate manager expected me to be creative.	○	○	○	○	○
My immediate manager would have probably been disappointed in me if I was not creative.	○	○	○	○	○

Please rate your agreement with the following statements about your **immediate manager** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My immediate manager got me to look at problems from many different angles.	○	○	○	○	○
My immediate manager challenged me to think about old problems in new ways.	○	○	○	○	○
My immediate manager challenged me to be innovative in my approach to work assignments.	○	○	○	○	○
My immediate manager encouraged me to be an independent thinker.	○	○	○	○	○

Back Next

Accelerating Innovation and Creativity at Company X

Instructions:
Please respond to the following items when thinking about your **job** during the past 90 days (January 1st - March 31st).

Please rate your agreement with the following statements about your **job** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I decided on my own how to go about doing my work.	○	○	○	○	○
My job gave me a chance to use my personal initiative or judgment in carrying out my work.	○	○	○	○	○
My job gave me considerable opportunity for independence and freedom in how I do my work.	○	○	○	○	○

Please rate your agreement with the following statements about your **job** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I felt if I made a mistake, it would be held against me.	○	○	○	○	○
I was able to bring up problems and tough issues.	○	○	○	○	○
Other employees sometimes rejected me for being different.	○	○	○	○	○
It was safe for me to take a risk.	○	○	○	○	○
It was difficult to ask other employees for help.	○	○	○	○	○
No one would deliberately act in a way that undermined my efforts.	○	○	○	○	○
Working with other employees, my unique skills and talents were valued and utilized.	○	○	○	○	○

Please indicate the amount the following was present in your **job** from *none* to *a great deal*.

	None	A little	A moderate amount	A lot	A great deal
How much friction was there among other employees?	○	○	○	○	○
How much were personality conflicts evident?	○	○	○	○	○
How much tension was there among other employees?	○	○	○	○	○
How much emotional conflict was there among other employees?	○	○	○	○	○

Back Next

Accelerating Innovation and Creativity at Company X

Instructions:
Please respond to the following items when thinking about **yourself** during the past 90 days (January 1st - March 31st).

Please rate the frequency you felt the following from *almost never* to *almost always*.

	Almost Never	Rarely	Sometimes	Often	Almost Always
I felt worn out at the end of the working day.	○	○	○	○	○
I was exhausted in the morning at the thought of another day at work.	○	○	○	○	○
I felt that every working hour was tiring for me.	○	○	○	○	○
I did not have enough energy for family and friends during leisure time.	○	○	○	○	○
My work was emotionally exhausting.	○	○	○	○	○
My work frustrated me.	○	○	○	○	○
I felt burnt out because of my work.	○	○	○	○	○

Please rate your agreement with the following statements about **yourself** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
At my work, I felt bursting with energy.	○	○	○	○	○
At my job, I felt strong and vigorous.	○	○	○	○	○
When I got up in the morning, I felt like going to work.	○	○	○	○	○
I was enthusiastic about my job.	○	○	○	○	○
My job inspired me.	○	○	○	○	○
I was proud of the work that I did.	○	○	○	○	○
I felt happy when I was working intensely.	○	○	○	○	○
I was immersed in my work.	○	○	○	○	○
I got carried away while I was working.	○	○	○	○	○

Please rate your agreement with the following statements about **yourself** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I felt that I was good at generating novel ideas.	○	○	○	○	○
I had confidence in my ability to solve problems creatively.	○	○	○	○	○
I had a knack for further developing the ideas of others.	○	○	○	○	○

Please rate your agreement with the following statements about **yourself** from *strongly disagree* to *strongly agree*.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I tended to bounce back quickly after hard times.	○	○	○	○	○
I did not have a hard time making it through stressful events.	○	○	○	○	○
It did not take me long to recover from a stressful event.	○	○	○	○	○
It was easy for me to snap back when something bad happened.	○	○	○	○	○
I usually came through difficult times with little trouble.	○	○	○	○	○
I tended to take a short time to get over set-backs in my life.	○	○	○	○	○

Back Next

Accelerating Innovation and Creativity at Company X

Instructions:
Please provide your response to the question below.

Please do not describe anything proprietary to Company X or any personally identifiable information (e.g., names).

What do you consider the most important factor(s) to accelerating innovation and creativity at Company X?

Background Information

Please provide basic information about your role in the organization to help us add context to your answers.

What sector are you in?

A	B	C	D	E
○	○	○	○	○

About how many years have you been with Company X?

Less than 1 year	1 =< 3 years	3 =< 10 years	10 =< 20 years	20 or more years
○	○	○	○	○

What technical-grade level are you?

T01	T02	T03	T04	T05	T06
○	○	○	○	○	○

What best describes your work location?

Company X Facility	Customer Site	Full-time Telecommuter	Company X Facility and Partial Telecommuter	Customer Site and Partial Telecommuter
○	○	○	○	○

Back Submit Survey

APPENDIX C

MANAGER SURVEY

Please review the consent form before proceeding with the survey.

Informed Consent Form
Old Dominion University

Project Title: Creativity and Innovation Through the Job Demands-Resources Model

Introduction
The purpose of this form is to give you information that may affect your decision whether to say YES or NO to participation in this research.

Researchers
The Responsible Project Investigator (RPI) for this study is Konstantin Cigularov, Ph.D. (Old Dominion University). Konstantin is supervising Nathan Bjornberg, M.S., A.B.D. (Old Dominion University; Company X) as he completes his dissertation. If you have any questions or concerns, please contact Konstantin Cigularov at kcigular@odu.edu or Nathan Bjornberg at nbjornbe@odu.com.

Description of Research Study
This research examines how factors of the work environment relate to employee creativity and innovation. In this survey, you will be asked to answer questions about one of your direct reports.
- The survey contains a total of 14 questions and should take less than 5 minutes to complete.

Risk and Benefits
RISKS: There is a minimal risk for the identification of survey responses. To reduce this risk, anonymity will be ensured by keeping employee identifiable information, such as email addresses, completely separate from survey responses. Employee information will not be shared with Old Dominion researchers and individual survey responses will not be shared with Company X. As with any research, there is some possibility that you may be subject to risks that have not yet been identified.
BENEFITS: There are no personal benefits for participating in this study. There are potential benefits to Company X from the results of this study, such as providing information on ways to enable and support innovation.

Costs and Payments
The researchers want your decision about participating in this study to be absolutely voluntary. The researchers are unable to offer any financial rewards.

New Information
If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

Confidentiality
The researchers will take reasonable steps to keep private information confidential. Individual survey responses will never be shared with Company X. The aggregated results of this study may be used in reports, presentations, and publications; but your individual responses will never be shared.

Withdrawal Privilege

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled. Your decision to withdraw will also not impact your position at Company X.

Compensation for Illness and Injury

If you say YES, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Konstantin Cigularov at 757-683-6159, Dr. Tancy Vandecar-Burdin the current IRB chair at 757-683 3802 at Old Dominion University, or the Old Dominion University Office of Research at 757-683-3460 who will be glad to review the matter with you.

Voluntary Consent

By accepting this form, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers should be able to answer them. If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. Tancy Vandecar-Burdin, the current IRB chair, at 757-683-3802, or the Old Dominion University Office of Research, at 757-683-3460.

And importantly, by clicking "Accept and Begin Survey", you are telling the researcher YES, that you agree to participate in this study. If you would like a copy of this form for your records, please print it now or contact the researchers.

Accept and Begin Survey

Accelerating Innovation and Creativity at Company X

Instructions:
Please respond to the following when thinking about the **employee listed in the email invitation** at work during the past 90 days (January 1st - March 31st).

Definitions:
"Creativity" is the generation of ideas that are unique and useful within the context of an employee's job. These ideas can be for things such as new processes, products, procedures, services, and solutions.

"Innovation" is the actual implementation of these ideas. This can include things such as applying a process improvement, solving a workplace challenge, or developing a new product or service for a customer.

Please think about the **employee listed in the email invitation** and their activities at work. Rate the frequency in which they performed the following activities:

	Almost Never	Rarely	Sometimes	Often	Almost Always
Identified opportunities for new products/processes.	○	○	○	○	○
Searched out new working methods, techniques, or instruments.	○	○	○	○	○
Tried out new ideas and approaches to problems.	○	○	○	○	○
Created new ideas for difficult issues.	○	○	○	○	○
Generated original solutions for problems.	○	○	○	○	○
Generated novel, but operable work-related ideas.	○	○	○	○	○
Mobilized support for innovative ideas.	○	○	○	○	○
Acquired approval for innovative ideas.	○	○	○	○	○
Made important organizational members enthusiastic for innovative ideas.	○	○	○	○	○
Transformed innovative ideas into useful applications.	○	○	○	○	○
Introduced innovative ideas into the work environment in a systematic way.	○	○	○	○	○
Evaluated the utility of innovative ideas.	○	○	○	○	○

How often did you observe **this employee** completing their work over the past 90 days (January 1st - March 31st)?

Daily	Weekly	Monthly	Every Other Month or Less Often
○	○	○	○

About how many months have you been this employee's manager (or acted in a management role to them)?

less than 6	6	12 (1 yr)	18	24 (2 yrs)	more than 24
○	○	○	○	○	○

Back Submit Survey

VITA

Nathan Haugejorde Bjornberg
Department of Psychology
250 Mills Godwin Building
Old Dominion University
Norfolk, VA 23529

EDUCATION

Industrial/Organizational Psychology — Ph.D. (2017)
Old Dominion University
Norfolk, VA

Psychology — M.S. (2014)
Old Dominion University
Norfolk, VA

Psychology — B.A. (2009)
University of Minnesota
Minneapolis, MN

WORK EXPERIENCE

Organizational Research Scientist — 2015-Current
Northrop Grumman Corporation

Organizational Research Lab — 2011-2017
Old Dominion University

Research Assistant
metaBUS — 2014-2015

Instructor — 2014-2015
Old Dominion University

Teaching Assistant — 2011-2014
Old Dominion University

Employment Consultant — 2009-2011
Community Involvement Programs

Intern — 2006-2009
Brightech, Inc.