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**THE RELATIONSHIP BETWEEN ORGANIZATIONAL CULTURE, INTRINSIC
MOTIVATION, AND EMPLOYEE PERFORMANCE: A SYSTEMATIC REVIEW AND
META-ANALYSIS**

by

PATRICIA S. RADAKOVICH

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

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for the degree of

DOCTOR OF PHILOSOPHY

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MAJOR: INSTRUCTIONAL TECHNOLOGY
(Performance improvement)

Approved By:

Advisor

Date

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DEDICATION

This dissertation is dedicated to my grandparents, who are no longer here with us but on whose backs I stand.

Milica Jakovljevic

Lazar Jakovljevic

Danilo Radakovich

Andja Radakovich

And to my four-legged, furry family. To those who have seen me through to the end of this journey—Zalea, Qodji, Sadira, Jack, Daphne, Wally, Vashti, Yasmeen, and Ravi—and to those who were here for part of it but sadly could not stay until the end—Haldor, Krandel, Ptor Ptor, Fienyx, Sebastian, Basil, Ursat, Xango, Naiya, Evie, Rashi, Cha Cha, Mitsy, Isabel, Acacia, Griffin, Lily, Taviias, Orion, and Indy.

And finally...

to Owl

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CHAPTER 1: INTRODUCTION

Determining what motivates employees continues to be a highly debated topic even though it has been researched for decades by businesses and scholars around the globe. Theories, tools, and techniques that motivate employees and enhance performance—employees' actions or behaviors that lead to measurable accomplishments which add value to the organization—are highly sought after by employers. In particular, intrinsic motivation—performing an activity for one's own satisfaction rather than the desire for some external reward—has been the subject of much research since the 1920s, but is difficult to manipulate directly. One compelling idea that has emerged is that organizational culture—a pervasive part of the work environment consisting of the shared values, behavior, philosophies, norms, and assumptions among people within an organization—plays a critical role in influencing an employee's intrinsic motivation to perform (e.g., Parker et al., 2003; Sokro, 2012; Rusu & Avasilcai, 2014). Because there are numerous factors that make up organizational culture, its influence has been difficult to research. This study attempts to explore the relationship between organizational culture (through specific organizational cultural factors), intrinsic motivation, and employee performance through a combination of a systematic review and meta-analysis of the current literature on this topic.

Antecedents

Organizational culture. Organizational culture is “the learned, shared, tacit assumptions on which people base their daily behavior. It results in what is popularly thought of as ‘the way we do things around here’” (Schein, 1999, p. 24). Organizational culture is simply the culture of the work place. A more formal definition of culture is presented by Schein (2004):

A pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well

enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (p. 17)

Organizational culture can permeate throughout the entire organization, or sub-cultures can develop in different parts of the company. Culture consists of three levels: artifacts, espoused beliefs and values, and underlying assumptions (Schein, 2004). Artifacts are the visible operations of the organization and are difficult to decipher. Espoused values are the stated beliefs of the organization. Underlying assumptions are the unconscious, shared beliefs within the organization and are the ultimate source for action.

Studies have shown that the work environment, or organizational culture, can have a positive impact on performance (e.g., Carmeli & Tishler, 2004; Hartmann, 2006; Mohamed, Nor, Hasan, Olagathan, & Gunasekaran, 2013).

Intrinsic motivation. Motivation consists of internal and external components, where the internal components drive action and the external components support that action (Locke & Latham, 2004). Those internal components are referred to as intrinsic motivation:

The phenomenon of *intrinsic motivation* reflects the primary propensity of organisms to engage in activities that interest them and, in so doing, to learn, develop, and expand their capacities. Intrinsic motivation is entailed whenever people behave for the satisfaction inherent in the behavior itself. These satisfactions typically concern the positive feelings of being effective (White, 1959) and being the origin of behavior (deCharms, 1968), and they often result from engaging in novel and challenging activities (Berlyne, 1971; Csikszentmihalyi, 1975; Deci, 1975). The natural inclination toward intrinsically motivated behavior is a significant feature of human nature and plays an important

role in development (Elkind, 1971; Ryan, 1993), high-quality performance (Utman, 1997), and well-being (Deci & Ryan, 1991). (Ryan & Deci, 2000, pp. 16-17)

Research shows that intrinsic motivation increases work performance (e.g., Frank, 2011; Taghipour, & Dejban, 2013). Some researchers look at how meeting specific motivational needs, such as personal growth or finding meaning in life, drive performance (de Vries & Florent-Treacy, 2002). Other research shows that in the absence of motivation, performance wanes (Contiu, Gabor, & Oltean, 2012; Grant, 2008).

Performance. Performance consists of employees' actions, or behaviors, that lead to measurable accomplishments which in turn add value to the organization by contributing to the achievement of organizational goals. Therefore, performance is measured differently based on the goals of the organization. For example, performance of physicians might be measured by number of patients whose conditions improved, while performance of retail sales associates might be measured by number of customers served or daily sales totals. There are different levels of performance—individual, team, and organizational—although in the performance improvement literature levels are sometimes referred to as performer, process, and organization (Rummler & Brache, 1990). Also in the performance improvement literature, performance is often viewed through the lens of a human performance model. The external environment of the organization is the basis for the creation of organizational goals, objectives, and internal requirements.

One set of internal requirements is specifically related to *human performance*.

These requirements...trigger a number of *behaviors* that result in

accomplishments. Behaviors and accomplishments are strongly *influenced* by

both the external environment...and the internal *organizational environment*
(composed of many elements). (Stolovitch & Keeps, 1999, pp. 13-14)

Performance improvement. Performance improvement is a field of study that draws from both business and education in an attempt to design interventions that will help improve the performance of organizations. “Performance improvement (PI) is a systematic process that links organizational and business goals and strategies with the workforce responsible for achieving the goals” (Van Tiem, Moseley, & Dessinger, 2012, p. 5).

The process of PI consists of five stages: 1) performance analysis, 2) cause analysis, 3) intervention selection, design, and development, 4) intervention implementation and change, and 5) evaluation. This study will address factors that primarily affect the cause analysis and intervention selection stage of performance improvement. During the cause analysis stage, the root causes for the gaps in performance are often identified using Gilbert’s Behavior Engineering Model (BEM) (see *Theoretical Framework* for complete definition). The “BEM is a primary diagnostic model that shapes human performance technology (HPT) theory and practice (Rosenberg, Coscarelli, & Hutchinson, 1999)” (Crossman, 2010, p. 33). During the intervention selection stage, interventions are selected based on the cause analysis findings from the second stage (Van Tiem, Moseley, Dessinger, 2012).

Organizational culture, intrinsic motivation, and employee performance. Not much research has looked at the relationship between organizational culture, intrinsic motivation, and employee performance. Perhaps the lack of research is due to confusion in constructs and terminology for organizational culture (Parker et al., 2003), issues with measurement (Sackmann, 2011), or the plethora of research and subsequent confusion of constructs and terminology for motivation in general (Shah & Kruglanski, 2000; Lepper & Henderlong, 2000; Locke & Latham,

2004). There seems to be more research focused on safety climate, safety motivation, and safety performance (e.g., Clarke, 2010; Neal & Griffin, 2006), so looking at this research may provide some insights into overall organizational culture and its relationship to intrinsic motivation and employee performance.

Statement of the Problem

There are few empirical studies that look at the relationship between organizational culture, intrinsic motivation, and employee performance. However, there are studies that link each of the two variables.

Looking at organizational culture and employee performance, studies have shown that organizational culture can positively influence performance. Hartmann (2006) found that organizational culture influenced innovative behavior in a Swiss construction firm. Larsson, Brousseau, Kling, and Sweet (2007) measured the alignment between people, strategy, culture, and motivational capital which is defined as the fit between people's individual motives and an organization's culture.

Numerous studies have correlated intrinsic motivation with employee performance. Pink (2009), Frank (2011), and Amabile and Kramer (2011) showed employers desire self-motivated and driven employees. A meta-analysis of companies who used the Gallup Workplace Audit determined that employee satisfaction and engagement were positively correlated with all business outcomes studied, including productivity and performance (Harter, Schmidt, & Hayes, 2002). A study of the Iranian oil industry by Taghipour and Dejban (2013) further supported previous findings that work motivation, of which intrinsic motivation is a factor, enhances performance. Taghipour and Dejban found that work motivation was correlated with job performance and that work motivation fully mediated the relationship between job involvement and perceived

supervisor support with job performance. Although there is correlation between motivation and performance in the literature, none of the studies attempted to affect workers' intrinsic motivation directly, which is in line with Gilbert's premise that addressing intrinsic motivation directly is very difficult and costly (Gilbert, 1996).

Looking at organizational culture and intrinsic motivation, studies have shown that specific cultural factors positively impact the motivation of employees. Janus (2014) showed that specific cultural factors, such as autonomy and relationships with colleagues, can have a positive impact on the intrinsic motivation of physicians. Bassous (2010) looked at how organizational culture, in particular leadership styles, affected the motivation of employees in a faith-based non-profit organization. This research suggests that specific factors of organizational culture, such as leadership style, communication, or human resource practices, may be able to influence the intrinsic motivation of employees.

In order to determine what factors of organizational culture are most likely to influence intrinsic motivation, which in turn could enhance employee performance, a review of intrinsic motivation theories related to work as well as organizational culture theories that impact performance helped to link the factors together. Once those factors were determined, a systematic review of the studies across industries and countries was warranted in order to synthesize the research to address all three variables—organizational culture, intrinsic motivation, and employee performance. By examining the resulting body of relevant data and then applying meta-analytic techniques, this study helped determine if specific elements of organizational culture can affect intrinsic motivation and in turn positively enhance employee performance. Compiling and analyzing the research from across fields to link organizational culture, intrinsic motivation, and employee performance helped fill a gap in the research literature.

Purpose and Hypotheses

Purpose of the study. The purpose of this study was to determine the influence of specific organizational cultural factors—autonomy and meaningful work—on the intrinsic motivation and individual performance of employees. The research suggested that all three high-level variables—organizational culture, intrinsic motivation, and employee performance—were correlated and that each variable was correlated with the other two variables independently. The research has extended over several different industries and countries; study populations varied from public sector employees to healthcare workers to private business employees. With an extremely narrow focus for the study populations and the variation across national cultures, many of the studies are not generalizable as the unique characteristics of the study participants may not translate into other areas. Therefore, there is a need for research that synthesizes all of the existing research to look for generalizable results and to determine the interplay of all three variables.

Variables. The variables in this study are organizational culture, autonomy and meaningful work as organizational cultural factors, intrinsic motivation, and employee performance. A model showing the anticipated relationships between these variables is shown in Figure 1.

Research question. The following research question will guide this study: What is the relationship between the specific organizational cultural factors autonomy and meaningful work, intrinsic motivation, and employee performance?

Hypotheses. Based on the available research, the following hypotheses have been made:

1. Intrinsic motivation partially mediates the relationship between autonomy and employee performance.
2. Intrinsic motivation partially mediates the relationship between meaningful work and employee performance.

3. Autonomy and meaningful work are predictors of employee performance.

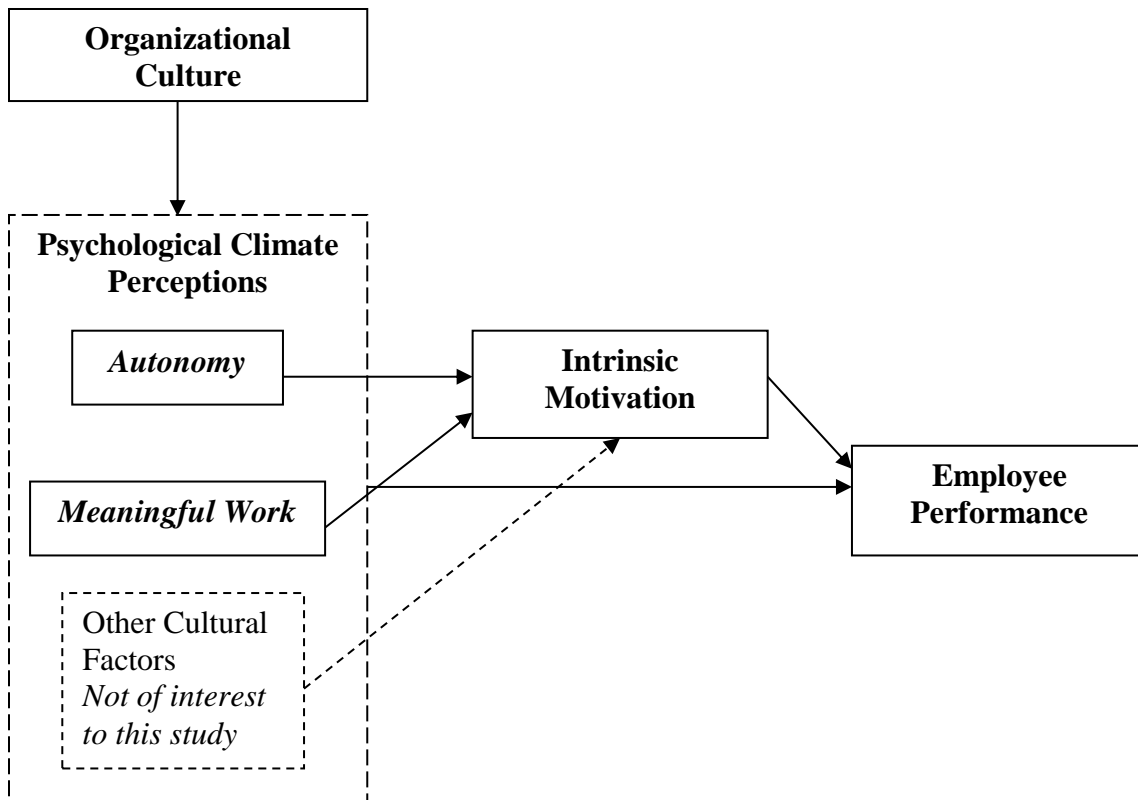


Figure 1. Research Variables

Justification of the Problem

Significance of the study. This study is significant on three levels. First, by showing how specific cultural factors can impact intrinsic motivation and employee performance, employers will have a way to increase performance effectively that is evidence-based. Second, by showing that autonomy or meaningful work has a positive impact on the intrinsic motivation of employees, employers will know focusing on these cultural factors will increase employee motivation. Third, by showing the results are generalizable across industries and countries, the study will have a bigger impact for performance improvement practitioners by offering another method that can be utilized to enhance employee performance.

Evolution and justification of the study. Today, more than ever, organizations are seeking ways to enhance employee performance with minimal investment in time and expense. While changing organizational culture is not easy and can be time-consuming, it can also be very cost effective (Lunden, Paul, & Christensen, 2000). The idea that “you can’t motivate people, but you can create an environment that encourages them to be motivated” (Landes, 2006 p. 27) is prevalent in the practitioner literature. However, without empirical research, the question remains what type of environment has the greatest impact on employee performance.

This study answered this question by examining the linkage between organizational culture, intrinsic motivation, and employee performance. Only by analyzing all three variables can the influence of organizational culture on intrinsic motivation be uncovered to see if there is a way to utilize intrinsic motivation to enhance employee performance.

Theoretical Framework

The link between organizational culture, organizational climate, and psychological climate perceptions. Measuring organizational culture has been the subject of much debate among researchers (Sackmann, 2011). “Sackmann (2006) presented and discussed 25 ways to measure and assess culture” (Sackmann, 2011, p. 189). There are some standardized measures that have been developed—Denison Organizational Culture Survey, Competing Values Framework, Organizational Culture Inventory—yet most researchers either create their own measure or adapt an existing measure for their research (Sackmann, 2011). The measurements are believed to be measuring organizational culture through organizational climate.

In general, researchers agree that climate is a measure of the surface manifestations of culture and is not entirely distinct from culture. Most researchers argue that culture can only be measured by qualitative methodologies, whereas climate as a

more superficial characteristic of organizations can be assessed using quantitative questionnaire measures. (West, 2001, p. 10925)

However, when measuring organizational climate through the use of individual survey instruments, the measurement is actually that of the psychological climate perceptions of employees, or, in other words, how the employees perceive their work environment (Baltes, 2001). Distinguishing between organizational culture, organizational climate, and psychological climate perceptions allows researchers “to focus squarely on individual level issues, such as the relationship between psychological climate and various outcome variables (e.g., individual job performance)” (Baltes, 2001, p. 12356). Due to the confusion and misuse of terminology that is prevalent throughout the field (Parker et al., 2003) and overlapping constructs (Schneider, Ehrhart, & Macey, 2013), terms are often used interchangeably.

Gilbert’s Behavior Engineering Model. Gilbert’s Behavior Engineering Model (BEM) is one tool performance improvement practitioners might use during the cause analysis stage to identify causes of performance problems and to design interventions to address those causes. The BEM divides the causes of performance problems into two main behavioral influences—environmental supports and a person’s repertory of behavior—across three categories—information, instrumentation, and motivation. The resulting matrix identifies six causes of performance deficiencies: data, instruments, incentives, knowledge, capacity, and motives. The model is used to help determine the causes of performance problems, as seen in Figure 2 (Gilbert, 1996).

Gilbert (1996) surmised that if data, instruments, incentives, and knowledge were addressed, the motives deficiency would be minimized.

Whatever defects in motives or capacity exist, their consequences can usually be minimized by careful attention to the other variables in the behavior engineering model....Most people have both sufficient motive and capacity for exemplary performance in almost all circumstances of work and school. So, we should look to these variables only when we have exhausted other remedies. (p. 89)

	Information	Instrumentation	Motivation
Environmental Supports	Data 1. Relevant and frequent feedback about the adequacy of performance 2. Descriptions of what is expected of performance 3. Clear and relevant guides to adequate performance	Instruments 1. Tools and materials of work designed scientifically to match human factors	Incentives 1. Adequate financial incentives made contingent upon performance 2. Nonmonetary incentives made available 3. Career-development opportunities
Person's Repertory of Behavior	Knowledge 1. Scientifically designed training that matches the requirements of exemplary performance 2. Placement	Capacity 1. Flexible scheduling of performance to match peak capacity 2. Prosthesis 3. Physical Shaping 4. Adaptation 5. Selection	Motives 1. Assessment of people's motives to work 2. Recruitment of people to match the realities of the situation

Figure 2. Gilbert's Behavior Engineering Model

Note. From *Human Competence: Engineering Worthy Performance* (p. 88), by T. F. Gilbert, 1996, Maryland: International Society for Performance Improvement. Copyright 1996 by International Society for Performance Improvement.

While the field of performance improvement attempts to increase performance through various interventions, these interventions generally do not address intrinsic motivation directly. If intrinsic motivation is the cause of a performance problem, practitioners attempt to remedy the situation by focusing on the other causes. However, these attempts sometimes fail to address intrinsic motivation (Gilbert, 1996).

This study will focus on Gilbert's last cell: motives. In particular, it will look at item one within that cell—assessment of people's motives to work—since the study is looking at

performance problems of existing employees, making recruitment not applicable as a variable of interest.

Intrinsic motivation: The neglected performance factor. The Behavior Engineering Model (BEM) works by identifying the cause of a performance problem (as it relates to one of the model's six cells) and basing the intervention on that cause. Gilbert clearly states that the BEM is a tool to identify the causes of performance problems, but it does not necessarily indicate the best solutions to those problems (Gilbert, 1996). However, it is possible to derive generic solutions from the cause, while specific solutions must include a broader analysis that relates to the specific organization and situation. The six main causes of performance problems as stated in the BEM and possible solutions are shown in Table 1.

Table 1

Performance Problems: Causes and Possible Solutions

Cause	Possible Solution
Data	Information: expectations, feedback, documentation, processes
Instruments	Tools and resources
Incentives	Pay, benefits, incentives
Knowledge	Training
Capacity	Training, adaptation
Motives	Alignment of motives with work

Gilbert's BEM is extensively used in the performance improvement field, where practitioners mainly focus on the first five causes or cells: data, instruments, incentives, knowledge, and capacity. However, there is a justified reason for neglecting the motives cell; the literature says to focus on the other causes. Gilbert himself stated that the last cell provides the least leverage for resolving a performance issue. "The performance engineer will usually find the greatest leverage in other aspects of behavior than attempts to directly influence the motives of people" (Gilbert, 1996, p. 96). Gilbert stated that it was too difficult and costly to deal with people's individual psychology, so it is best to focus on other aspects of behavior (Gilbert, 1996).

He also believed that if the other five cells were in alignment the last cell would resolve itself. Therefore, since the proposal of the BEM, practitioners have steered away from dealing with the motives cell.

Revisions of the BEM have fared no better in dealing with this cell. Binder (1998) and Chevalier (2003) updated the BEM and both cautioned about trying to work directly with motives. Binder renamed the model to Six Boxes™ and renamed the last cell (now referred to as a box) to “motives and preferences (attitude).”

We notice that investing directly in this box with attempts to “pump up” motivation, without managing the previous five boxes, generally does not produce the desired outcome. We also suggest that when organizations adequately address the first five boxes, the sixth one often takes care of itself. (Binder, 1998, p. 50)

Chevalier redefined motives slightly by shifting the focus to alignment to achieve performance. “Individual motives should be aligned with the work environment so that employees have a desire to work and excel” (Chevalier, 2003, p. 10). However, he does not provide any practical advice on how to address those motives, other than addressing the other five performance factors.

Definitions

Autonomy. Autonomy refers to the amount of control or choice a performer has in the workplace over his or her work, schedule, and the like. The concept is about self-directed behavior and being responsible for the consequences of that behavior.

Cultural factors. Cultural factors are the individual components that combine to form an organizational culture. Core factors are common throughout an organization, but subunits can also have their own unique factors (Cameron & Quinn, 2006). These factors can be one basic

assumption, stated value, or artifact, or a combination of all three levels that supports the underlying assumptions. A culture cannot consist of one factor, but rather is made up of many factors that combine to create a complete picture.

Intrinsic motivation. Intrinsic motivation is the desire to perform an activity for one's own satisfaction or internal desire rather than for some external reward. In this study, intrinsic motivation refers to the desire to work or perform a job.

Meaningful work. Meaningful work refers to the amount of value or meaning work has for the performer or organization. At the individual level, meaningful work may provide value to the performer by the nature of the job itself or by the perception that the work is contributing to a larger societal goal.

Organizational climate. Organizational climate is the shared perceptions of the organizational environment (Baltes, 2001). "Climate is often considered as relatively temporary, subject to direct control, and largely limited to those aspects of the social environment that are consciously perceived by organizational members" (Denison, 1996, p. 624).

Psychological climate perceptions. Psychological climate perceptions are the individual perceptions of the organizational environment that can be quantified and measured through questionnaires and surveys.

Organizational culture. Organizational culture is the shared values, behavior, philosophies, norms, and assumptions among people within an organization.

Performance. In performance improvement literature, performance is defined in terms of accomplishments. Performance consists of employees' actions, or behaviors, that lead to measurable accomplishments which in turn add value to the organization. Gilbert took the definition a step farther by adding worth to the equation. Worthy performance, then, is when "the

value of the accomplishment exceeds the cost of the behavior” (Gilbert, 1996, p. 17). In performance improvement, worthy performance is what practitioners hope to enhance.

Limitations

One limitation of the study is that the language and terminology used throughout the field is not always precise and is sometimes confusing. In order to resolve this issue, the concepts in the applicable studies had to align with the operational definitions used to guide the systematic review, regardless of terminology choices. Another limitation of this study is that the systematic review was conducted by a single author. Most systematic reviews include at least one additional reviewer to resolve any issues arising from subjective decisions regarding the study selection criteria. To resolve this issue, a thorough explanation of the decision criteria and transparency of the process has been provided. Furthermore, the primary search results were reviewed twice, spaced several months apart.

Summary

In this section, the purpose of the study, research questions, and hypotheses were introduced, along with the antecedents, theoretical framework, and definitions. In summary, intrinsic motivation is a neglected performance factor that has largely been ignored by performance improvement practitioners, mainly because it is difficult to impact directly. Instead, intrinsic motivation may be impacted indirectly by purposefully aligning motives with other environmental support and performance factors. When this alignment still does not result in desired performance, practitioners need additional recourse. Organizational culture may be the key to resolving this issue. By focusing on specific cultural factors, organizational culture may influence intrinsic motivation, which, in turn, will influence employee performance. In order to discover if this

hypothesized relationship is viable across a variety of industries and countries, a systematic review and meta-analysis of the existing data were justified.

CHAPTER 2: LITERATURE REVIEW

A review of the relevant literature was conducted to determine if a study between the three variables—organizational culture, intrinsic motivation, and employee performance—was warranted. The review supported the assertion that a systematic review and meta-analysis of applicable studies was justified.

Organizational Culture and Intrinsic Motivation

This section highlights research between organizational culture (variable A) and intrinsic motivation (variable B); many of the studies demonstrated a relationship between these variables, although intrinsic motivation was often confounded with other types of motivation. Some of these studies tested conceptual models or frameworks, for example, a model of work motivation was found to predict how specific leverage points in an organization's work context can influence work motivation (Wright, 2004) and a cultural framework was able to measure the alignment between people, strategy, culture, and motivational capital, defined as the fit between people's individual motives and an organization's culture (Larsson, Brousseau, Kling, & Sweet, 2007).

Moynihan and Pandey (2007) determined that a strong work culture and organizational purpose influence work motivation and engage the workforce, but can also have detrimental effects if used in a negative way. They also showed that leaders have limited influence over organizational culture and employees in highly routine jobs are especially likely to have lower work motivation. Bassous (2010) determined "the correlational analysis suggested a significant moderate positive relationship between organizational culture and workers' motivation level" (p. 147) in his research into employee motivational factors in a faith-based non-profit organization.

Safety culture and safety motivation. Crossman (2010) examined the impact of the occupational contextual environment (safety culture) on the safety motivation of volunteer

firefighters. This study also specifically tested its theory against the BEM model in an attempt to validate the BEM within the safety context.

“This study demonstrated that Gilbert’s three contextual variables—information, resources, and incentives—synergistically combine to create an ideal environment for the cultivation of an intrinsically motivated workforce” (Crossman, 2010, p. 47). This research is important because it shows the BEM is still a useful tool, although it can be difficult to validate due to the multiple factors that make up the performance system.

Specifically, incentives played a mediating role, absorbing the indirect effects of communication and resource availability and directly influencing safety motivation. Findings confirm Gilbert’s contentions that (1) system dimensions are interdependently related and (2) structuring the environment is a critical management task in improving and maintaining performance. (Crossman, 2010, p. 43)

Crossman’s study is relevant because it showed a correlation between organizational culture and motivation, albeit in a safety context. The results are also encouraging that the BEM can be applied and tested in this manner, although more research needs to be done in this area.

Learning culture and motivation to transfer learning. Egan, Yang, and Bartlett (2004) examined the relationship between organizational learning culture, job satisfaction, and organizational outcome variables—motivation to transfer learning and turnover intentions—for information technology employees in the United States. A survey research method was utilized to gather the data and structural equation modeling was used to analyze the data.

The study found that an organizational learning culture had significant positive contributions to job satisfaction and motivation to transfer learning, but job satisfaction did not

have a significant contribution to motivation to transfer learning. The study also found that while job satisfaction had a significant contribution to turnover intentions, the organizational learning culture had an indirect impact on turnover intentions through job satisfaction as the mediating variable. In summary, “the culture and environment of an organization can influence the types and numbers of learning-related events and employee job satisfaction as well as employee motivation to transmit newly acquired knowledge to the workplace context” (Egan et al., 2004, p. 280).

The research by Egan et al. is relevant because it looked at how a specific organizational culture (in this case, a learning culture) can impact performance outcomes and motivation. While this study is very limited in scope, the general premises are applicable to the current study, specifically that organizational culture can positively impact motivation.

Organizational culture and intrinsic motivation summary. “The crucial point with motivation is that without it employees become inefficient and costly. Thus, managers must find appropriate instruments that motivate employees and fit the current organizational culture” (Contiu et al., 2012, p. 982). These studies demonstrated that independent of the third variable (performance), organizational culture and motivation are positively related. In many of these studies, performance may be an unidentified variable that was assumed.

Intrinsic Motivation and Performance

This section highlights research between intrinsic motivation (variable B) and performance (variable C); these studies demonstrated a correlation between the variables. For example, Frank (2011) postulated that “because productivity and motivation are closely linked, ‘when people lack motivation, productivity suffers’ (Berman, 1998, p. 40). By contrast, ‘when people have motivation, they work with energy, enthusiasm, and initiative’ (Berman et al., 2010, p. 181)” (p.

137). In other words, if motivation is high, performance is high; if motivation is low, performance is low.

Some studies indicate leaders have an impact over the motivation of employees. De Vries and Florent-Treacy (2002) found that effective global leaders create conditions favorable to high performance and understand the existence of a motivational need system in each employee. In particular, the needs they address are attachment/affiliation (the need to belong) and exploratory/assertive, connected to learning and personal growth. “A powerful derivative of these two need systems—the desire to be useful, to transcend one’s own personal needs in order to find *meaning* in life—constitutes an additional powerful motivational force for many people” (de Vries & Florent-Treacy, 2002, p. 300).

Several studies looked at Herzberg’s two-factor theory of motivation (e.g., Sledge, Miles, & Coppage, 2008; Frank, 2001), which is an older theory for work motivation. “Motivation factors such as responsibility, achievement, recognition, advancement, personal growth, and intrinsic value of the work itself collectively motivate employees to improve productivity (Herzberg et al., 1959)” (Frank, 2011, p. 137).

These studies and others indicate that intrinsic motivation and performance are linked, as the relationship is born out in the literature repeatedly (e.g., Herzberg, 1968; Hackman & Oldham, 1980; Pink, 2009; Amabile & Kramer, 2011). The research reveals that intrinsically motivated employees are more productive and thus perform at a higher level than non-intrinsically motivated employees. (See *Intrinsic Motivation Revisited: Theories of Intrinsic Motivation in the Workplace* for a deeper dive into this topic.)

Organizational Culture and Performance

This section highlights research between organizational culture (variable A) and performance (variable C) broken down into key concepts and researchers; the studies demonstrated a relationship between variables A and C and presented evidence that different cultural factors have different degrees of influence over performance. For instance, employees whose personal values did not fit with the organizational values stayed longer in firms emphasizing interpersonal relationships, suggesting that interpersonal relationships is a more universal value (Sheridan, 1992). Other studies showed that the elements of a specific type of leadership and a culture of discipline had a huge impact on performance (e.g., Collins, 2001).

Cultural impact on organizational effectiveness and performance. Denison (1997) demonstrated that an organization's culture directly impacts its effectiveness and performance. His culture and effectiveness model showed there are four main areas that impact effectiveness: adaptability (internal flexibility and external focus), mission (meaning and direction), involvement (informal processes and formal structure), and consistency (normative integration and predictability). The model is supported by both qualitative and quantitative research.

Hartmann (2006) found that culture does have influence over innovative behavior, but contextual factors—organizational strategy, project constraints, and regional separation of business units—affect the extent to which managerial actions can influence culture and behavior.

Employees are only motivated to go beyond their designated role and get involved in spontaneous and innovative activities if they have a strong identification with the organization. Organizational culture plays a critical role in motivating innovative behaviour, as it can create commitment among members of an organization in terms

of believing in innovation as an organizational value and accepting innovation-related norms prevalent within the organization. (Hartmann, 2006, p. 159)

Collins (2001), Collins and Porras (2002), and Collins and Hansen (2011) conducted large-scale studies in the business world to see what differentiated successful companies from those that are not as successful. He found that culture had a huge impact on organizational effectiveness and performance. His research showed that long-term successful companies preserve their core values while simultaneously stimulating progress (Collins & Porras, 2002). The research also showed that companies that went from having average to extraordinary performers had cultures that supported self-motivation by leading with questions; understood how to be the best, make money, and be passionate about the work; and had a disciplined culture (Collins, 2001; Collins & Hansen, 2011; Pink, 2009).

The strong culture debate. Kotter and Heskett (1992) were two of the first researchers to demonstrate how culture influences an organization's performance. Prior to this study, most researchers believed that strong cultures alone were enough to promote excellent performance. They defined strong culture as one in which a consistent set of values and methods for doing business is shared among employees and are adopted easily by new employees. Typically, norms are more visible and easier to change than values in a corporation. But in strong cultures, shared values are often stated in a creed or mission that everyone is encouraged to follow (Kotter & Heskett, 1992). Tushman and O'Reilly (2002) also emphasized the creation of norms that reflect the organization's values as fundamental for successful performance.

Kotter and Heskett found that in order to influence performance, cultures must also be strategically appropriate and adaptive.

In firms with strong corporate cultures, managers tend to march energetically in the same direction in a well-coordinated fashion. That alignment, motivation, organization, and control can help performance, but only if the resulting actions fit an intelligent business strategy for the specific environment in which a firm operates....Furthermore, our research shows that even contextually or strategically appropriate cultures will not promote excellent performance over long periods unless they contain norms and values that can help firms adapt to a changing environment. (Kotter & Heskett, 1992, pp. 141-142)

On the other side of the debate, promoting the idea that strong culture alone promotes excellent performance, Deal and Kennedy published an earlier work (1982) emphasizing the link between strong cultures and performance, which was supported by other researchers. In the second version of their book (1999), they responded to the claims of Kotter and Heskett that strong cultures alone are not enough for excellent performance. "According to our reanalysis of their [Kotter and Heskett, 1992] data, strong-culture companies massively outperformed weak ones between 1977 and 1988. Our 1982 assertion, emphasizing cultural robustness, seems vindicated" (Deal & Kennedy, 1999, p. 25). Other researchers also support this side of the debate.

Organizational culture and perceived organizational reputation are the measures most important to organizational performance....This clearly indicates that organizations with strong organizational culture and favorable perceived organizational reputation achieve above normal performance. (Carmeli & Tishler, 2004, p. 1267)

Whether or not strong cultures alone are enough to impact performance is not the subject of this study, but it is clear they are a critical component to an organization's effectiveness and

success. “Strong cultures thrive on the accomplishments of members....The aggregate of these successes results in higher company performance” (Deal and Kennedy, 1999, p. 262).

People-centered management. Deal and Kennedy (1999) also believed that cultures must be purposefully managed. “Since every business is a people business, creating a high-performing culture puts managing people center stage” (Deal & Kennedy, 1999, p. 251). Factors involved in this management include knowing the right people to hire, reward, and promote; providing the right compensation; organizing the company to get the most out of people; setting performance standards; and tracking performance.

Pfeffer is another strong advocate of people-centered management (1998). He believed it is more important how you manage people than it is to look for the right people.

Of course, companies that want to succeed need great people, and recruitment, selection, and retention are obviously important. But companies need something else that is even more important and often more difficult to obtain: cultures and systems in which these great people can actually *use* their talents, and even better, management practices that produce extraordinary results from almost everybody.

(O’Reilly & Pfeffer, 2000, pp. 1-2)

Pfeffer’s research highlighted seven dimensions that organizations need to focus on to obtain high performance: employment security, selective hiring, self-managed teams, high compensation contingent on organizational performance, extensive training, reduced status distinctions and barriers, and sharing of financial and performance information within the organization (Pfeffer, 1998).

Alignment of organizational culture with other factors. At the heart of people-centered companies are values and culture that come first, then alignment and consistency to express these

values, and finally leaders throughout the company that maintain these values (O'Reilly & Pfeffer, 2000). Pfeffer (1998) emphasized the alignment of business strategy with management practices.

Tushman and O'Reilly (2002) discussed the importance of cultural alignment with other areas of the organization, including people, critical tasks, and formal organization.

There are three important levers managers can use to influence the social control system of their units: shaping culture through participation or systems of involvement that lead people to feel responsible, using management behavior to convey vivid messages about what attitudes and behaviors are important, and designing comprehensive systems of reward and recognition that are targeted at those attitudes and behaviors critical for success. (Tushman and O'Reilly, 2002, pp. 131-132)

Organizational culture and performance summary. The studies linking organizational culture and performance indicated that these variables are independently related apart from motivation. However, the studies do not indicate the mechanism by which organizational culture and performance are related. In a few of the studies, motivation was hinted at as the key linking variable between organizational culture and performance. Of additional importance, these studies showed that there are many factors that can make up organizational culture, with some of those factors appearing to be more universally influencing on performance than others.

However, it is vital to remember that performance does not happen in a vacuum. People are a vital part of an organization and if people as a whole are not performing well then the organization cannot perform well. Therefore, it is a logical assumption that if organizational culture impacts organizational performance, it must also affect individual performance (Deal and Kennedy, 1999).

Studies Linking Organizational Culture, Intrinsic Motivation, and Performance

This section highlights studies that looked at some form of all three variables—organizational culture (variable A), intrinsic motivation (variable B), and performance (variable C)—such as a unique cultural factor instead of culture as a whole or a performance indicator instead of general performance. They contribute to the background understanding of this topic by looking at the interplay of cultural factors, motivational factors, and performance.

Psychological climate, work attitudes, motivation, and performance. Parker et al. (2003) examined the relationship between psychological climate and work outcomes at the individual level, such as employee attitudes, well-being, motivation, and performance. Motivation was a single measure that combined both intrinsic and extrinsic motivation. The study was a meta-analytic review of the current literature, primarily focusing on countries with individualistic cultures. The researchers then used structural equation modeling to correlate the variables derived from the meta-analytic review.

Based on the meta-analytic review, the researchers found that psychological climate perceptions do have reliable relationships with employees' work attitudes, psychological well-being, motivation, and performance. Generally, psychological climate perceptions have stronger relationships with employees' work attitudes (satisfaction, commitment, and job involvement) and their psychological well-being than with employees' motivation and performance....We found that the effects of psychological climate perceptions on performance are fully mediated by work attitudes and employee motivation. This result suggests that employees' motivational and behavioral reactions to perceptions of their work environment are

mediated by their overall evaluations of these perceptions. (Parker et al., 2003, p. 405-406)

The research by Parker et al. is relevant because it analyzed the relationship between work climate, work attitudes, motivation, and performance. The finding that motivation was a mediating variable between climate and performance demonstrated that the three variables are correlated and that motivation plays a pivotal role in the relationship between organizational culture and performance. What is unclear from this study is how big of a factor intrinsic motivation was on the other variables since the measurement was a combined concept of motivation. Because the meta-analysis reviewed studies from a variety of sources, the results are generalizable when used for individual-level outcomes.

Work-family conflicts, safety motivation, and performance. Cullen (2005) examined how work-family conflicts affected the safety motivation and performance of hospital employees. A survey methodology was used to obtain data from a sample of health care workers in the United States.

One of the findings of the study was that family-to-work conflicts negatively affected the safety motivation and performance of employees. However, the findings also showed that organizations with family-friendly policies also have a negative effect on safety and motivation, even though correlations showed that a supportive culture leads to lower conflict and lower conflict leads to higher motivation. Cullen offers one explanation for this discrepancy:

Perhaps the focus on work-family culture instills in employees a sense of competing values. Whereas a supportive work-family culture establishes for employees a general concern for family and personal well-being it would be counterproductive for such a value to come at the expense of creating a perceived lower priority for

other different yet equally important organizational values (e.g., safety). (Cullen, 2005, p. 102-103)

The implications of Cullen's study are that the organizational culture needs to be supportive of possible work-family conflicts but in a way that does not conflict with other organizational values in order to increase safety motivation and compliance (performance).

Cullen's study is relevant because it demonstrated one factor of organizational culture (family-friendly policies) that has an impact on motivation and performance. Although the study is very narrowly-focused, it would be interesting to see if these findings hold for different factors of culture.

Intrinsic motivation, prosocial motivation, and performance. Grant (2008) examined the relationship of intrinsic motivation to prosocial motivation and performance, where "prosocial motivation is the desire to expend effort to benefit other people (Batson, 1987)" (Grant, 2008, p. 49). The study used a survey methodology over two different workplaces where prosocial motivation was expected to be high.

Grant found that intrinsic motivation is a strong positive moderating variable between prosocial motivation and performance, productivity, and persistence. The study had mixed results over whether intrinsic motivation could independently predict performance and productivity. The researcher attributed these mixed results to the different environments of the study populations. One environment included varied, complex tasks (where intrinsic motivation did predict performance) and the other included repetitive, simple tasks (where intrinsic motivation did not predict performance). "This interpretation is consistent with evidence that intrinsic motivation is difficult to sustain in repetitive tasks (Hackman & Oldham, 1976) and more likely to increase effort in varied than repetitive tasks (Koestner & Losier, 2002)" (Grant, 2008, p. 54).

This study also found that when intrinsic motivation was low, it had a negative impact on persistence and productivity. Grant suggested that “prosocial motivation without intrinsic motivation may deplete employees’ psychological resources for self-regulation (Muraven & Baumeister, 2000), leading to exhaustion and thereby decreased persistence and productivity” (Grant, 2008, p. 54).

Grant’s research is relevant because it showed a link between intrinsic motivation and performance, albeit as a moderating variable between prosocial motivation and performance. This research was also conducted in the public sector where prosocial motivation is generally anticipated to be high, which suggests that prosocial motivation is part of the organizational culture in public sector companies. As such, if prosocial motivation is construed as part of organizational culture, then the results could be interpreted as intrinsic motivation as a positive moderating variable between an organizational cultural factor and performance. Even without this interpretation, the study showed support for the idea that in the right environment, intrinsic motivation can positively impact performance.

Cultural elements, motivation, and business excellence. Stok, Markic, Bertoneclj, and Mesko (2010) examined how elements of organizational culture were linked to business excellence—defined as individual behaviors producing results leading to business performance at one level and organizational performance on another level—in Slovenia. The study used a survey methodology to gather and analyze data from 825 managers across medium to large enterprises.

The study confirmed organizational culture, motivation, and business excellence were related. “The research has found out that an appropriate communication structure, interpersonal relationships, motivation, stimulation and values as part of organizational culture positively affect business excellence in enterprises” (Stok et al., 2010, p. 311).

The research by Stok et al. is relevant because it demonstrated that there are specific factors of organizational culture that have a positive impact on performance and that motivation is a key variable. Performance in this case, however, is not differentiated by level so the interpretation of these results must be viewed narrowly.

Organizational context, teamworking, motivation, and performance outcomes.

Gould-Williams and Gatenby (2010) examined the effects of organizational context and teamworking activities on performance outcomes of local government employees in England. “Ability, Motivation and Opportunity (AMO) theory is used as the basis of this study in which it is predicted that employees’ ability, motivation and opportunities to participate will affect organizational performance” (Gould-Williams & Gatenby, 2010, p. 759).

This study verified a link between organizational culture (organizational context and teamworking), job satisfaction, and performance.

With specific reference to AMO theory, it was noted that training and development (providing employees with the skills needed to perform), along with involving them in decision making (providing employees with the motivation to perform) as well as teamworking (creating opportunities for employees to use their skills) enhanced perceptions of organizational performance (cf. Guest et al. 2004).

(Gould-Williams & Gatenby, 2010, p. 783)

Gould-Williams and Gatenby’s research is relevant because it showed a relationship between organizational culture and performance, with an inferred relationship with motivation. The study also demonstrated that these findings hold for non-US public sector employees.

Organizational culture, motivation, and employee creativity. Hon and Leung (2011) examined the relationship between organizational culture, motivation, and employee creativity as

a performance element in Chinese hospitality organizations. The theory of person-culture fit was the theoretical framework behind this study.

“Our data indicate that firm-level cultures can moderate the individual-level effects of intrinsic motivations on employees’ creative performance” (Hon & Leung, 2011, p. 131).

The data reveal that innovative culture moderates the relationship between the need for achievement and creativity, traditional culture moderates the relationship between the need for power and creativity, and cooperative culture moderates the relationship between the need for affiliation and creativity. (Hon & Leung, 2011, p. 125)

Hon and Leung’s study is relevant for a number of reasons. First, it showed a correlation between the variables for multiple types of culture and multiple types of motivations with performance in the form of creativity. Second, it validated the theory of person-culture fit which aligns organizational culture with motives to impact performance. A note of interest is that organizational culture appeared as a moderating variable for the other two variables in this study instead of motivation as the outlying variable.

Organizational culture, motivation, organizational commitment, and employee performance. Widyaningrum (2011) examined the link between motivation, culture, and performance of healthcare workers in Indonesia. The study employed a survey methodology of 175 employees at a community hospital.

The study found that all the variables are related. “The results of this study indicate the existence of direct and indirect influences of variables of motivation and organizational culture on organizational commitment and employee performance” (Widyaningrum, 2011, p. 234).

Widyaningrum's study is relevant to this study because it demonstrated that the variables can have both direct and indirect effects on each other, which supports hypotheses one and two that intrinsic motivation is a mediating variable. The research also demonstrated that the findings are replicable in a non-Western nation, which speaks to the generalizability of the main research question of the current study.

Culture, motivation, and competitiveness. Contiu, Gabor, and Oltean (2012) examined the link between motivation, culture, and competitiveness and how this impacted employee performance in the hospitality industry in Romania. The study used a survey methodology to gather data from employees at 13 hotels in the country.

The research showed that all three variables are linked but it only partially supported the hypothesis that “in a collectivist, feminine culture...employees are motivated by incentives which offer them security, social status and recognition within the organization, and a better quality of life” (Contiu et al., 2012, p. 983). “Feminine oriented organizations, as the ones analyzed, will focus on quality of life, human relationships, service, solidarity and support and they might be more inclined to develop innovative motivational practices, allowing thus their employees to enjoy a better quality of life” (Contiu et al., 2012, p. 986).

The research by Contiu et al. is relevant because it addressed the concept of different types of national culture and how that impacts the organizational culture, motivation, and determinants of performance in the work environment. National culture, while not looked at directly in the current study, is often a factor of organizational culture.

Organizational culture, motivation, and performance. Maithel, Chaubey, and Gupta (2012) examined the role of organizational culture on the motivation and performance of

employees in India. A mixed-methods methodology consisting of survey and interview was conducted with 229 employees among various industries.

The success and growth of an organisation depends on how effectively and efficiently does it employee [sic] performs and culture is a means through which employees learn and communicate what is acceptable or unacceptable in an organisation in the light of its values and norms. It is seen that significant difference exists in the mean of different organizational cultural factor across the organisational outcome as perceived by the employees. The different organizational culture factor(s)...should be analysed carefully and promoted in the organization to enhance the employees productivity and in turn improving organisational [sic] performance. (Maithel et al., 2012, p. 73)

The research by Maithel et al. is relevant because not only does it link organizational culture, motivation, and performance, it also showed that certain cultural factors have more impact on motivation and performance than others. The study lends credence to the idea that there may be some cultural factors that are universal across industries and countries that could positively impact motivation and performance.

Organizational culture, intrinsic motivation, and performance summary. The studies linking organizational culture, intrinsic motivation, and performance demonstrated that there is wide interest in these variables around the globe. However, the studies also demonstrated that measurement of these variables varies just as widely. Nevertheless, the level of interest is encouraging to pursue the premise of the current study.

As established by the literature review, the most common method to research organizational culture, intrinsic motivation, and performance is by looking at organizational

cultural factors instead of organizational culture as a whole. The key is to determine what specific cultural factors to review and analyze. In order to make that determination, the intrinsic motivation literature and organizational culture literature had to be revisited and linked.

Intrinsic Motivation Revisited: Theories of Intrinsic Motivation in the Workplace

Intrinsic motivation has many theories and has been the subject of much research; the breadth of the entire field is so vast it is beyond the scope of this study. This study attempted to summarize key theories of intrinsic motivation related to employee performance and extract common elements from them to become the focus of the systematic review and meta-analysis.

Job characteristics model. Hackman and Oldham (1980) developed the job characteristics model (see Figure 3), which built upon Herzberg's motivation-hygiene theory, an older model of motivation that stated factors that lead to job satisfaction (motivators) are completely separate and distinct from factors that lead to job dissatisfaction (hygiene factors) (Herzberg, 1968). The job characteristics model has intrinsic motivation at its core. Hackman and Oldham claimed that there are three critical psychological states necessary for high internal work motivation: experienced meaningfulness of the work, experienced responsibility for the outcomes of the work, and knowledge of the actual results of the work. Core job characteristics—skill variety, task identity, task significance, autonomy, and feedback from the job—feed into the critical psychological states. These states then lead to outcomes: high internal work motivation, high “growth” satisfaction, high general job satisfaction, and high work effectiveness. Moderators to all of these factors—core job characteristics, critical psychological states, and outcomes—are knowledge and skill, growth need strength, and “context” satisfaction.

“It appears, then, that *motivation at work may actually have more to do with how tasks are designed and managed than with the personal dispositions of the people who do them*” (Hackman

& Oldham, 1980, pp. 76-77). So while intrinsic motivation is core to their theory, they found it is best manipulated by other variables that can influence those psychological states.

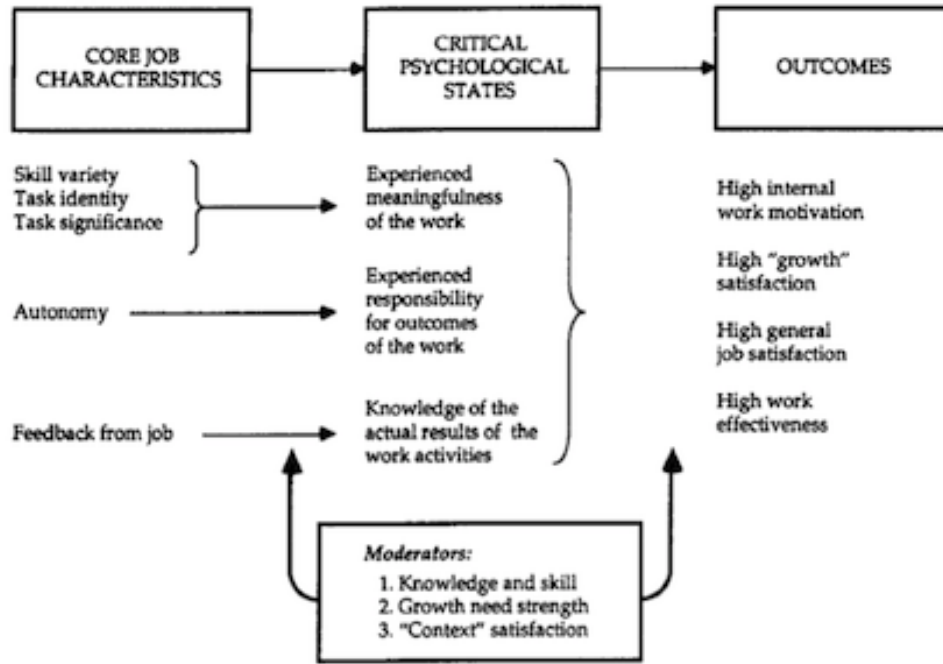


Figure 3. Job Characteristics Model

Note. From *Work Redesign* (p. 90), by J.R. Hackman & G.R. Oldham, 1980, Reading, MA: Addison-Wesley Publishing Company. Copyright 1980 by Addison-Wesley Publishing Company.

Self-determination theory. Deci and Ryan introduced self-determination theory (SDT) in 1985 as a response to the concept of three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2009).

The theory proposes that aspects of people's interpersonal environments and their own individual differences will affect the degree to which they are able to satisfy their basic psychological needs and sustain their growth-oriented nature. The outcome of this ongoing interaction of people's inherent proactivity with the social environment that is either supportive or thwarting of their basic psychological

needs has a profound impact on their motivation, cognition, affect and wellbeing.

(Deci & Ryan, 2009, p. 442)

SDT divides motivation into intrinsic motivation and four types of extrinsic motivation: external regulation, introjected regulation, identified regulation, and integrated regulation. These different types of motivation, along with amotivation, form the relative autonomy continuum (Deci & Ryan, 2009) as shown in Figure 4.

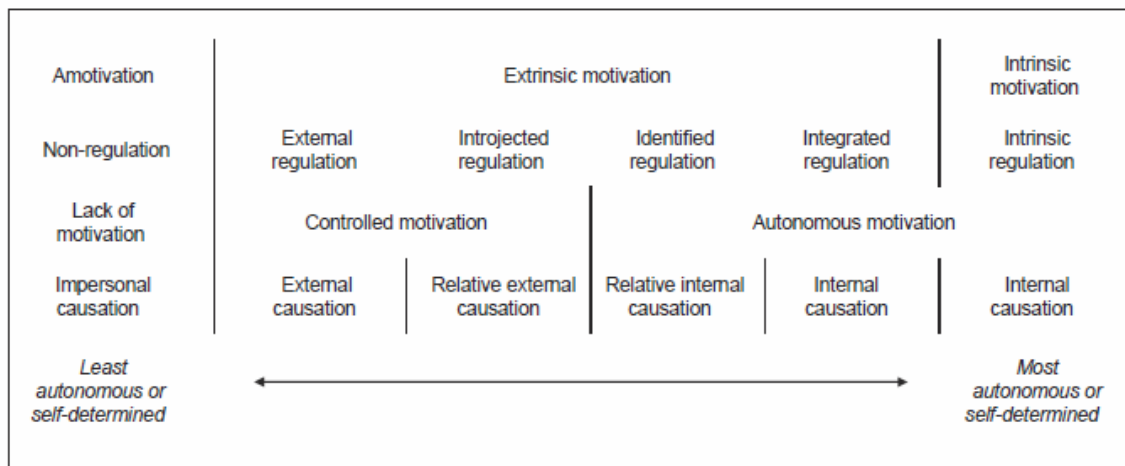


Figure 4. The Self-Determination Continuum of Relative Autonomy

Note. From "Self-Determination Theory: A Consideration of Human Motivational Universals," by E. L. Deci & R. M. Ryan, 2009, *The Cambridge Handbook of Personality Psychology*, p. 445. Copyright 2009 by Cambridge University Press.

These levels of motivation help predict outcomes such as psychological well-being and performance. Components of SDT also include the role of social context and goals (Deci & Ryan, 2009).

Drive: Three elements that motivate. Pink (2009) offered a new theory of motivation based on four decades of scientific research. His premise was that there is a disconnect between what science knows and what business does. He demonstrated that there are three main elements of motivation: autonomy, mastery, and purpose (Figure 5).

Autonomy refers to the desire to direct one’s own life. Mastery refers to the desire to improve in something that is meaningful to the performer. Purpose refers to the desire to contribute to something larger than oneself. None of these concepts is new. Senge (1990) emphasized the importance of mastery as an intrinsic employee goal and Kaufman (2006) discussed the mega, or societal impact, of actions within an organization.

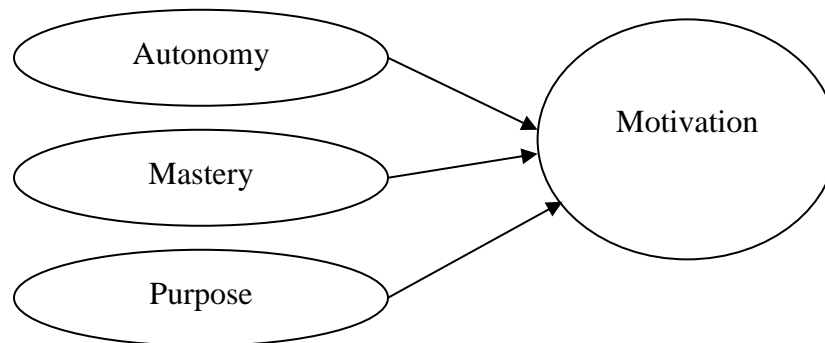


Figure 5. Daniel Pink’s Drive Model of Motivation

The progress principle. The progress principle is a more recent study that explained the work of researchers Amabile and Kramer and their look at the inner work lives of employees to find out what motivates them. Their study involved gathering data from employees in several different companies to learn about their inner work life. Study participants filled out daily questionnaires for a period of up to 38 weeks. Additional questionnaires, phone conversations, and meetings were also part of the research. The researchers spent 14 years collecting, analyzing, and publishing the results of their work.

First, Amabile and Kramer showed that inner work life consists of three components: perceptions/thoughts, emotions/feelings, and motivation/drive. Next, they showed that high performance has four dimensions—creativity, productivity, commitment, and collegiality—which all relate to inner work life. “*Creativity*—coming up with novel and useful ideas—is probably the

most crucial aspect of performance in today's business world" (Amabile & Kramer, 2011, p. 49). Creativity and motivation have a strong relationship.

Over the past thirty years, we and our colleagues have conducted several studies showing that people are more creative when they are driven primarily by intrinsic motivators: the interest, enjoyment, satisfaction, and challenge of the work itself—and not by extrinsic motivators: the promise of rewards, the threat of harsh evaluations, or the pressures of win-lose competitions or too-tight deadlines. Most of the evidence comes from experiments, allowing conclusions about cause and effect: if we lowered intrinsic motivation, or increased extrinsic motivation, lower creativity resulted. (Amabile & Kramer, 2011, pp. 55-56)

The three key influences on inner work life are the progress principle, the catalyst factor, and the nourishment factor as shown in Figure 6. Of the three, the progress principle is the most important. Progress must be rooted in meaningful work. Meaningful work does not have to have a large focus; it is simply something that is believed to have perceived value to a key stakeholder, something that matters to the performer, including the performer himself/herself.

Motivational Factors Derived from Intrinsic Motivation Research

While there are many more theories of intrinsic work motivation, the job characteristic model, self-determination theory, drive, and the progress principle represent four key theories: two old—Hackman and Oldham (1980) and Deci and Ryan (1985)—and two new—Pink (2009) and Amabile and Kramer (2011). By looking at the intersection of these theories (see Table 2), three common elements emerge: autonomy, meaningful work, and valuable work. The table does not represent a new model, but rather a synthesis of the existing research to inform the direction of this study.

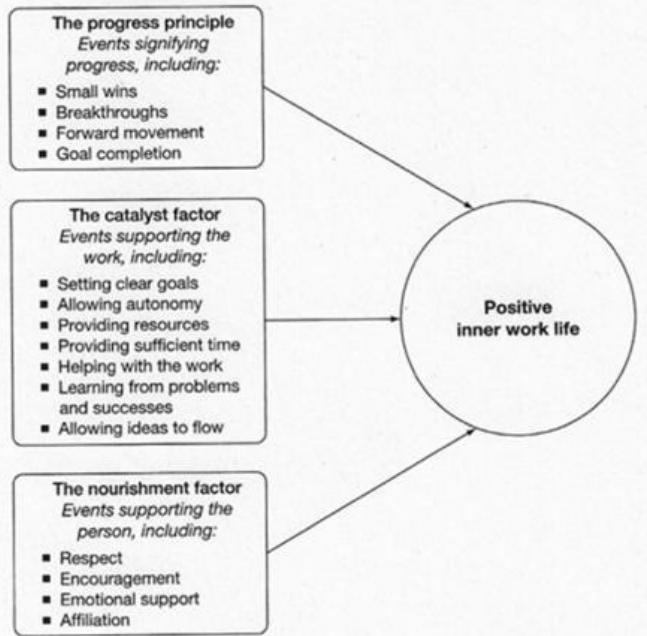


Figure 6. The Key Three Influences on Inner Work Life

Note. From *The Progress Principle: Using Small wins to Ignite Joy, Engagement, and Creativity at Work* (p. 85), by T. Amabile & S. Kramer, 2011, Boston: Harvard Business Review Press. Copyright 2011 by Harvard Business Review Press.

Table 2

Common Motivational Factors across Motivation Theories

	Common Motivational Factors across Motivation Theories		
Motivational Theory	Autonomy	Meaningful Work: Valued by Performer	Valuable Work: Valued by Organization
Hackman and Oldham's Job Characteristics Model	Autonomy leads to responsibility for outcomes of the work	Meaningfulness of the work	Knowledge of actual results of work activities
Deci and Ryan's Self-Determination Theory	Need for autonomy	Intrinsic regulation	Introjected or identified regulation
Pink's Drive Model	Autonomy	Mastery Purpose	Mastery
Amabile and Kramer's The Progress Principle	Autonomy (under catalyst factor)	Progress principle (rooted in meaningful work)	Nourishment factor

Autonomy is about self-directed behavior; it refers to the amount of choice a performer has in how, and perhaps even when, his or her work is to be done. Meaningful work is work that is valuable or meaningful to the performer, whether that work is perceived by the individual to

contribute to society at large or fulfills an individual need. Valuable work is work that is valuable to the company and acknowledged as such by being overtly expressed to the employee.

There is additional support for these motivational factors beyond the four studies and resulting theories above. For example, Morrison, Burke, and Greene (2007) suggested that meaning in work is a key motivator and can be influenced by organizational culture.

Dewhurst, Guthridge, and Mohr (2009) reported that amidst falling morale among half of all companies surveyed by McKinsey, another survey showed that non-financial incentives were more effective motivators than their financial counterparts. Those incentives were praise and commendation by the immediate manager (valuable work), attention from leaders (valuable work), and opportunities to lead projects or task forces (autonomy, meaningful work).

Nohria, Groysberg, and Lee (2008) focused on four drives that motivate employees: the drives to acquire, bond, comprehend, and defend. The drive to acquire includes social status and getting promoted (valuable work), the drive to bond includes a sense of belonging to the organization (meaningful work), the drive to comprehend includes making meaningful contributions (meaningful work), and the drive to defend includes allowing people to express their ideas and opinions (autonomy). Each of these drives relate to organizational levers which can influence them including the reward system, culture, job design, and performance management and resource allocation processes.

From Motivational Factors to Organizational Cultural Factors

The three common motivational factors that emerged from the research—autonomy, meaningful work, and valuable work—can now be linked to the cultural components that affect performance from the previous research presented on organizational culture and performance (see *Organizational Culture and Performance*). The main components of some key organizational

culture theories regarding the influence of culture on performance can be logically linked to the common motivational factors derived from the research on intrinsic motivation (see Table 3). For example, adaptability and involvement relate to self-management and the ability to respond to external factors (Denison, 1997; Kotter & Heskett, 1992) which indicates some level of autonomy. And people-centered management and leadership relate to all three motivational factors because employees are often afforded the opportunity to self-manage and have autonomy (Deal & Kennedy, 1999; Pfeffer, 1998; O'Reilly & Pfeffer, 2000). The synthesis of the research on intrinsic motivation and organizational culture supports the rationalization that the resulting specific cultural factors are likely to influence internal motives, and hence intrinsic motivation.

Table 3
Linking Motivational Factors to Organizational Culture Research

Key Organizational Culture Researchers	Common Motivational Factors across Theories		
	<i>Autonomy</i>	<i>Meaningful Work: Valued by Performer</i>	<i>Valuable Work: Valued by Organization</i>
<i>Denison</i>	Adaptability Involvement	Mission	Mission
<i>Collins, Porras, & Hansen</i>	Stimulate progress	Factors that support self-motivation including leadership and discipline	Preserve core values
<i>Kotter & Heskett</i>	Adaptive	Strong cultures	Fit with business strategies
<i>Deal & Kennedy</i>	Strong cultures People-centered management	Strong cultures People-centered management	Strong cultures People-centered management
<i>Pfeffer & O'Reilly</i>	People-centered management Leadership	Alignment People-centered management Leadership	Alignment People-centered management Leadership

Organizational Cultural Factors for Systematic Review and Meta-Analysis

In order to determine if these organizational cultural factors were suitable for use in a systematic review and subsequent meta-analysis, a cursory review of the literature on these topics was conducted.

Autonomy. Autonomy had the most research associated with the other variables, which is expected because it was the only variable directly expressed in all four intrinsic motivation theories previously outlined. “Autonomy is something that people seek and that improves their lives. A sense of autonomy has a powerful effect on individual performance and attitude” (Pink, 2009, p. 88).

Dysvik and Kuvaas (2011) explored the relationship between autonomy, intrinsic motivation, and two work performance measures: work effort and work quality. Their study found that in individuals with high intrinsic motivation, intrinsic motivation moderated the relationship between autonomy and work quality, but not work effort.

Several studies researched job dimensions from the job characteristics model, where autonomy was just one of the variables of interest (e.g., Tyagi, 1985; Dubinsky & Skinner, 1984). Whereas other studies researched autonomy from the lens of self-determination theory (Moran, Diefendorff, Kim, & Liu, 2012; Kong & Ho, 2016). All of these studies investigated the relationship between autonomy, intrinsic motivation, and performance.

Meaningful work. Meaningful work studies were not as plentiful, but there seemed to be enough research in the topic to warrant further review. Michaelson, Pratt, Grant, and Dunn (2014) examined and compared meaningful work research from the fields of organizational studies and business ethics. Steger, Dik, and Duffy (2012) developed the Work and Meaning Inventory, a survey-based instrument to measure meaningful work. And empirical studies spanned from older

research, such as Campbell (1980) who examined meaningful work through the lens of the job characteristics model, to newer applications of the concept like Xiong and King (2015) who expanded the concept of meaningful work to examine brand meaningfulness. All of these studies demonstrated an interest in meaningful work across disciplines.

Valuable work. The cursory review of this factor found the terminology used for valuable work was too variable in the literature as the conceptualization was not as concrete as autonomy or meaningful work. The studies uncovered were few and did not measure the same construct. Hence, valuable work was not considered a good candidate for further review. Therefore, only the organizational cultural factors of autonomy and meaningful work were researched further for purposes of this study.

Summary

The research analyzed in the literature review suggested that organizational culture, intrinsic motivation, and employee performance are related, but the question that remained was how they are linked. The results of this literature review demonstrated a gap in the literature on this topic and justified the need for this research. The reviewed literature also revealed meta-analysis would be useful in conducting this research since the studies varied across industries and countries. In order to compile and compare existing data in an attempt to show meaningful results, a systematic review and meta-analysis were justified.

In order to determine the best organizational cultural factors to use in the systematic review and meta-analysis, intrinsic motivation theories were compared to derive common motivational factors. These factors were then linked to organizational culture research in order to derive organizational cultural factors. The factors derived from this process that were ultimately used in the systematic review and meta-analysis were autonomy and meaningful work.

CHAPTER 3: METHODOLOGY

A combination of systematic review and meta-analysis was performed to answer the research question and test the hypotheses for each predictor variable. “When used in tandem, these methods embody a scientific approach to the identification, analysis, and synthesis of quantitative evidence from previous studies” (Littell, Corcoran, & Pillai, 2008, p. 1).

First, a systematic review was performed to obtain studies for the meta-analysis. Second, a meta-analysis was conducted to estimate the true score correlations between the variables. Third, a path analysis and mediation test were performed to estimate the relationship of the variables in order to answer the research question and to test the hypotheses. This process was performed three times, once for each set of variables.

The overall variables of interest for this study were organizational culture, intrinsic motivation, and employee performance, all measured at the individual level. As discussed previously (see *Theoretical Framework*), measures of organizational culture are actually measures of psychological climate perceptions (Baltes, 2001). Psychological climate perceptions are usually measured as independent factors (although some measures are reported on the climate as a whole). In order to proceed with the study, organizational cultural factors were derived from intrinsic motivation theory and organizational culture research as presented at the end of the literature review. Those factors were autonomy and meaningful work. Due to the small number of resulting studies for the meta-analyses, the overall organizational culture/climate variable was added as a third variable for comparative purposes. The addition of this variable resulted in three separate studies—each using the process of systematic review and meta-analysis—focusing on each of the predictor variables: autonomy, meaningful work, and organizational culture/climate.

Systematic Review

Systematic reviews are a distinct but complementary process to meta-analysis. They are different from traditional literature reviews because they follow a protocol that is carefully thought out and specified in advance to help eliminate bias in the review process (Littell et al., 2008). A thorough systematic review results in a transparent and replicable process, including thorough documentation of any decisions that are made during the review that were not part of the original protocol (Littell et al., 2008).

Three systematic reviews of the literature—one for each predictor variable—were conducted to obtain studies that contained measures of the relationship between the organizational culture predictor variables—autonomy, meaningful work, and organizational culture—and the outcome variables—intrinsic motivation and performance. The procedures for the systematic review, including protocol formulation and data collection, were primarily based on the procedures set forth by Littell et al. (2008), Lipsey and Wilson (2001), and Kepes, McDaniel, Brannick, and Banks (2013). Specific details of the review are included in *Systematic Review Procedures and Data Collection*. The review consolidated the research findings to date and identified studies eligible for the meta-analysis.

Meta-Analysis

Whereas a systematic review is the process by which studies are obtained and data are collected, a meta-analysis is the process by which that data are analyzed. “*Meta-analysis* is a quantitative method used to combine quantitative outcomes (effect sizes) of primary research studies. Meta-analysis is the statistical or data analytic part of a *systematic review*” (Kepes et al., 2013, p. 124). A meta-analysis is the appropriate research to conduct when there are multiple studies looking at the same variables. “Meta-analysis is a technique for looking at the general

trends in differences between many different groups across many different studies” (Salkind, 1994, p. 191).

Probability theory tells us that if we collect data from multiple samples, the point estimates from those samples will be distributed around the population parameter. Meta-analysis uses this logic, relying on multiple estimates from different studies to obtain a better picture of the distribution of effects and more precise parameter estimates. However, all estimates are approximate and should be presented with confidence intervals (CIs) that express the level or certainty that accompanies the estimate. (Littell et al., 2008, p. 81)

There are two types of meta-analysis: one used primarily in medicine and the social sciences—Hedges and Olkin—and the other in the organizational sciences—Hunter and Schmidt—but the approaches are sometimes integrated. The organizational sciences approach is known as psychometric meta-analysis (Kepes et al., 2013). The Hedges and Olkin’s approach corrects for sampling error; the Hunter and Schmidt approach corrects for sampling error, measurement error, and other types of artifacts that affect the variance (Schmidt & Hunter, 2015).

The purpose [of meta-analysis] is to estimate as accurately as possible the construct-level relationships in the population...because these are the relationships of scientific interest (Schmidt et al., 2013)...This is a task of estimating what the findings would have been if all studies had been conducted perfectly. Doing this requires correction for sampling error, measurement error, and other artifacts (when present) that distort study results. (Schmidt & Hunter, 2015, p. 555)

Meta-analysis is not as common as other types of research, but it is viable research option. The field of performance improvement also calls for more meta-analyses to be performed. “The

consensus from a 1999 symposium on appropriate inquiry in HPT (Sugrue & Stolovitch, 2000) was as follows: We should focus on integrative, meta-analytic studies of existing basic and applied research in disciplines that inform our practice” (Sugrue, 2004, p. 8).

Furthermore, the challenge of studying multiple interrelated variables has also been noted in performance improvement, which is what the meta-analysis will help to achieve.

While it is relatively easy to find research that links single variables such as motivation or organizational culture to individual or organizational performance, it is more difficult to validate sets of variables and prioritizations of variables within sets that have become the foundation of our practice. (Sugrue, 2004, p. 10)

Three meta-analyses—one for each predictor variable—were conducted to analyze the correlations (effect sizes) between the organizational culture predictor variables—autonomy, meaningful work, and organizational culture—and the outcome variables—intrinsic motivation and performance—using the psychometric method and correcting for reliability. The data were analyzed to determine the relationship between the variables for each study. The procedures for the meta-analysis, including coding and statistical analysis, were primarily based on the procedures set forth by Schmidt and Hunter (2015), Lipsey and Wilson (2001), and Kepes et al. (2013), as they are recognized authorities on meta-analysis, in particular the psychometric tradition. Specific details of the meta-analysis are included in *Meta-Analysis Procedures and Coding*.

Variables

The variables in this study were autonomy (variable A1) and meaningful work (variable A2) as organizational cultural factors, intrinsic motivation (variable B), and performance (variable C). Organizational culture/climate (variable A3) was also reviewed for comparative purposes. All

variables were measured at the individual level. It was hypothesized that intrinsic motivation is a mediating variable between organizational cultural factors and performance as shown in Figure 1 (see *Purpose and Hypotheses* for Figure 1).

Operational Definitions of Variables

The following operational definitions informed the direction of the study search criteria. While terminology varied, the constructs in the obtained studies had to align with these definitions to be included in the meta-analysis. A summary of the variables and their usage is provided in Table 4.

Autonomy. Autonomy refers to the amount of control or choice an employee has in the workplace over how he or she performs the work.

Intrinsic motivation. Intrinsic motivation refers to the employee's internal desire to perform in a work environment rather than the desire to perform for some external reward.

Meaningful work. Meaningful work refers to work that has some intrinsic value to the employee, whether it is the work itself or its perceived contribution to a larger societal goal.

Organizational culture. Organizational culture is the shared values, behavior, philosophies, norms, and assumptions among employees within an organization.

Performance. Performance refers to the employee's efforts that add value to the organization by contributing to the achievement of organizational goals.

Systematic Review Procedures and Data Collection

As previously mentioned, the procedures for the systematic review were primarily based on the procedures set forth by Littell et al. (2008), Lipsey and Wilson (2001), and Kepes et al. (2013), unless otherwise noted. The studies for the meta-analysis needed to contain the combination of all the research variables—A1BC, A2BC, or A3BC—so the reviews were

conducted to search for studies containing all three variables. Studies were located via several sources: databases, references in usable studies, studies citing usable studies, references in related theoretical work, references in related meta-analyses, and personal communication with researchers.

Table 4
Variables for Systematic Review and Meta-Analysis

Study Used	Variable ID	Variable Name	Conceptualization
1	A1	Autonomy	The amount of control or choice an employee has in the workplace over how he or she performs the work
2	A2	Meaningful work	Work that has some intrinsic value to the employee, whether it is the work itself or its perceived contribution to a larger societal goal
3	A3	Organizational culture/climate	The shared values, behavior, philosophies, norms, and assumptions among people within an organization
All	B	Intrinsic motivation	The employee's internal desire to perform in a work environment, rather than the desire to perform for some external reward
All	C	Performance	The employee's efforts to add value and contribute to the achievement of organizational goals

Study sources. The databases chosen for the systematic review were ProQuest Multisearch, ProQuest Dissertations and Theses, Web of Science, PsycInfo, and Business Source Complete as these are the databases most relevant to the fields of business, education, and psychology, where most of the relevant literature would likely be found. Both published and unpublished empirical studies were sought. Only peer-reviewed published studies were searched; unpublished studies searched included dissertations, theses, conference papers and proceedings, and empirical studies provided by researchers.

Search strategy. Several trial searches were conducted to determine if there were enough studies with the desired variables to proceed, if those studies were in the business field, and what search strategies would yield the best results. A research librarian was then consulted to assist in

developing Boolean search strings that would return the highest yield of results while searching for studies with all of the desired variables using the most common terminology and alternative terms. During the trial searches, several studies were uncovered in the fields of medicine, education, and sports. These settings were not of interest to this study. However, if the studies were about employees in those fields, the studies were of interest and were subsequently reviewed. For example, if the subject of the study was student performance, it was not of interest. However, if the study was about teacher performance, it could be of interest to this study. Therefore, so as not to miss those studies, it was determined that broader search terms would need to be used and the searches would not be restricted by setting or subject. The final decision to include or exclude a particular study would take place in the subsequent review steps.

Search terms. The search terms were specific to the meaning of the operational definitions and consisted of simple terminology choices for each of the three variables (see Table 5). Autonomy (variable A1) is a robust term well known in the literature; it was the only term searched for variable A1. Meaningful work (variable A2) was originally searched along with the term meaningfulness; the definition was later expanded to include task significance. Search terms for organizational culture (variable A3) included corporate culture, organizational culture, organizational climate, psychological climate, and climate perceptions. The exact terminology used for cultural factor searches was refined throughout the review as there is often confusion about the terminology in the literature, as noted by Parker et al. (2003). However, the conceptual definition of any study's variables ultimately needed to match with the operational definitions set forth in this section. Search terms for intrinsic motivation (variable B) included intrinsic motivation, internal motivation, internal motives, and work motivation. Terms for performance

(variable C) included performance, individual performance, work performance, job performance, and productivity.

Table 5
Search Terms

Variable ID	Variable Name	Search Terms
A1	autonomy	autonomy
A2	meaningful work	Original: meaningful work, meaningfulness Expanded: task significance
A3	organizational culture	Original: culture measure, culture measurement, culture survey, culture questionnaire, culture inventory, climate measure, climate measurement, climate survey, climate questionnaire, climate inventory Revised: corporate culture, organizational culture, organizational climate Expanded: psychological climate, climate perceptions
B	intrinsic motivation	intrinsic motivation, internal motivation, internal motives, work motivation
C	performance	performance, individual performance, work performance, job performance, productivity

Search strings. The search terms were then combined to create the Boolean search strings shown in Table 6.

Study inclusion and exclusion criteria. Since this study was focused on adult employees, populations involving, seniors, children, volunteers, and special needs individuals were excluded. Studies included involved research conducted of adult employees in businesses from around the world, whether the business was for-profit, not-for-profit, or governmental; there were no other restrictions on study participants or the research setting. Exclusion criteria by the subject of the study were any studies that did not fit within the scope of the study variables, such as studies about creativity, pay for performance systems, and the like.

Designs included were survey, mixed methods, or other research designs that resulted in outcomes reported as correlations. Studies whose outcomes were solely reported as the result of multivariate analysis were excluded because those outcomes cannot be converted into correlations;

however, if those studies also contained correlations, the correlations were included if they fit the other eligibility criteria. Ethnographic studies, qualitative reviews, and general theories cannot be included in a meta-analysis as they have no statistical measures that can be used so they were excluded; previous meta-analyses were not appropriate for inclusion if correlations of individual studies were not reported.

Sample size in the original study was not a criterion; the meta-analytic corrections accounted for small-sample bias. Only English-language studies were included, but there were no geographical or other cultural restrictions. (Study language is not typically an exclusion criterion, but due to the difficulty of getting translations for empirical studies, it was an exclusion criterion for this study.) Since no previous meta-analyses were found on this exact topic, dates were not appropriate exclusion criteria. Study validity is often an exclusion criterion, but research by Kepes, Banks, McDaniel, and Whetzel (2012) determined that this exclusion criterion can lead to publication bias. Instead, they suggested to look at study quality as a possible moderator. Therefore, study quality was not an exclusion criterion. For those studies used in the final meta-analysis, the publication source and number of citations of the article were assessed as an indicator of study quality.

The main inclusion criteria were that the study had to contain measures of all three variables—A) autonomy, meaningful work, or organizational culture/climate; B) intrinsic motivation, and C) performance—contain correlations or intercorrelations between all the desired variables (or provide sufficient statistical data to calculate the correlations), and have measurements of those variables at the individual level. See Table 7 for a summary of the search inclusion and exclusion criteria.

Table 6
Search Strings

Variable ID	Variable Name	Search Strings
A1	autonomy	autonomy AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity)
A2	meaningful work	Search 1: ("meaningful work" OR meaningfulness) AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity) Search 2: "task significance" AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity)
A3	organizational culture	Search 1: ("culture measure" OR "culture measurement" OR "culture survey" OR "culture inventory" OR "culture questionnaire" OR "climate measure" OR "climate measurement" OR "climate survey" OR "climate inventory" OR "climate questionnaire") AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity) Search 2: ("corporate culture" OR "organizational culture" OR "organizational climate") AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity) Search 3: ("psychological climate" OR "climate perceptions") AND ("intrinsic motivation" OR "internal motivation" OR "internal motives" OR "work motivation") AND (performance OR "individual performance" OR "work performance" OR "job performance" OR productivity)

Winnowing process for primary searches. After all of the studies were compiled, duplicates were removed first. Then a title review was conducted. This review consisted of

analyzing the search results by title to determine if studies could be excluded based on title alone. For example, a study about autonomy and performance in collegiate athletes could easily be excluded at this level. If exclusion criteria were questionable, the study was left for the next round of review.

Table 7
Study Inclusion and Exclusion Criteria

Criterion	Factors for Inclusion	Factors for Exclusion
Population	Adult employees	<ul style="list-style-type: none"> • Children • Seniors • Special needs • Volunteers
Setting/environment	Workplace <ul style="list-style-type: none"> • For profit • Non-profit • Governmental 	<ul style="list-style-type: none"> • School/academics • Sports • Volunteering • Medicine • Experimental/lab
Subject area	Research in: <ul style="list-style-type: none"> • Autonomy • Meaningful work • Organizational culture/climate • Intrinsic motivation 	Research in <ul style="list-style-type: none"> • Empowerment • Creativity • External rewards • Other areas outside the scope of this study
Study design	<ul style="list-style-type: none"> • Survey • Mixed methods • Others with reported correlations 	<ul style="list-style-type: none"> • Outcomes reported with only multivariate analysis • Ethnographic studies • Qualitative studies • General theories (not empirical research)
Study language	English only	Studies not published in English
Variables/measures	All three desired variables (ABC) contained in the study	Studies that did not contain all three variables
Measurement Level	Individual level	<ul style="list-style-type: none"> • Team or group level • Organization level
Measurements	Correlations or intercorrelations between all desired variables reported	<ul style="list-style-type: none"> • No correlations reported • Missing correlations could not be obtained from researchers • Statistical data reported could not be converted to correlations

Next, the abstracts of the remaining studies were analyzed to determine if any studies could be excluded in this phase. If there was any doubt, the study remained for the next round of review.

The third round of review involved obtaining the entire study (article, book, conference proceeding, etc.) and reviewing each study on a cursory level to determine if it was a fit for the meta-analysis. The reviewer looked at variables, measures, correlations, and methodologies to determine if the desired variables appeared to be in the study. A deeper dive into the studies that passed this review was performed in the next review phase.

The final round of review was done just prior to the coding phase. For each study, variables, measures, correlation matrices, methodology, and other factors if necessary were analyzed to ensure the study met inclusion criteria. Variables and measures were also analyzed at the construct level as sometimes the same construct had different terminology and sometimes the same terminology represented different constructs. For studies that were missing reliabilities, they were included in the coding phase as the reliabilities could be imputed. For studies that were missing correlations between any of the desired variables, the researchers for those studies were contacted to see if the missing correlations could be obtained. (See *Appendix A* for a sample email.) If the correlations could not be obtained, the study was excluded.

A month prior to finalizing this study, the searches were run again to uncover any studies that had been published since the initial search session and the winnowing process was repeated. Also, since there was only one evaluator of the studies, all of the studies were re-reviewed to ensure the inclusion and exclusion criteria were properly applied.

Secondary searches. After it was determined which studies were to be included in the meta-analysis, a secondary search was performed by reviewing the reference sections of those studies in an attempt to obtain additional studies for the meta-analysis. Secondary searches were

also performed on studies that passed the third round of review (cursory review at study level). Since these studies were being reviewed at the title level and were part of the secondary search, they were not recorded on the search log if they were excluded. After checking for duplication, any study that appeared to be a match for the meta-analysis was obtained and reviewed; most of these were reviewed at the study level as there was usually not an abstract level due to the nature of the search strategy. For any secondary studies that were ultimately included, their reference sections were reviewed as well since the systematic review process is cyclical. For meaningful work, because there were so few empirical studies, references were also reviewed from the theoretical articles, but this ultimately did not produce any fruitful results.

A few secondary search items were discovered by other means. In one instance there was a replication of a study that Google Scholar suggested when retrieving the original study; the replication was included in the search results. In another instance, a dissertation that was part of the initial search could not be obtained, so an article published about the dissertation research was reviewed instead.

In an attempt to obtain additional studies for the meta-analysis, an additional secondary search strategy was performed only on studies included in the final meta-analysis. Using Google Scholar, the cited by feature was used to review all studies citing the study in the meta-analysis. For dissertations, the cited by feature was used in the ProQuest Dissertations and Theses database. The citations were reviewed first at the title level, then abstract level, and finally the study level. There was one exception to this search strategy. Studies citing Hackman and Lawler (1971) were not reviewed fully. This study was cited 3031 times. A title review of a sample of these citations was performed and it was determined they were not focused on the desired variables, so reviewing the remaining citations would most likely not be fruitful and any relevant studies would most likely

be discovered via another search strategy. Considering Hackman and Lawler was a seminal study on job characteristics from over 40 years ago, these findings are not surprising. Only those studies retrieved for purposes of review are included on the search log.

Tertiary search strategy. As a tertiary search strategy, prominent researchers for the respective variables were contacted to see if they knew of any published or unpublished studies with those variables. (See *Appendix B* for a sample email.) For autonomy, two prominent researchers that together accounted for eight of the studies reviewed in the systematic review—the most of any other authors (most authors had one study)—were contacted. For meaningful work, since almost all of the studies were excluded, five prominent theoretical researchers were contacted. Two additional researchers were contacted on the referral of one of the first contacts. If any references given were not duplicates, the studies were obtained and reviewed at the study level. If any references given were duplicates and that study had previously been rejected, the study was re-analyzed to confirm the original exclusion decision was valid. No researchers were contacted for organizational culture, as the search for studies produced no usable results other than safety and service climate.

Retrieving studies. Studies were retrieved mainly through the search databases, interlibrary loan, Google scholar, Google, and personal communication. While most studies were relatively easy to obtain, there were a few studies that could not be retrieved. For studies that were not obtainable through normal channels, the following retrieval methods were utilized: extensive Google search, contacting the author(s), and contacting the publisher. In cases where those methods did not result in retrieval of the study, a search was done for similar studies written by the same author, reviews of the study, or a more detailed abstract of the study. Relevant studies that could not be obtained by other methods were purchased, provided that option was available.

Systematic Review: Individual Search Decisions

A systematic review was conducted for each set of variables. The procedures for data collection were followed for each review. However, there were specific decisions unique to each review that require further explanation.

Autonomy: Study 1. This systematic review was the most straight forward. There were no exceptions or additional decisions that needed to be made.

Meaningful work: Study 2. This systematic review did not produce many results. As such, the definition of meaningful work was expanded to include task significance in an effort to obtain additional studies. Task significance is one precursor of meaningful work in the Job Characteristics Model, however the definition is similar to the operational definition of meaningful work in this study, which speaks to the similarity of the constructs. (“Task significance: The degree to which the job has a substantial impact on the lives of other people, whether those people are in the immediate organization or in the world at large” (Hackman & Oldham, 1980, p. 79).) Therefore, task significance was added as a predictor variable and the meta-analytic results were evaluated by sensitivity analysis. If both measures were present, meaningful work was used.

Organizational culture: Study 3. Because the previous reviews produced a low number of studies, the decision was made to look for studies with organizational culture as a whole to allow for comparison across the three reviews. First, a systematic review was performed specifically looking for studies that contained a measure, measurement, inventory, survey, or questionnaire of organizational culture or climate in addition to intrinsic motivation and performance. When this search produced a low number of results, a broader search was performed with more general terms. A third search was run to include additional terms that were revealed in the reviewed studies. (For a full list of search strings, see Table 6.)

An older search from three years prior had been run combining the following search terms: organizational culture, corporate culture, or work culture; intrinsic motivation, internal motivation, or motivation; and performance, work performance, or productivity. This older search utilized the following databases: ProQuest Multisearch, ERIC, Web of Science, and PsycInfo. While this search was not a systematic review, the studies that had been retrieved from this search were reviewed and recorded as secondary searches.

The only usable searches for the meta-analysis from the systematic review were studies that measured safety climate or service climate. Safety climate and service climate are specific types of organizational climates. Since they were not the focus of this study, no new searches were performed with those terms and studies citing those studies were not reviewed.

Meta-Analysis Procedures and Coding

As previously mentioned, the procedures for the meta-analysis were primarily based on the procedures set forth by Schmidt and Hunter (2015), Lipsey and Wilson (2001), and Kepes et al. (2013), unless otherwise noted. Studies were compiled based on the study selection criteria. Once those studies were identified, the relevant studies were coded to include elements for analysis and then statistical analyses were performed on those data, including outlier analysis, meta-analysis computations, sensitivity analyses, and publication bias assessment.

Coding. The following items were coded: internal article ID, title, author, year, publication source, synopsis of study and findings related to the meta-analysis, all study variables, cited by, type of company (private, government, etc.), industry, number of companies included in study, types of employees/participant selection, data collection method, source of surveys, predictor variable (A) terminology, outcome variable (B) terminology, outcome variable (C) terminology,

sample size, correlation of AB, correlation of BC, correlation of AC, reliability of A, reliability of B, reliability of C, and note.

As previously mentioned, studies with missing correlations were not included in the coding process. No studies with missing correlations had significant statistical data to calculate the correlations and no researchers responded to the request for missing data. The coding did produce empty cells for reliabilities, however. These reliabilities were imputed and sensitivity analyses were run to determine the effect with and without those studies.

If the number of cases with missing values is small relative to the total number of cases, then any reasonable method should suffice. We recommend that, whatever the method of imputation, a sensitivity analysis be performed to assess the extent to which the results of the analysis depend upon the way missing data are handled.

(Lipsey & Wilson, 2001, pp. 127-128)

Outlier analysis. Prior to conducting the meta-analysis, outlier analysis was performed to determine if there were any outliers present that might skew the meta-analytic results. The Metafor package in R (Viechtbauer, 2015) was used to conduct the analysis. Outlier analysis was run for Study 1 (autonomy) and Study 2 (meaningful work) only, as study three only contained three data sets. The studies with outliers were not removed from the analysis, but rather evaluated with sensitivity analysis. “When sample sizes are small to moderate...extreme values can occur....Such values are not true outliers and should not be eliminated from the data, because the formula for sampling error variance assumes and allows for occasional large sample errors” (Schmidt & Hunter, 2015, p. 236).

Meta-analysis software evaluation. Several spreadsheets and software packages were evaluated for use in performing the meta-analysis calculations. The final spreadsheets used were

Meta-Analysis Mark XIV by Steel and Sauder (2007) and Berry Individual Corrections Meta-Analysis Spreadsheets – Simple Artifacts by Berry (2010). The Berry spreadsheet had easier-to-read output while the Steel spreadsheet contained additional variables and graphing capabilities. An analysis was performed between the spreadsheets to ensure the output was comparable. A summary of the analysis is provided in Table 8 (data from Autonomy AB calculations).

Meta-analysis computations. For the meta-analysis computations, several calculations were performed. A list of the calculations reported along with an explanation and their formulas is presented in Table 9.

The key calculations are rho (mean corrected r), variance of rho, credibility interval, and confidence interval. The mean rho is an estimate of the true population correlation; this correlation is one of the main reasons for conducting a meta-analysis. If the data are homogenous, rho is an estimate of one population and validity can be generalized. If the data are heterogeneous (where moderators are present), rho is an estimate of the average of several subpopulations (Whitener, 1990). In order to predict if moderators are likely present, the credibility interval is used. Then the appropriate confidence intervals are calculated to estimate the amount of remaining sampling error in mean rho. Cohen's rule of thumb was applied to each pair of correlations and their variances to assess their strengths (Cohen, 1992).

Moderators can also be detected by looking at the percentage of variance in rho attributable to all artifacts. "If 75% or more of the variance is due to artifacts, we conclude that all of it is, on the grounds that the remaining 25% is likely to be due to artifacts for which no correction has been made" (Schmidt & Hunter, 2015, p. 375). So if less than 75% of the variance is due to artifacts, then there are likely moderators present. Aside from using the detection tools to predict if moderators are likely present, no further moderator analysis was part of this study.

Table 8
Comparison of Berry and Steel & Sauder Psychometric Meta-Analysis Spreadsheets

Calculations	Berry	Steel & Sauder	Corrections	Notes
Number of correlations (k)	17	17		
Total sample size (N)	3967	3967		
Mean uncorrected correlation	0.335455508	0.335455508		
Standard deviation of uncorrected correlation (SDr)	0.132145543	0.132145543		
Mean true score correlation (mean rho)	0.408855104	0.408855104		
Variance of corrected correlations (variance of rho)	0.018806204	0.023804197	0.018810928	The Steel spreadsheet does not report the sampling error correction on this line. However, sampling error is taken into account when calculating the credibility interval. If you subtract sampling error, you will get same results as Berry.
Standard deviation of true score correlations (SD of rho)	0.137135713	0.154286087	0.137152938	The standard deviation is the square root of variance, so since the reported variance is different, the SD will be as well. However, if you calculate for sampling error you will get same number.
80% Credibility Interval				
Lower 20% (20th percentile) of true score correlation	0.233321391	0.233086542		Berry's spreadsheet actually is reporting the 80% interval (there is a typo on the original sheet).
Upper 20% (80th percentile) of true score correlation	0.584388816	0.584623666		
Observed variance of the corrected correlations (adjusted for reliability)	0.023804197	0.023804197		
Variance in corrected correlations attributable to all artifacts (reliability and sampling error)	0.004997993	0.004993268		
Percent variance in corrected correlations attributable to all artifacts	20.9962679	0.209764204		In Steel, this number, which is the combination of variances due to sampling and reliability errors, must be calculated by hand. The number shown here is the sum of those percentages.
95% confidence interval - lower	0.375248128	0.331197486	0.3738632	Steel reports numbers for homogenous and heterogeneous populations. Berry calculates for the homogenous population only.
95% confidence interval - upper	0.442462079	0.483765556	0.441099842	

Table 9
Meta-Analysis Calculations

Calculations	Definition	Formula	Spreadsheet Used
N	Total sample size across all studies	Sum of the sample sizes from all studies	Berry
k	Number of studies in the sample	Count of unique number of studies reporting correlations	Berry
Mean uncorrected r	Mean uncorrected correlation	Sum (r*N for all studies) / Sum of N for all studies	Berry
SDr	Standard deviation of uncorrected correlation	Square root of (((sum of r- mean uncorrected r) ² *N)) / (sum of N))	Berry
Rho (mean corrected r)	Mean true score correlation corrected for reliability (measurement error) and sampling error	Sum of (corrected r)*(corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) / Sum of (corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) (See note ¹)	Berry
Variance of rho	Variance of corrected correlations	Observed variance of corrected correlations minus variance in corrected correlations attributable to all artifacts	Berry
SDrho	Standard deviation of true score correlations	Square root of variance of rho	Berry
80% Credibility interval - lower	Estimate of heterogeneity of the sample and predictor of presence of moderators	Mean rho minus (SDrho*1.28)	Berry
80% Credibility interval - upper		Mean rho plus (SDrho*1.28)	Berry
Var(rc)	Observed variance of the corrected correlations (adjusted for reliability)	Sum of (corrected r – mean rho) ² *(corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) / Sum of (corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) (See note ¹)	Berry
Ave(ve)	Variance in corrected correlations attributable to all artifacts (reliability and sampling error)	Sum of (variances of corrected r)*(corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) / Sum of (corrected N*(sq rt of reliability of x*sq rt of reliability of y) ²) (See note ¹)	Berry
Percent variance in rho attributable to sampling error	Amount of variance attributable to sampling error	Sampling error variance of r (uncorrected for reliability) / variance of weighted r (uncorrected for reliability)	Steel & Sauder
Percent variance in rho attributable to reliability	Amount of variance attributable to measurement error (corrected for reliability only)	Percent variance attributable to all less percent variance attributable to sampling error	Steel & Sauder
Percent variance in rho attributable to all artifacts	Amount of variance attributable to sampling error and reliability measurement error	Ave(ve)/Var(rc)	Steel & Sauder
95% Confidence interval - lower	Estimate of amount of remaining sampling error in mean rho	Mean rho minus 1.96*(sq rt of Ave(ve) / sq rt of k) (See note ²)	Steel & Sauder
95% Confidence interval - upper		Mean rho plus 1.96*(sq rt of Ave(ve) / sq rt of k) (See note ²)	Steel & Sauder

Note¹: The formula for corrected r is $r / ((\text{sq rt of reliability of } x) * (\text{sq rt of reliability of } y))$ where r is the individual correlation for xy. The formula for corrected N is $[(1 - (\text{mean uncorrected } r)^2) / (\text{sampling error variances})] + 1$. The formula for sampling error variances is $(1 - (\text{mean uncorrected } r)^2) / (N - 1)$.

Note²: The formula for homogenous populations is shown. The formula for heterogeneous populations uses the residual variance where the sampling error variance has been removed (Whitener, 1990).

Sensitivity analyses. Sensitivity analyses are used to test the robustness of the conclusions drawn from the meta-analytic calculations. Sensitivity analyses were performed by removing various studies, rerunning the meta-analysis calculations, and comparing results to look for any significant changes.

For Study 1 (autonomy), sensitivity analysis was performed for a number of instances. First, terminology was considered to see whether the term “work motivation” measured the same construct as “intrinsic motivation.” The coded studies that included the term “work motivation” were predicted to be measuring the same construct because the definitions of the term in the original studies was comparable with the operational definition of the intrinsic motivation variable. Second, studies with imputed data were considered to see if they had any significant impact on the calculations. Third, a study with an experimental design was removed. And fourth, in another consideration of terminology, a study that measured innovative performance was removed.

For Study 2 (meaningful work), terminology was again considered, testing for changes in results for studies measuring “meaningful work” versus “task significance.” This analysis also covered the outliers found. Second, a study looking at brand meaningfulness was removed. Third, studies with imputed data were removed. And fourth, a study with an experimental design was removed.

For Study 3, a study on service climate was removed to see if the studies on safety climate produced differing results.

Publication bias assessment. According to Kepes et al. (2012), publication bias is most likely a factor in all meta-analyses. Publication bias is prevalent for a number of reasons: underreporting of studies with unfavorable or unexpected results, unpublished studies, unavailable literature, and the like. While there is no way to correct for publication bias, studies with robust

protocols can help minimize it. Furthermore, analysis can be done to estimate the amount of publication bias in the meta-analysis and to see how it might impact rho. One method of assessment is the funnel plot. The funnel plot provides a visual interpretation of the data points based on the corrected correlations on the x-axis and a measure of sample size on the y-axis (Sterne, Becker, & Egger, 2005). When the data points are asymmetrical, one assumption is that publication bias is present. For studies with more than one variable, funnel plots are created for the data points for each correlation pair. As a rule of thumb, if there are less than five data points, a funnel plot will be ineffective (Sterne et al., 2005). For Studies 1 and 2, funnel plots were created using Steel & Sauder's spreadsheet for corrected r measured against sample size. There was an error with the corrected r funnel plot macro in the spreadsheet so the numbers were adjusted by hand in order to graph the correct plots. No funnel plots were created for Study 3 as there were less than five studies.

Path Analysis

After the meta-analyses were run, Cohen's rule of thumb was applied to each pair of correlations and their variances to assess their strengths (Cohen, 1992). Then, path analysis was run for the resulting variables in each study using LISREL to determine the maximum likelihood estimation for estimating the model, including mediation effects. The calculations factored in mean rho, total sample size of all studies, average reliabilities, and error variances. The resulting path analysis models were then created. From these path analyses, the research question was answered and the hypotheses were tested.

Summary

In order to research the relationship between organizational culture, intrinsic motivation, and performance, a combined systematic review and meta-analysis was the appropriate

methodology to answer the research question and test the hypotheses. In this section, the general premise of these methods was discussed, along with detailed procedures. The protocol for the systematic review was introduced and the meta-analysis calculations were explained, along with additional analyses. Finally, the path analysis method was presented. Although less frequently used in the field of performance improvement, the combined systematic review and meta-analysis is a proven methodology that can help inform the field by synthesizing and analyzing relevant research from across disciplines.

CHAPTER 4: RESULTS

In this section, the results of all three systematic reviews and meta-analyses are presented. For each study, the results of the systematic review, including search logs and winnowing of studies, is reported. Next, the meta-analysis procedures and results are discussed, including coding, outlier analysis, meta-analytic calculations, sensitivity analysis, and publication bias assessment. Last, the path analysis results are used to test the hypotheses and answer the research question.

Study 1: Autonomy

In this section, the results of the systematic review and meta-analysis for autonomy, intrinsic motivation, and employee performance is presented and discussed.

Systematic review. During the systematic review for autonomy, intrinsic motivation, and performance, a total of 718 studies were evaluated. Out of that total, 571 came from the original primary search, 101 came from the second primary search, 40 came from secondary sources, and six came from tertiary sources. (See Figure 7.) Duplicates accounted for 131 of those studies. Studies were then evaluated and removed at the various levels of review: 308 studies were removed at the title level, 65 studies were removed at the abstract level, 193 studies were removed at the study level, and two studies were unobtainable. In addition, four studies were removed because although all three desired variables were present, some or all of the correlations were missing. The correlations could not be calculated with the given data and attempts to contact the researchers went unanswered so the studies could not be included for further analysis. The remaining 15 studies were included in the meta-analysis. A redacted sample of the search log with exclusion reasons is reported in Appendix C. In most cases, only one reason for exclusion is reported, although there could be several reasons.

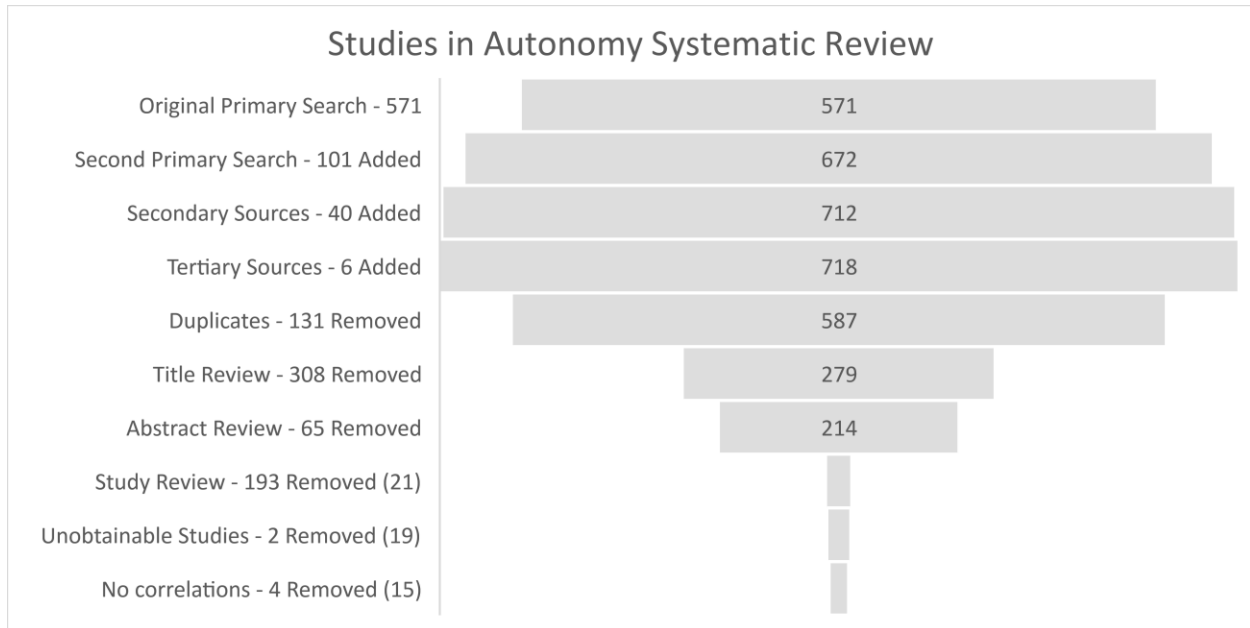


Figure 7. Studies in Autonomy Systematic Review Winnowing Chart

Coding. The 15 studies that resulted from the systematic review were coded. Two of the studies each contained two unique data sets bringing the total data sets to 17. The full coding sheet is presented in Appendix D.

For variable A1, the terms used in the individual studies were autonomy, job autonomy, perceived job autonomy, perceived work autonomy, autonomy orientation, and leader autonomy support. The operating definitions for all of these terms from the individual studies was conceptually the same as the operating definition for autonomy in this study. For example, autonomy orientation referred to how people perceive their own autonomy and leader autonomy support was a measure of how the worker perceived autonomy on the job.

For variable B, the terms used in the individual studies were intrinsic motivation, internal work motivation, work motivation, self-determined work motivation, intrinsic work motivation, level of intrinsic motivation, and internal motivation. The measures for internal work motivation and internal motivation were derived from the Hackman and Oldham Job Diagnostics Survey (JDS); the definition is comparable to the operational definition of intrinsic motivation in this study

so the studies using that terminology were included. However, to determine if the conceptualizations of the measures were the same, work motivation was analyzed during the sensitivity analysis phase.

For variable C, the terms used in the individual studies were performance, work quality, in-role performance, job performance, overall performance, work performance, innovative job performance, rated performance: quality, performance ratings, task performance, and performance evaluation. Task performance was the same construct as performance. In two studies, there were multiple measures of performance. Work quality was closest to the operational definition of performance so it was chosen to represent that variable. For the study that looked at innovative job performance, they did not present a measure of overall performance; the study was included but was analyzed during sensitivity analysis to determine if the construct was the same.

One study was an experimental design that occurred in the work place. Two data sets were reported: one for enriched workers and one for unenriched workers. This study also had some confounding of the performance variable as it was a mix of a single question supervisor rating and group productivity indices. The study was included in the analysis, but was subject to sensitivity analysis. The sample size was small for each data set ($N=36$), so it was anticipated the study would not have much effect on the overall meta-analysis results.

Six studies required imputation of one or all of the reliabilities. Several of these studies used the JDS as the measures for autonomy and intrinsic motivation, so the reliabilities were imputed from the original JDS (Hackman & Oldham, 1975). Performance measures were imputed differently. For studies that used a company performance review or other company data for the performance measure, the reliability for performance was imputed as 1 because the number came from the company and not a researcher survey; while the company's methods may not have been

completely objective, all company provided measures of performance were treated as objective data, which has a reliability of 1, for the purposes of this meta-analysis. One study used a composite rating of performance so the reliability was imputed from another study in the meta-analysis that also used a composite rating. For the final study that required imputation of performance (measured by self-report), the reliability for performance was imputed by taking the average reliability of other self-reported performance scales in the meta-analysis since none of the measurement scales used were the same. Studies with imputed data were subject to sensitivity analysis. A more detailed explanation of the imputations is included in the coding sheet.

Outlier analysis. Before the meta-analysis was performed, outlier analysis was performed using Metafor in R. Outlier analysis was run for all autonomy variable pairs: A1B, A1C, BC. No outliers were found for any of the autonomy variable pairs. The outlier analysis graphs are presented in Figures 8, 9, and 10. The full outlier analysis is provided in Appendix E.

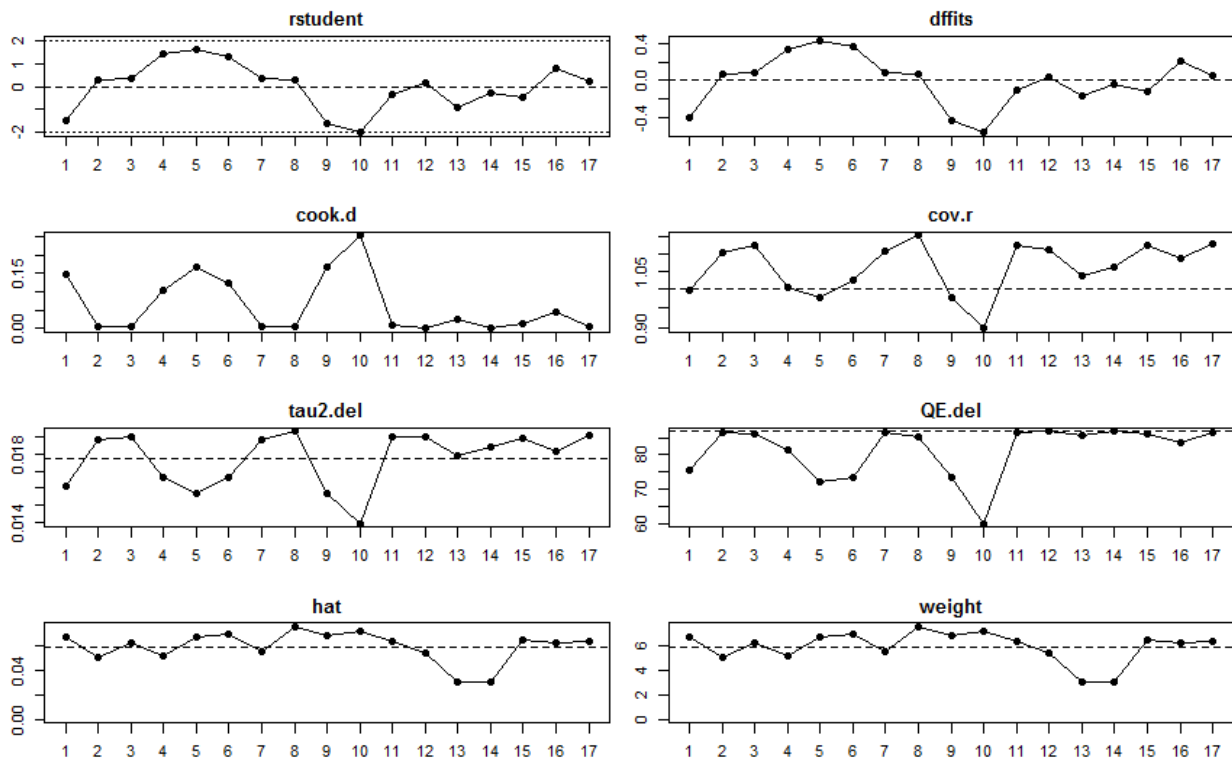


Figure 8. Outlier Analysis Graphs for Autonomy Variable Pair AB

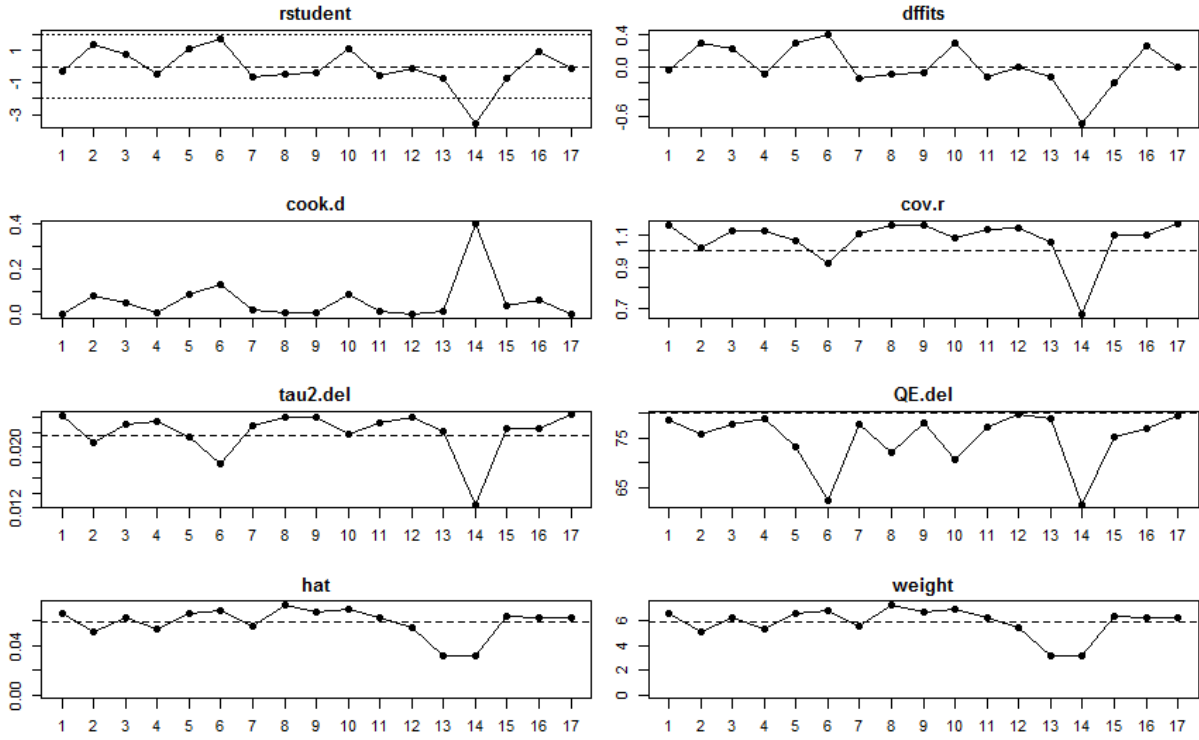


Figure 9. Outlier Analysis Graphs for Autonomy Variable Pair AC

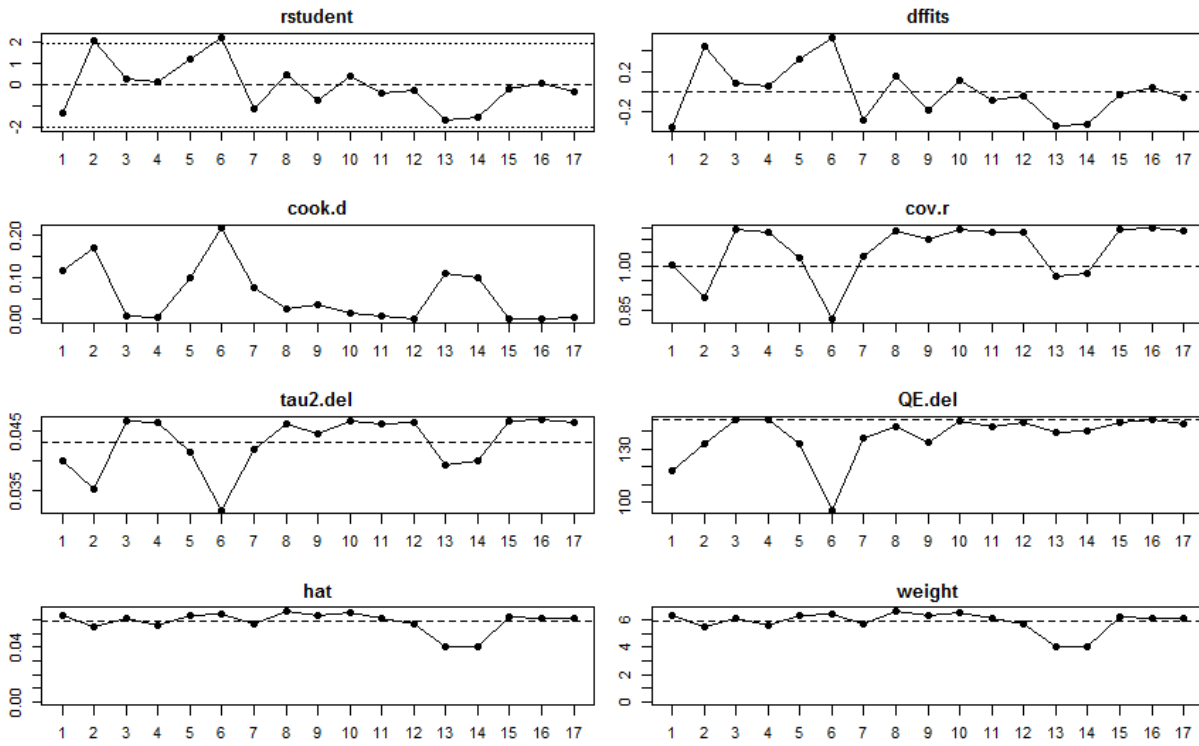


Figure 10. Outlier Analysis Graphs for Autonomy Variable Pair BC

Meta-analysis calculations. The meta-analysis was run for all variable pairs using Berry's and Steel and Sauder's spreadsheets as discussed in the methodology section. The results are presented in Table 10.

Table 10
Meta-Analysis Calculations for Study 1: Autonomy

Calculations	A1B	A1C	BC
N	3967	3967	3967
k	17	17	17
Mean uncorrected r	0.335	0.262	0.245
SDr	0.132	0.132	0.176
Rho	0.409	0.313	0.293
Variance of rho	0.019	0.022	0.039
SDrho	0.137	0.147	0.197
80% Credibility Interval			
Lower	0.233	0.125	0.0410
Upper	0.584	0.502	0.5446
Var(rc)	0.024	0.027	0.0441
Ave(ve)	0.005	0.005	0.0054
Percent variance in rho attributable to sampling error	19.5%	21.4%	12.3%
Percent variance in rho attributable to reliability	1.5%	0.0%	0.0%
Percent variance in rho attributable to all artifacts	21.0%	21.4%	12.3%
95% Confidence Interval (Homogenous)			
Lower	0.374	0.281	0.258
Upper	0.441	0.351	0.328
95% Confidence Interval (Heterogeneous)			
Lower	0.331	0.240	0.193
Upper	0.484	0.392	0.393

The total number of data sets (k) was 17 resulting in a combined sample size (N) of 3967. Rho for autonomy-intrinsic motivation was .409 with a variance of .019; according to Cohen's rule of thumb, this represents a medium to strong correlation. For autonomy-performance, rho was

.313 with a variance of .022, which represents a medium correlation. And for intrinsic motivation-performance, rho was .293 with a variance of .039, which represents a medium correlation.

The credibility intervals and percentage of variance attributable to all artifacts suggested there were moderators present. This result predicted that the data are heterogeneous and the results would most likely not be generalizable. As previously stated, moderator analysis is not part of this study design so no further analysis on moderators was performed. Because the confidence intervals are not wide and do not include 0, the mean effect size is statistically significant (Lipsey & Wilson, 2001).

Sensitivity analysis. Sensitivity analyses were performed by removing studies that used the term “work motivation,” looking at studies that only used the term “work motivation,” removing all studies with imputed data, removing the study with the experimental design, and removing the study that measured innovative job performance. The results of the sensitivity analyses are presented in Table 11.

The sensitivity analyses demonstrated the meta-analysis for autonomy is pretty robust. There was not much variance between the rhos when the different sensitivity analyses were performed. This robustness suggested that the terms work motivation and intrinsic motivation were measuring the same construct as predicted. Also the studies with imputed data had little impact on the mean rho, nor did the experimental data sets. The study that measured innovative performance had little impact on rho as well.

Publication bias assessment. Publication bias was assessed by looking at funnel plots for each variable pair using individual corrected r and the study sample size. The funnel plots are shown in Figures 11, 12, and 13.

Table 11
Sensitivity Analysis for Study 1: Autonomy

Variables	Full MA	Without work motivation	Just work motivation	No imputed data	Innovative performance removed	Experimental study removed
Studies included	ALL	A3, A48, A70, A85, A88, MW9 removed	A3, A48, A70, A85, A88, MW9	A8, A70, A85, A88, MW9 removed	A79 removed	A88 removed
AB						
N	3967	2814	1153	3362	3672	3895
k	17	10	7	11	16	15
Rho	0.409	0.389	0.466	0.397	0.432	0.410
Var rho	0.019	0.020	0.011	0.022	0.015	0.019
BC						
N	3967	2814	1153	3362	3672	3895
k	17	10	7	11	16	15
Rho	0.293	0.318	0.233	0.320	0.316	0.302
Var rho	0.039	0.017	0.084	0.031	0.037	0.035
AC						
N	3967	2814	1153	3362	3672	3895
k	17	10	7	11	16	15
Rho	0.313	0.314	0.312	0.327	0.324	0.321
Var rho	0.022	0.018	0.031	0.017	0.023	0.016

A = Autonomy, B = Intrinsic motivation, C = Performance

Note: A79 was not removed as a work motivation study because intrinsic work motivation is the same operational definition of intrinsic motivation. A88 was removed as a work motivation study because even though the language says internal motivation it is measured through the Hackman and Oldman scale which is termed internal work motivation.

While the funnel plots are relatively symmetrical, they did show some signs of publication bias, as is to be expected.

Path analysis. Path analysis was performed using LISREL to determine the maximum likelihood estimation for estimating the model and mediation effects. The path analysis determined all the variables are related and intrinsic motivation partially mediates the relationship between autonomy and performance. See Figure 14 for the standardized estimates for the final model and Appendix F for the full LISREL calculation.

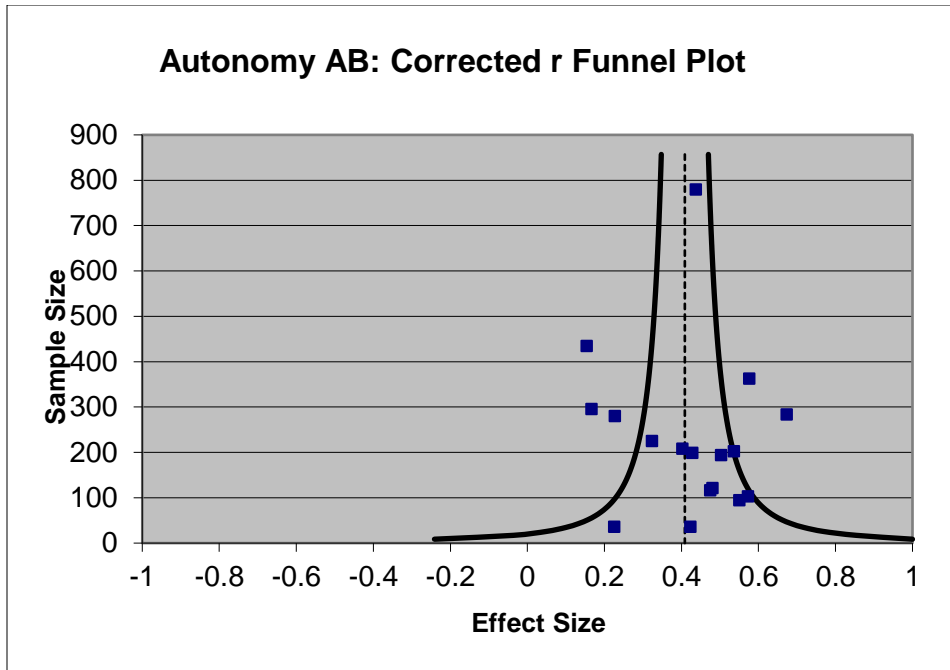


Figure 11. Corrected r Funnel Plot for Autonomy Variable Pair AB

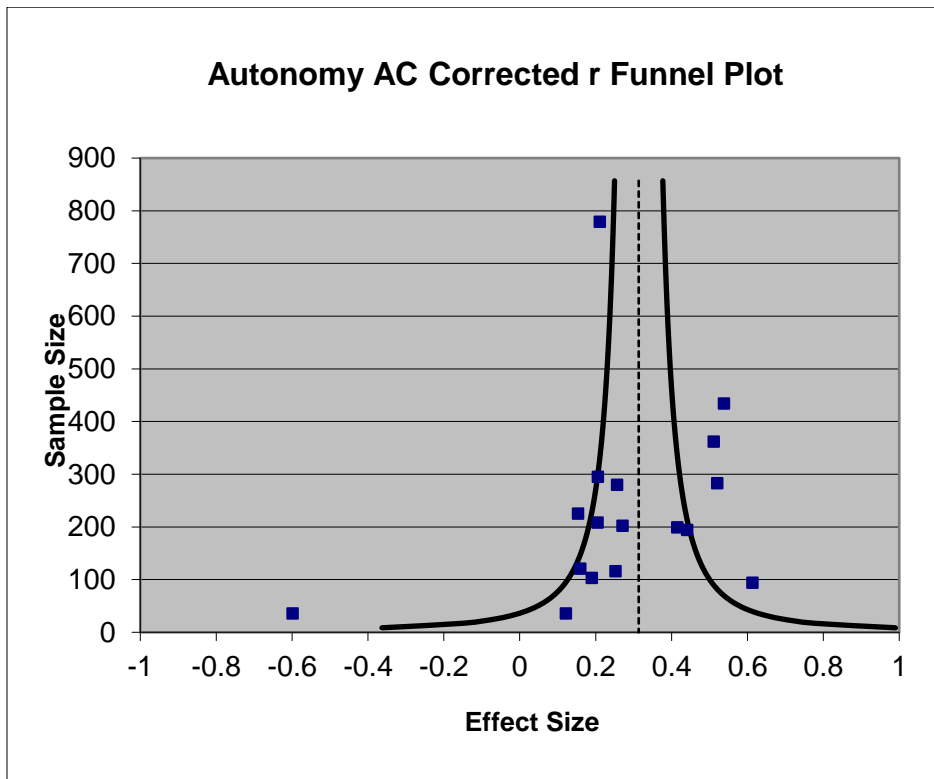


Figure 12. Corrected r Funnel Plot for Autonomy Variable Pair AC

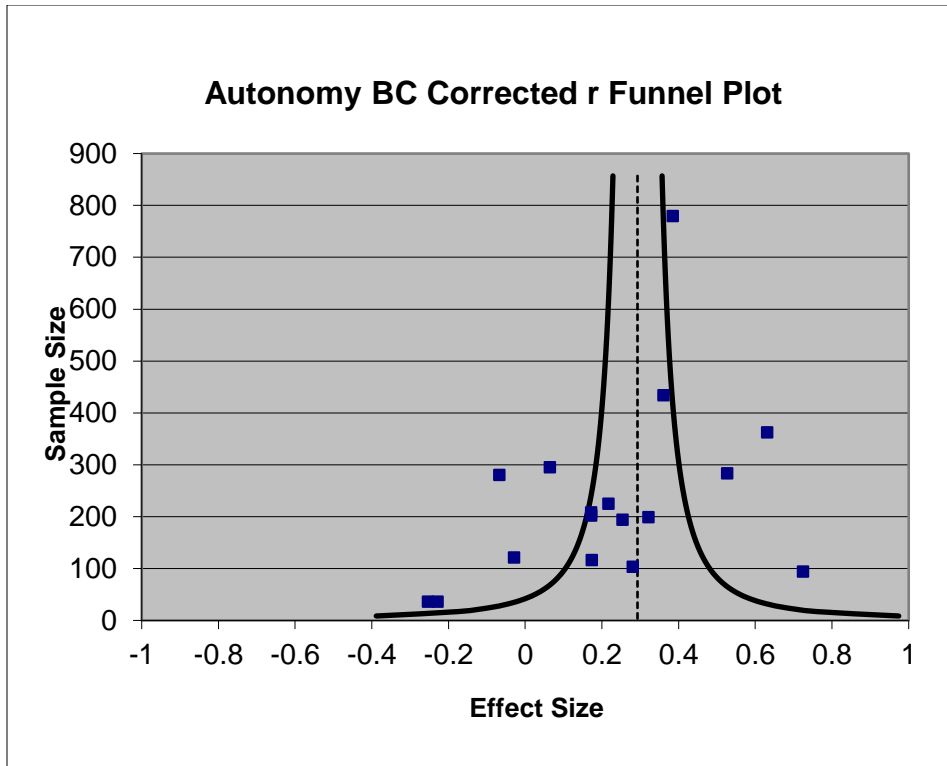


Figure 13. Corrected r Funnel Plot for Autonomy Variable Pair BC

The model supported hypothesis 1 that intrinsic motivation partially mediates the relationship between autonomy and employee performance. The model also supported hypothesis 3 that autonomy is a predictor of employee performance.

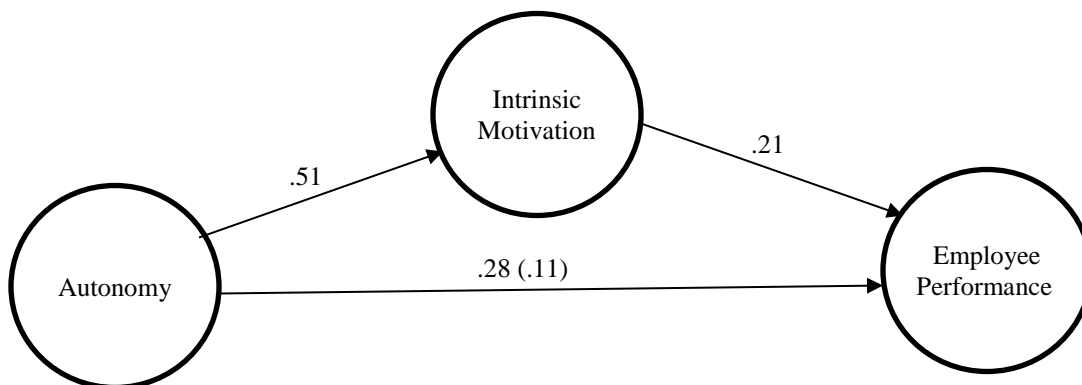


Figure 14. Standardized estimates in final model relating autonomy to intrinsic motivation and employee performance. All estimates are reliably different from zero ($p < .05$). The number in parentheses represents the mediation effect.

Study 2: Meaningful Work

In this section, the results of the systematic review and meta-analysis for meaningful work, intrinsic motivation, and employee performance is presented and discussed.

Systematic review. During the systematic review for meaningful work, intrinsic motivation, and performance, a total of 216 studies were evaluated. Out of that total, 26 came from the original primary search, 128 came from the second primary search, 30 came from expanding the definition to include task significance, 27 came from secondary sources, and five came from tertiary sources. (See Figure 15.) Duplicates accounted for 36 of those studies. Studies were then evaluated and removed at the various levels of review: 97 studies were removed at the title level, 32 studies were removed at the abstract level, and 46 studies were removed at the study level. The remaining five studies were included in the meta-analysis. A redacted sample of the search log with exclusion reasons is reported in Appendix G. In most cases, only one reason for exclusion is reported, although there could be several reasons.

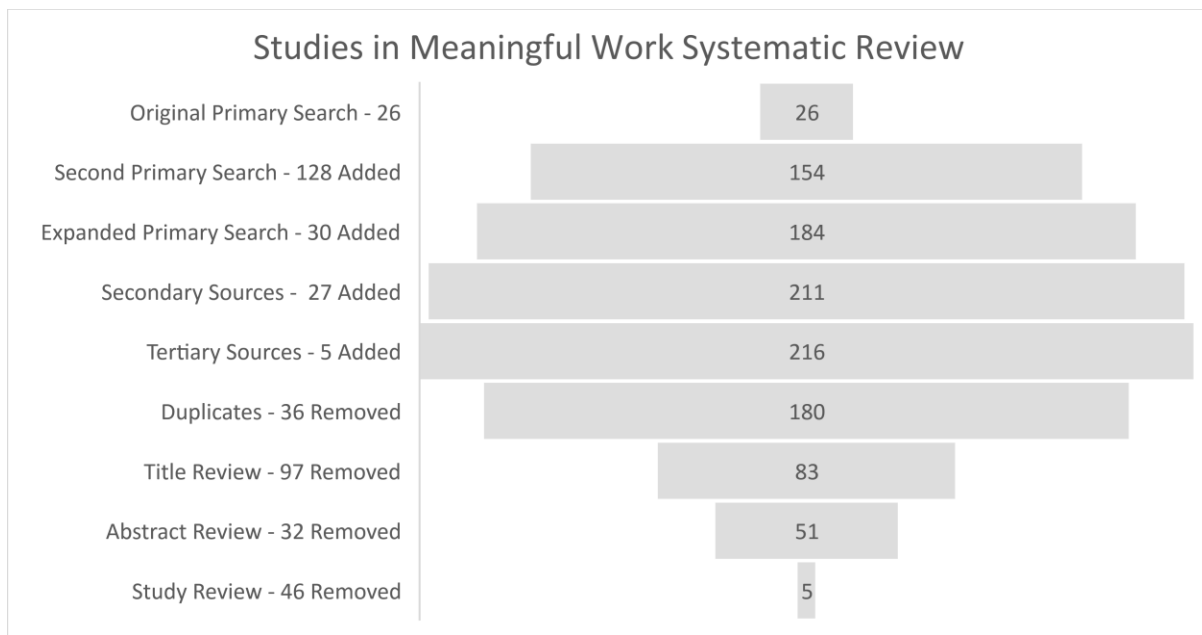


Figure 15. Studies in Meaningful Work Systematic Review Winnowing Chart

Coding. The five studies that resulted from the systematic review were coded. One of the studies contained two unique data sets bringing the total data sets to six. The full coding sheet is presented in Appendix H.

For variable A2, the terms used in the individual studies were meaningfulness (one time), brand meaningfulness (one time), and task significance (four times). As previously mentioned, task significance was added as a search term in order to look for more studies; the term was analyzed during sensitivity analysis to determine if it was the same construct as meaningful work. Although brand meaningfulness was a specific use of the term, the study was included with the effects evaluated with sensitivity analysis.

For variable B, the terms used in the individual studies were intrinsic motivation, internal work motivation, intrinsic motivation to work, and internal motivation. The measures for internal work motivation and internal motivation were derived from the Hackman and Oldham Job Diagnostics Survey (JDS); the definition is comparable to the operational definition of intrinsic motivation in this study so the studies using that terminology were included. Sensitivity analysis was not performed on these terms during this study because the studies that used the terminology were part of the autonomy study and it was previously determined the same construct was being measured.

For variable C, the terms used in the individual studies were performance, in-role performance, performance ratings, performance evaluation, and brand performance. Brand performance refers to the behaviors and actions of employees that are in line with their company's brand. It was included in the meta-analysis and evaluated with sensitivity analysis.

One study was an experimental design that occurred in the work place. Two data sets were reported: one for enriched workers and one for unenriched workers. This study also had some

confounding of the performance variable as it was a mix of a single question supervisor rating and group productivity indices. The study was included in the analysis, but was subject to sensitivity analysis. The sample size was small for each data set ($N=36$), so it was anticipated the study would not have much effect on the overall meta-analysis results.

Four studies required imputation of one or all of the reliabilities. These were the same studies that required imputation in the autonomy study. The reliabilities were imputed in the same manner. Studies that used the JDS as the measures for task significance and intrinsic motivation had reliabilities imputed from the original JDS (Hackman & Oldham, 1975). Performance measures were imputed exactly the same as they were when used in the autonomy study. Studies with imputed data were subject to sensitivity analysis. A more detailed explanation of the imputations is included in the coding sheet.

Outlier analysis. Before the meta-analysis was performed, outlier analysis was performed using Metafor in R. Outlier analysis was run for all meaningful work variable pairs: A2B, A2C, BC. Two outliers were found. Study MW9 was determined an outlier for variable pair AB; study MW10 was determined an outlier for variable pair AC. These two studies were the original studies included in the meta-analysis using the term meaningful work. This finding was suggestive that meaningful work and task significance might not be the same construct, although with only six data points the results could be skewed. These studies were evaluated using sensitivity analysis. The outlier analysis graphs are presented in Figures 16, 17, and 18. The full outlier analysis is provided in Appendix I.

Meta-analysis calculations. The meta-analysis was run for all variable pairs using Berry's and Steel and Sauder's spreadsheets as discussed in the methodology section. The results are presented in Table 12.

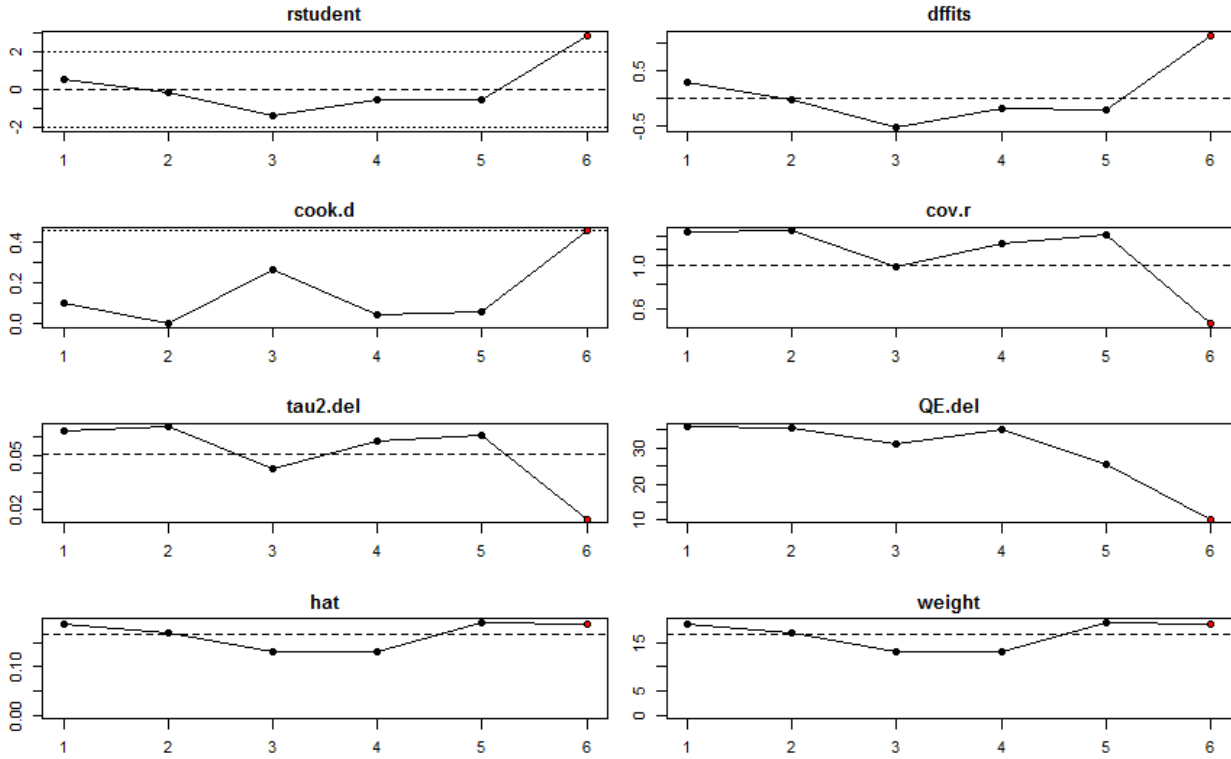


Figure 16. Outlier Analysis Graphs for Meaningful Work Variable Pair AB

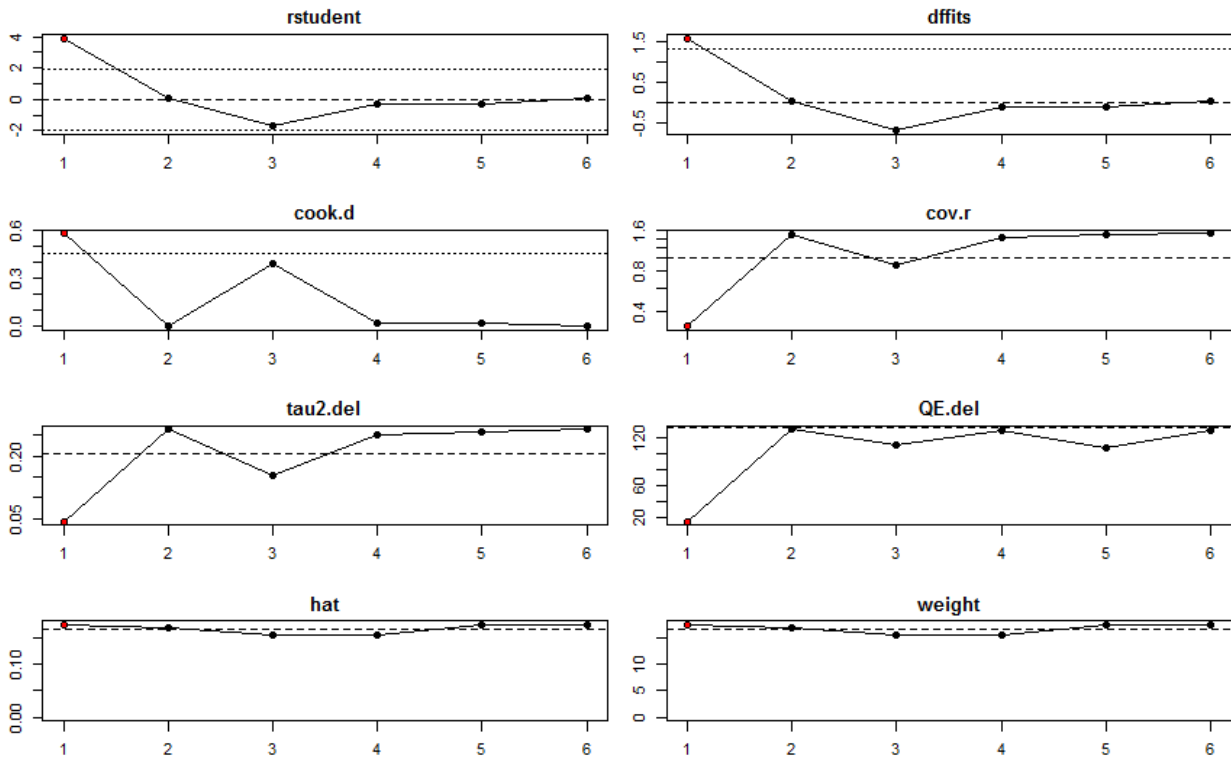


Figure 17. Outlier Analysis Graphs for Meaningful Work Variable Pair AC

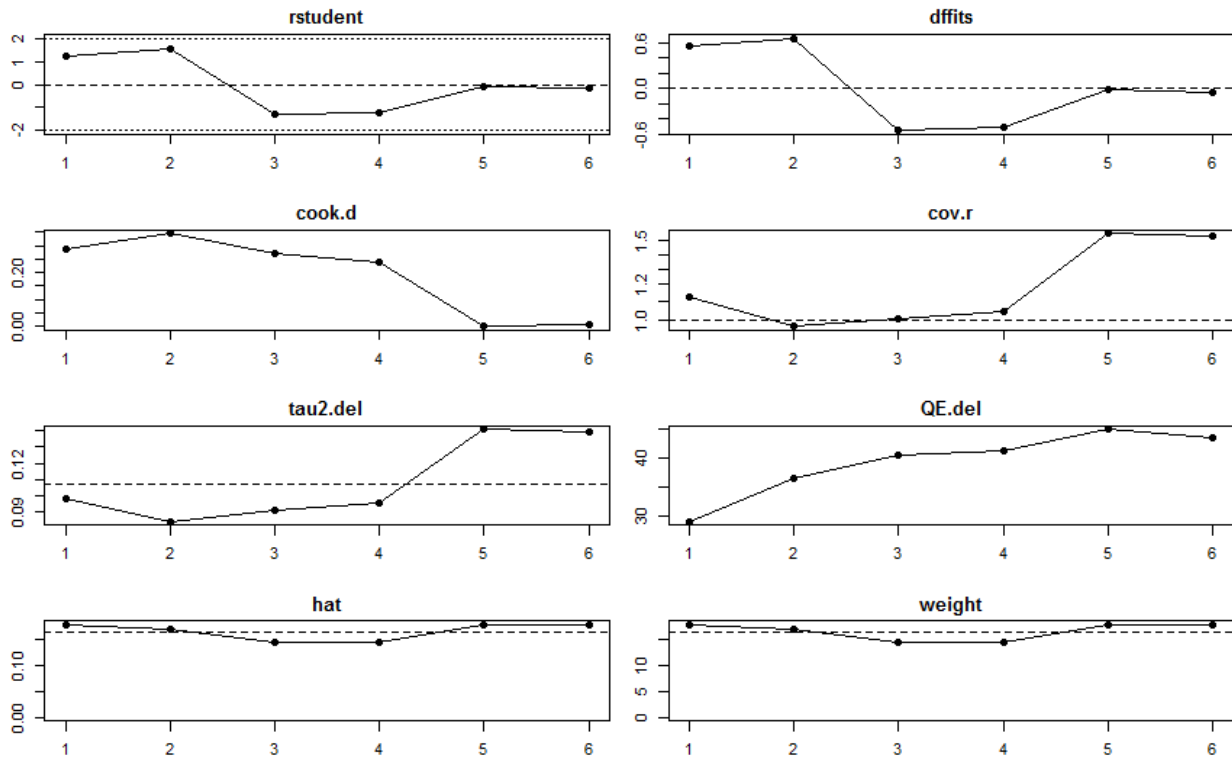


Figure 18. Outlier Analysis Graphs for Meaningful Work Variable Pair BC

The total number of data sets (k) was six resulting in a combined sample size (N) of 795. Rho for meaningful work-intrinsic motivation was .528 with a variance of .037; according to Cohen's rule of thumb, this represents a strong correlation. For meaningful work-performance, rho was .428 with a variance of .102, which represents a medium to strong correlation. And for intrinsic motivation-performance, rho was .321 with a variance of .056, which represents a medium correlation.

The credibility intervals and percentage of variance attributable to all artifacts suggested there were moderators present. This result predicted that the data are heterogeneous and the results would most likely not be generalizable. As previously stated, moderator analysis is not part of this study design so no further analysis on moderators was performed. Because the confidence intervals do not include 0, the mean effect size is statistically significant.

Table 12
Meta-Analysis Calculations for Study 2: Meaningful Work

Calculations	A2B	A2C	BC
N	795	795	795
k	6	6	6
Mean uncorrected r	0.427	0.333	0.270
SDr	0.170	0.299	0.226
Rho	0.528	0.428	0.321
Variance of rho	0.037	0.102	0.056
SDrho	0.192	0.320	0.238
80% Credibility Interval			
Lower	0.282	0.018	0.017
Upper	0.773	0.837	0.626
Var(rc)	0.045	0.111	0.0654
Ave(ve)	0.008	0.009	0.0089
Percent variance in rho attributable to sampling error	17.8%	6.7%	12.8%
Percent variance in rho attributable to reliability	0.00%	1.2%	0.8%
Percent variance in rho attributable to all artifacts	17.8%	8.0%	13.6%
95% Confidence Interval (Homogenous)			
Lower	0.460	0.329	0.239
Upper	0.602	0.479	0.390
95% Confidence Interval (Heterogeneous)			
Lower	0.362	0.114	0.104
Upper	0.699	0.695	0.525

Sensitivity analysis. Sensitivity analyses were performed by removing studies that measured task significance, looking at studies that only measured task significance, removing all studies with imputed data, removing the study with the experimental design, and removing the study that measured brand meaningfulness and brand performance. The results of the sensitivity analyses are presented in Table 13.

The sensitivity analyses demonstrated the meta-analysis for meaningful work is not very robust. The main variability seems to come from the use of the terms meaningful work and task

significance. Therefore, it was concluded that task significance was measuring a similar but not comparable construct. Due to this difference, when performing the path analysis, the model was run twice – once with all the data sets and once with meaningful work studies only. The studies with imputed data had some impact on the mean rho, but that is mostly likely due to the fact several of those studies measured task significance. The brand study and experimental data set had little impact on the results.

Publication bias assessment. Publication bias was assessed by looking at funnel plots for each variable pair using individual corrected r and the study sample size. The funnel plots are shown in Figures 19, 20, and 21.

Table 13
Sensitivity Analysis for Study 2: Meaningful Work

Variables	Full MA	Meaningful Work only	Task Significance only	No imputed data	Brand study removed	Experimental study removed
Studies included	ALL	MW10, MW9	A8, A88, A91	MW10, A91	A8, A88, A91, MW9	MW10, MW9, A8, A91
AB						
N	795	404	391	427	593	723
k	6	2	4	2	5	4
Rho	0.528	0.669	0.355	0.442	0.527	0.550
Var rho	0.037	0.026	-0.006	0.004	0.057	0.034
BC						
N	795	404	391	427	593	723
k	6	2	4	2	5	4
Rho	0.321	0.376	0.252	0.397	0.222	0.368
Var rho	0.056	0.032	0.079	0.024	0.049	0.0364
AC						
N	795	404	391	427	593	723
k	6	2	4	2	5	4
Rho	0.428	0.616	0.158	0.557	0.230	0.474
Var rho	0.102	0.066	0.030	0.114	0.024	0.076

A = Meaningful Work/Task Significance, B = Intrinsic motivation, C = Performance

Note: The task significance analysis is also the outlier analysis. MW9 was the outlier for AB. MW10 was the outlier for AC.

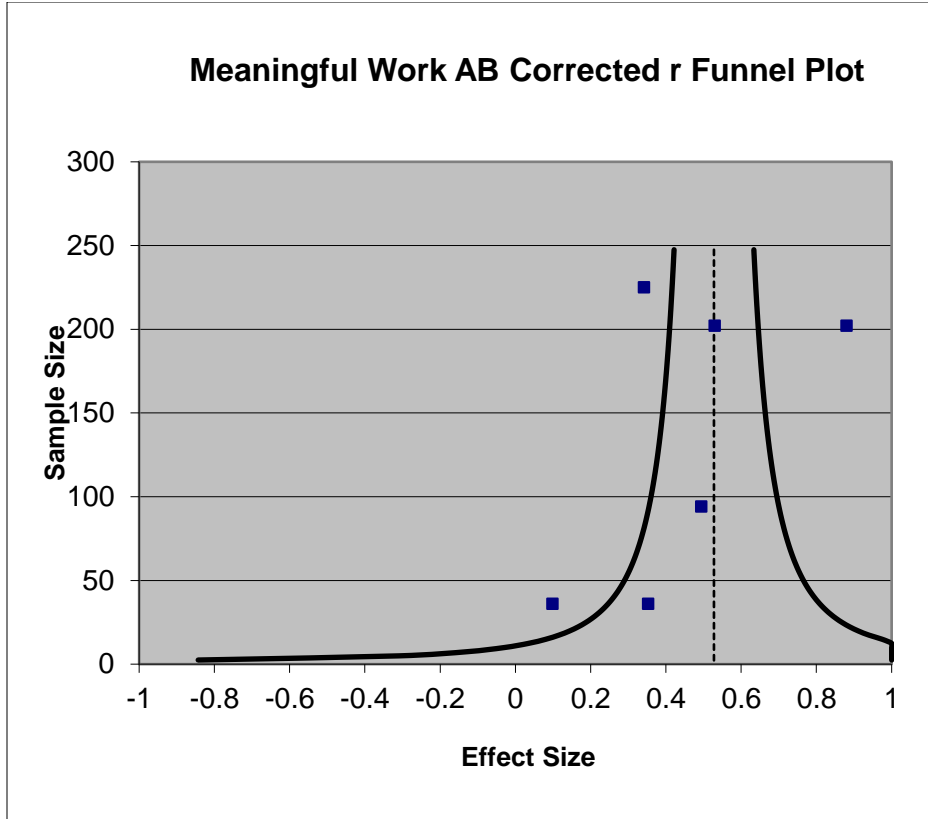


Figure 19. Corrected r Funnel Plot for Meaningful Work Variable Pair AB

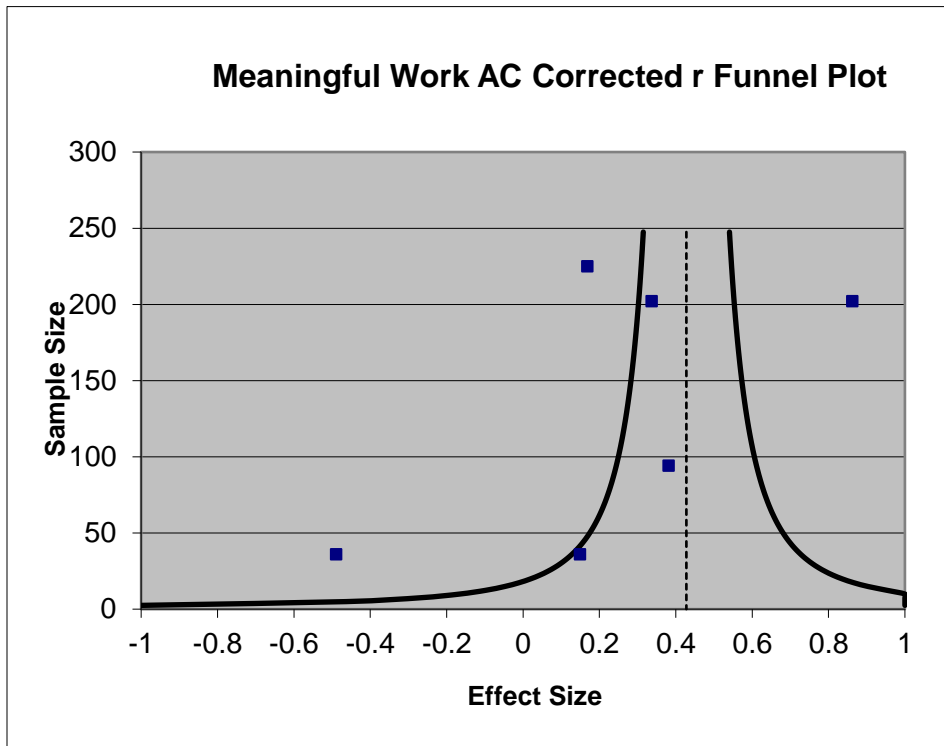


Figure 20. Corrected r Funnel Plot for Meaningful Work Variable Pair AC

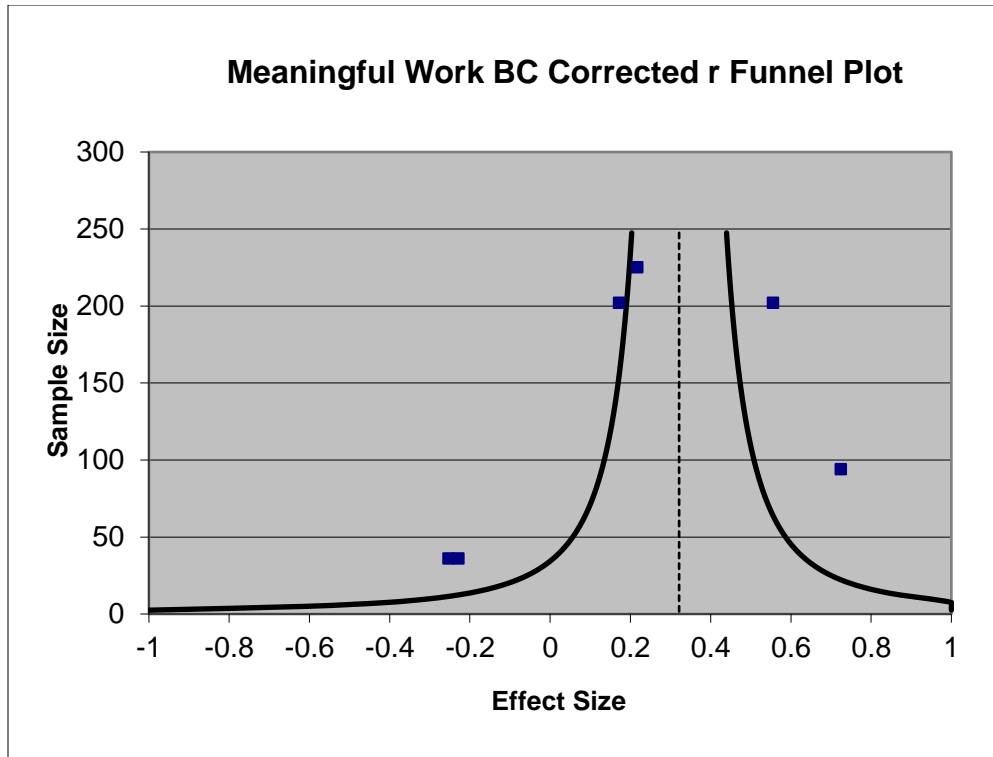


Figure 21. Corrected r Funnel Plot for Meaningful Work Variable Pair BC

Caution was used when interpreting the funnel plots because they had so few data points. The rule of thumb for funnel plots is they must contain five data points to be considered an effective assessment tool (Sterne et al., 2005). The funnel plots appeared asymmetrical, indicating publication bias.

Path analysis. Path analysis was performed using LISREL to determine the maximum likelihood estimation for estimating the model and mediation effects. Two path analyses were performed: once with all data sets and once with data sets measuring meaningful work only. For the path analysis with all data sets, all variables are related except intrinsic motivation and performance. No mediation was found. See Figure 22 for the standardized estimates for the final model and Appendix J for the full LISREL calculation.

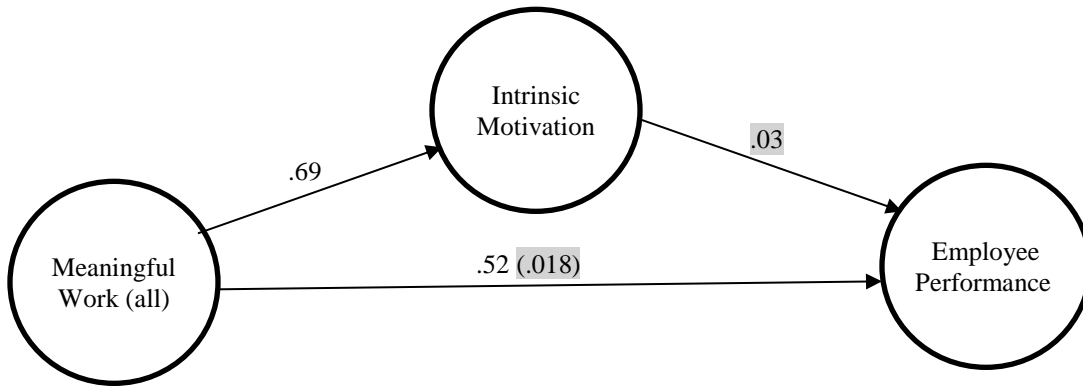


Figure 22. Standardized estimates in final model relating meaningful work to intrinsic motivation and employee performance. Estimates are reliably different from zero ($p < .05$) except highlighted estimates which were not significant. The number in parentheses represents the mediation effect.

The model did not support hypothesis 2 that intrinsic motivation partially mediates the relationship between meaningful work and employee performance. The model did support hypothesis 3 that meaningful work is a predictor of employee performance.

For the path analysis using data sets that solely measured meaningful work, all variables appear to be related, except in a surprising way. The path analysis determined there is a negative relationship between intrinsic motivation and performance and intrinsic motivation partially mediates the relationship between meaningful work and performance negatively. See Figure 23 for the standardized estimates for the final model and Appendix K for the full LISREL calculation.

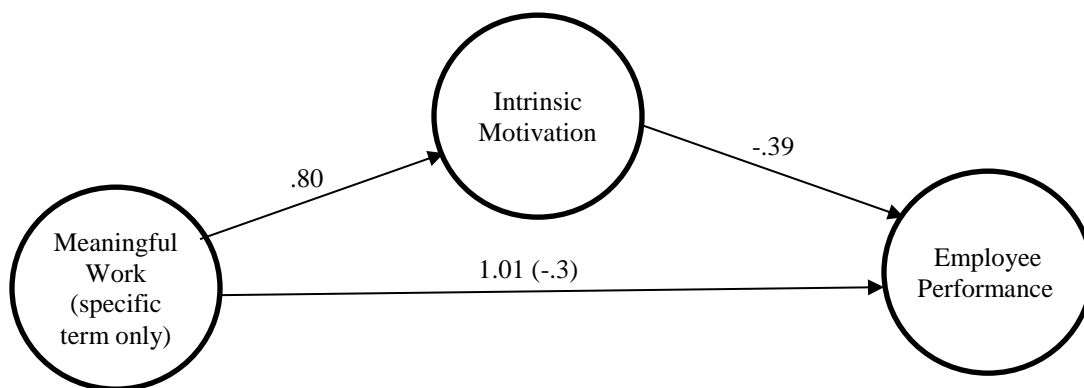


Figure 23. Standardized estimates in final model relating meaningful work (specific term only) to intrinsic motivation and employee performance. All estimates are reliably different from zero ($p < .05$). The number in parentheses represents the mediation effect.

Considering only two data sets were used to create this model and the relationship between meaningful work and performance was calculated as 1.01, caution must be made when interpreting it. The model appears to support hypothesis 2 that intrinsic motivation partially mediates the relationship between meaningful work and employee performance, but negatively. The model also appears to support hypothesis 3 that meaningful work is a predictor of employee performance. However, based on the calculated numbers, it is likely this model is not a good fit for these data and the conclusions cannot be supported.

Based on the first model, it appears there is a relationship between meaningful work and intrinsic motivation as well as a relationship between meaningful work and employee performance. Therefore, hypothesis 3 is supported. However, the results for hypothesis 2 are inconclusive and the hypothesis is not supported.

Study 3: Organizational Culture

In this section, the results of the systematic review and meta-analysis for organizational culture, intrinsic motivation, and employee performance is presented and discussed.

Systematic review. During the systematic review for organizational culture/climate, intrinsic motivation, and performance, a total of 331 studies were evaluated. Out of that total, 26 came from the original primary search, 150 came from the first expanded search, 24 came from the second expanded search, 125 came from an old search, and 22 came from secondary sources. (See Figure 24.) Duplicates accounted for 43 of those studies. Studies were then evaluated and removed at the various levels of review: 72 studies were removed at the title level, 76 studies were removed at the abstract level, 129 studies were removed at the study level, and three studies were unobtainable. In addition, five studies were removed because although all three desired variables were present, some or all of the correlations were missing. The correlations could not be calculated

with the given data and attempts to contact the researchers went unanswered so the studies could not be included for further analysis. The remaining three studies were included in the meta-analysis. A redacted sample of the search log with exclusion reasons is reported in Appendix L. In most cases, only one reason for exclusion is reported, although there could be several reasons.

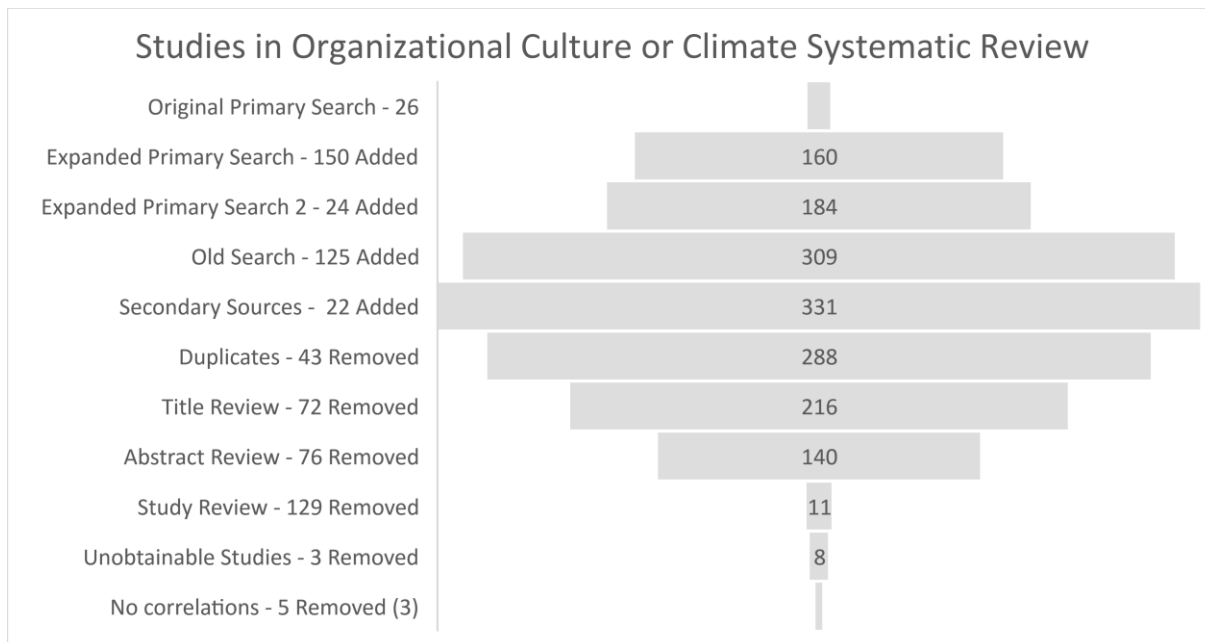


Figure 24. Studies in Organizational Culture Systematic Review Winnowing Chart

Coding. The three studies that resulted from the systematic review were coded. The full coding sheet is presented in Appendix M. Although it is preferable to have a larger amount of studies to perform a meta-analysis, meta-analysis can be performed with just two studies (Littell et al., 2008). The meta-analysis for organizational culture was run for comparative purposes with the other two studies.

For variable A1, two studies measured safety climate and one study measured service climate. The study that measured service climate focused on flight attendants in a Taiwan-based airline. The first safety climate study was a longitudinal study that conducted the same survey two years apart. Data were presented for both years only for employees that answered the survey for both years. According to Littell et al. (2008), only one data set from a study population may be

used in a meta-analysis and the data set that is most relevant to the research should be chosen. Because this meta-analysis is attempting to look at the relationship of all three variables, the data from the latest data set are used because there was more time for the variables to have an effect on each other. The second study that measured safety climate was conducted by the same researchers and both studies were conducted in an Australian hospital. Per personal communication with the researchers, the same hospital was used for both studies, but the studies were carried out in different years and there was a fair amount of turnover and organizational change. Even though there was some overlap with the study populations, the sample size from the second study was almost four times that of the other study. Both studies were included in the meta-analysis because there were more unique samples in the larger study than overlapping samples. Although there was a measure of organizational climate in the second study, safety climate was selected for the meta-analysis as the climate factor because it aligns with the other studies which are also looking at a specific type of climate.

For variable B, the safety climate studies measured safety motivation while the service climate study measured intrinsic motivation.

For variable C, the service climate study measured service performance. For the safety climate studies, safety compliance was the performance measurement. In one of the studies, there were two measures of safety performance; safety compliance was chosen because it was a measure of how safety is incorporated into the performance of the job.

Reliabilities did not need to be imputed for any of these studies. Sensitivity analysis was performed on the different types of climate.

Outlier analysis. Outlier analysis was not performed because there were only three studies and the results would have been skewed.

Meta-analysis calculations. The meta-analysis was run for all variable pairs using Berry's and Steel and Sauder's spreadsheets as discussed in the methodology section. The results are presented in Table 14.

Table 14
Meta-Analysis Calculations for Study 3: Organizational Culture

Calculations	A3B	A3C	BC
N	865	865	865
k	3	3	3
Mean uncorrected r	0.432	0.415	0.775
SDr	0.056	0.037	0.034
Rho	0.472	0.449	0.827
Variance of rho	0.002	0.000	0.001
SDrho	0.044	0.000	0.022
80% Credibility Interval			
Lower	0.415	0.449	0.799
Upper	0.528	0.449	0.856
Var(rc)	0.005	0.001	0.001
Ave(ve)	0.003	0.003	0.001
Percent variance in rho attributable to sampling error	72.7%	0.0%	49.6%
Percent variance in rho attributable to reliability	0.00%	0.0%	6.6%
Percent variance in rho attributable to all artifacts	72.7%	0.0%	56.1%
95% Confidence Interval (Homogenous)			
Lower	0.413	0.388	0.799
Upper	0.532	0.508	0.856
95% Confidence Interval (Heterogeneous)			
Lower	0.403	0.402	0.787
Upper	0.542	0.493	0.868

The total number of data sets (k) were three resulting in a combined sample size (N) of 865. Rho for culture-intrinsic motivation was .472 with a variance of .002; according to Cohen's rule of thumb, this represents a strong correlation. For culture-performance, rho was .449 with a

variance of 0, which represents a strong correlation. And for intrinsic motivation-performance, rho was .827 with a variance of .001, which represents a strong correlation.

For the AC correlation, the variance was actually a negative number and then set to 0. Schmidt and Hunter (2015) explained the reason this unexpected result occurs:

The estimated variance of population correlations is not computed as a conventional variance....It is computed as the difference between the given variance of observed correlations and the statistically given sampling error variance....The variance of observed correlations is a sample estimate. Unless the number of studies is infinite, there will be some sampling error in that empirical estimate. If the population difference is 0, then error will cause the estimated difference to be positive or negative with probability of one half....Such estimates are always taken as 0.

(Schmidt & Hunter, 2015, p. 103)

The credibility intervals were small and did not predict modifiers, but the percentage of variance attributable to all artifacts suggested there were moderators present. Due to the mixed result, there was no clear prediction on whether the data were homogeneous or heterogeneous, but the fact that these are climate measures as a whole suggested the data are heterogeneous and moderators are present since climate is made up of several cultural factors. As previously stated, moderator analysis is not part of this study design so no further analysis on moderators was performed. Because the confidence intervals are narrow and do not include 0, the mean effect size is statistically significant. There is little variability in this data set.

Sensitivity analysis. Sensitivity analysis was performed by removing the service climate study. The results of the sensitivity analysis are presented in Table 15.

The sensitivity analysis suggested the meta-analysis for organizational culture/climate is pretty robust, however, caution must be used when interpreting these results since there were only three studies included in the meta-analysis. There was not much variance between the rhos for all the studies and safety climate only studies, nor between the correlations for service climate.

Table 15
Sensitivity Analysis for Study 3: Organizational Culture

Variables	Full MA	Safety only	Service only
Studies included	ALL	C64, C67	C73
AB			
N	865	660	205
k	3	2	1
Rho	0.472	0.468	0.43
Var rho	0.002	0.004	Not reported
BC			
N	865	660	205
k	3	2	1
Rho	0.827	0.819	0.83
Var rho	0.001	0.001	Not reported
AC			
N	865	660	205
k	3	2	1
Rho	0.449	0.463	0.36
Var rho	-0.002	-0.002	Not reported

A = Organizational Culture/Climate, B = Intrinsic motivation, C = Performance

Note: Service only is reporting the data from the single study for comparative purposes. It is not rho, but just a standard correlation. Variance can be negative because of the way it's calculated in a meta-analysis. In this case, you just set it to 0.

Publication bias assessment. Because there are only three data points, a funnel plot analysis would be ineffective. There are no other publication bias assessment methods that would provide accurate data for such a small data set. However, an assumption can be made that there is publication bias considering the data set is so small. One example of publication bias is underreporting of correlations; five studies had to be dropped because no correlations were available.

Path analysis. Path analysis was performed using LISREL to determine the maximum likelihood estimation for estimating the model and mediation effects. The path analysis determined all the variables are related and intrinsic motivation fully mediates the relationship between organizational culture/climate and performance. See Figure 25 for the standardized estimates for the final model and Appendix N for the full LISREL calculation.

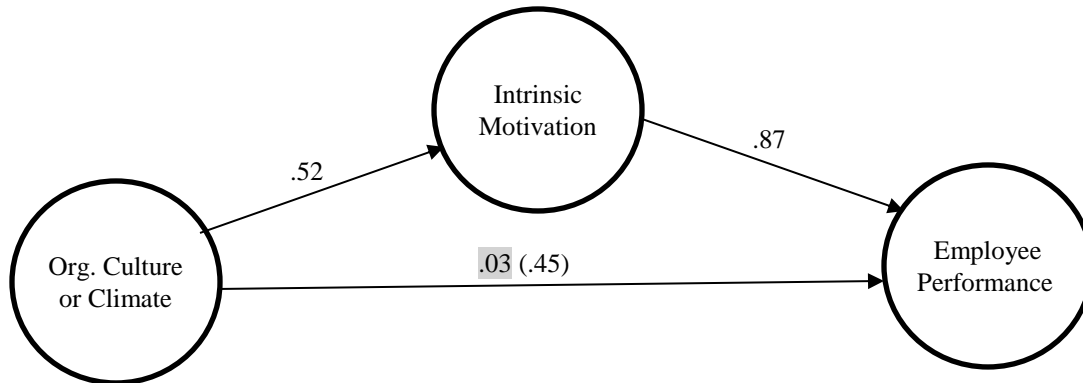


Figure 25. Standardized estimates in final model relating organizational culture/climate to intrinsic motivation and employee performance. All estimates are reliably different from zero ($p < .05$) except where highlighted. The number in parentheses represents the mediation effect.

The model appears to suggest that intrinsic motivation fully mediates the relationship between organizational culture and employee performance, making it a predictor of employee performance. Due to the small nature of the data set and differing types of climate, this model must be interpreted with caution. Furthermore, the measures of organizational climate from the studies were single measures and used in the path analysis in isolation from other factors. Taking other factors into consideration, such as work satisfaction, job attitudes, etc., the relationships in this model would likely be attenuated. In an earlier study by Parker et al. (2003), they concluded “that the effects of psychological climate perceptions on performance are fully mediated by employee work attitudes and motivation” (p. 404). Their study was also a meta-analysis; they measured climate using five dimensions and motivation was a single measure including both intrinsic and extrinsic motivation. Although the measure of motivation was not the same and they had additional

variables of work attitudes, it is encouraging to see similar results while also taking into account other factors in the model.

Summary

In this section, the results of all three studies were presented. Relationships between the study variables were evaluated and hypotheses were tested.

From study 1, it was concluded that autonomy, intrinsic motivation, and employee performance are related with a medium to strong correlation between autonomy and intrinsic motivation, a medium correlation between autonomy and performance, and a medium correlation between intrinsic motivation and performance. Using path analysis, the model supported hypothesis 1 that intrinsic motivation partially mediates the relationship between autonomy and employee performance. The model also supported hypothesis 3 that autonomy is a predictor of employee performance.

From study 2, it was concluded that meaningful work, intrinsic motivation, and employee performance are related with a strong correlation between meaningful work and intrinsic motivation, a medium to strong correlation between meaningful work and performance, and a medium correlation between intrinsic motivation and performance. Using path analysis, the model supported hypothesis 3 that meaningful work is a predictor of employee performance. The results for hypothesis 2, that intrinsic motivation partially mediates the relationship between meaningful work and employee performance, were inconclusive.

From study 3, it was concluded that organizational culture/climate, intrinsic motivation, and employee performance are related with a strong correlation between climate and intrinsic motivation, a strong correlation between climate and performance, and a strong correlation between intrinsic motivation and performance. Using path analysis, the model estimated that

intrinsic motivation fully mediates the relationship between climate and performance, but this estimate must be considered with caution since the data set only contained three studies, climate was a single measure, and climate was considered in isolation from other factors.

CHAPTER 5: DISCUSSION

In this chapter, the significant findings of the study are discussed along with alternative explanations and the generalizability of conclusions, the significance of the study, limitations of the study, implications for practice, and suggestions for further research.

Significant Findings of the Study

The purpose of this study was to determine the influence of specific organizational cultural factors—autonomy and meaningful work—on the intrinsic motivation and individual performance of employees and to determine the relationship between all three variables. There were three hypotheses:

1. Intrinsic motivation partially mediates the relationship between autonomy and employee performance.
2. Intrinsic motivation partially mediates the relationship between meaningful work and employee performance.
3. Autonomy and meaningful work are predictors of employee performance.

Study 1: Autonomy. From study 1, it was concluded that autonomy, intrinsic motivation, and employee performance are related with a medium or medium to strong (autonomy-intrinsic motivation) correlation between all the variables. Hypothesis 1 was supported as the path analysis estimated that intrinsic motivation partially mediates the relationship between autonomy and employee performance. Hypothesis 3 was partially supported in that autonomy was concluded to be a predictor of employee performance.

There were significant data to demonstrate the meta-analysis conclusions were robust, as seen by the sensitivity analysis and the small variance. However, the meta-analysis predicted there

were moderators or subgroups and the data were heterogeneous, so the results would not be generalizable outside of the study parameters.

Moderators and subgroups of autonomy were not considered as part of the study design as specific organizational cultural factors were presumed to be the subgroups of organizational culture. However, autonomy could be influenced by variables such as national culture or gender, and autonomy can be broken down into further subgroups—method, schedule, and criteria—as demonstrated by Sekhar (2011).

While study 1 found intrinsic motivation to partially mediate the effect of autonomy on performance, Kuvaas and Dysvik (2011) found intrinsic motivation to be a moderator between the other two variables. Other studies did not focus exclusively on these three factors but rather measured other variables as well. In support of the findings for study 1, a previous meta-analysis (Humphrey, Nahrgang, & Morgeson, 2007) found a weak positive correlation between autonomy and performance (both subjective and objective), while another meta-analysis (Van den Broeck, Ferris, Chang, & Rosen, 2016) found positive strong correlations between the need for autonomy and performance (task, creative, and proactive) and autonomy and intrinsic motivation.

Study 2: Meaningful work. From study 2, it was concluded that meaningful work, intrinsic motivation, and employee performance are related with a strong correlation between meaningful work and intrinsic motivation, a medium to strong correlation between meaningful work and performance, and a medium correlation between intrinsic motivation and performance. Hypothesis 3 was now fully supported in that meaningful work was also concluded to be a predictor of employee performance. The results for hypothesis 2, that intrinsic motivation partially mediates the relationship between meaningful work and employee performance, were inconclusive, so that hypothesis was not supported.

The path analysis estimated a relationship between meaningful work and intrinsic motivation and between meaningful work and performance, but either a negative or null relationship between intrinsic motivation and performance depending on the particular model estimation for this variable. Due to the strong correlation between the first two sets of variables (meaningful work-intrinsic motivation, meaningful work-performance), this result may have overridden the weaker correlation between intrinsic motivation and performance during path analysis.

This data set may have been problematic in that meaningful work and task significance were not actually measuring the same construct as concluded during sensitivity analysis. The data set was already small with only six studies, but removing task significance reduced the data set to just two studies. While meta-analytic calculations can be performed on such a small data set, the conclusions would not be generalizable.

As demonstrated by the systematic review, there has been little empirical research into the relationship between meaningful work, intrinsic motivation, and performance. Littman-Ovadia and Lavy (2015) found that meaningful work was one of several mediating mechanisms between perseverance and performance, but motivation was not part of their study. Steger et al. (2012) divided meaningful work into subscales and found positive correlations between each of the subscales and intrinsic motivation, but their study did not measure performance. These studies do support the findings in study 2, but again, with such a small data set, the conclusions are not generalizable.

Study 3: Organizational culture/climate. From study 3, it was concluded that organizational culture/climate, intrinsic motivation, and employee performance are related with a strong correlation between all the variables. Using path analysis, the model estimated that intrinsic

motivation fully mediates the relationship between climate and performance, but this estimate must be considered with caution since the data set only contained three studies, climate was a single measure, and climate was considered in isolation from other factors. Despite the small number of studies, the correlations were shown to be robust during sensitivity analysis and the variance was very small. However, two of these studies contained some overlapping subjects in the study population, so this overlap could explain why there was such strong correlation among the variables.

This study was conducted for comparison purposes with the other two studies and was not related to a hypothesis. The results did support the other two studies in that all the variables are correlated, however, the small data set and overlapping study population are problematic and no conclusions can be drawn from this study with a measure of confidence. As demonstrated by the literature review and systematic review, there are few studies that explore the relationship of organizational culture, intrinsic motivation, and performance. The study by Parker et al. (2003) came the closest to looking at all of the variables in a general sense. Their study also supported the estimation of full mediation, although their study looked at work attitudes in addition to performance as the mediating variables and the definition of motivation was confounded. Studies that investigate a particular type of climate, such as safety climate (Neal & Griffin, 2006) or service climate (Chen & Kao, 2014), may provide greater clues into the relationship of all three variables until more empirical research is conducted.

Generalizability of Conclusions

One of the main aims of this research was to synthesize the existing research to look for generalizable results. The meta-analysis determined there were likely moderators present for each study. Therefore, the results would not be generalizable outside of the parameters of the study.

However, due to the robustness of the autonomy study, the conclusions that autonomy is a predictor of performance and that intrinsic motivation partially mediates that relationship can be generalizable to other work settings as that falls within the scope of the study parameters, although there may be other variables that moderate those relationships that were not uncovered during this study.

All three of these studies looked at the three variables in isolation from other factors. When other factors come into play, it is likely and expected that these relationships will attenuate. Therefore, the impact of the predictor variables on intrinsic motivation and performance may lessen, as well as the impact of intrinsic motivation on performance, when other factors are introduced into the models. The correlations between each variable pair will also likely lessen when other factors are present. Therefore, the results of these three studies can be considered as subsets of a much larger model that includes other factors that impact the organization and its employees.

Significance of the Study

This study compiled, analyzed, and synthesized research from across fields to link organizational culture, intrinsic motivation, and employee performance to help fill a gap in the research literature. The findings showed that these variables are correlated through the use of the specific cultural factors autonomy and meaningful work. Autonomy and meaningful work are predictors of performance and intrinsic motivation mediates the relationship of autonomy on performance.

For employers, these conclusions can be used to help increase performance by ensuring that the organizational culture is autonomy supportive and is transparent on how each job can be

meaningful. Employers can also use the conclusions to help increase intrinsic motivation through autonomy.

For performance improvement practitioners, this study aimed to research factors that might affect the last cell of the Behavioral Engineering Model (BEM), motives. The conclusions supported that autonomy is one way to impact performance through intrinsic motivation, so by working with companies to help them increase employees' autonomy or to have an organizational culture that is autonomy supportive, practitioners can have a way of impacting the last cell of the BEM and add another method to their repertoire for enhancing employee performance.

Limitations of the Study

The limitations of the study were small data sets, imprecise terminology used throughout the field, and lack of empirical studies measuring all the variables. The lack of studies or studies that did not calculate correlations contributed to the problem of small data sets. The publication bias assessment supported this idea as well. Meta-analysis is a useful method for synthesizing research, even for small data sets, but small data sets can produce problematic results as can be seen with the path analysis for meaningful work. The imprecise terminology also contributed to the small data set issue. As can be seen by the meaningful work study, even operational definitions that appear to be comparable may not actually be measuring the same construct.

Implications for Practice

This study concluded that an organizational culture that supports the autonomy of employees can lead to enhanced employee performance, partly due to an increase in the intrinsic motivation of employees. This conclusion gives practitioners another method by which to assist organizations. While it may be difficult to increase intrinsic motivation directly, organizational

culture may be a key component to influencing it. Other organizational cultural factors may also influence intrinsic motivation or have a direct effect on employee performance.

Organizational leaders, managers, and human resources professionals can use the results of this study to take a closer look at their organizational culture and see where they may be able to make it more autonomy supportive. Not all organizations may be inclined to provide autonomy to employees, but even in organizations that are more tightly controlled by management, there may be some room for autonomy in certain aspects of the job.

Employees will benefit from this study when organizational management acts upon the findings and allows for more autonomy in the workplace. When autonomy is a value that is embedded into the organizational culture, employees will most likely experience an increase in intrinsic motivation and, ultimately, performance.

Returning to the BEM, when practitioners seek to improve performance, they typically use interventions to address the other five cells—data, instruments, incentives, knowledge, and capacity—and do not focus on motives. However, methods to address these other factors may fail to improve performance if motives are the underlying cause of the performance issues. This study provides a method for practitioners to enhance performance by influencing the last cell, motives, through organizational culture. Even if the motives cell of the BEM is not ultimately addressed, organizational cultural factors can directly impact performance, so practitioners should look for research that supports which specific cultural factors may have the biggest impact. It is important to remember, however, that the cells of the BEM do not operate independently of one another. Performance issues often result from a variety of factors and a multi-pronged approach to address those factors would then be warranted.

Practitioners can work with organizations to align the organizational culture/climate to be more autonomy supportive of its employees. What this autonomy supportive culture looks like will differ by organization and may even differ within the organization. Practitioners need to consider the current organizational culture and sub-cultures, national culture, diversity of the workforce, type of work performed, and a myriad of other factors to determine how best to incorporate autonomy into an organization. For some organizations, providing autonomy through creative freedom may be the answer. For others, autonomy may be offered by giving employees the freedom to choose how a task is performed, how to prioritize their workload, or whether to work projects individually or as a team. Autonomy supportive cultures might focus on location autonomy by allowing employees to decide if they want to telecommute and how often, or by giving them flex-time arrangements. There are different ways autonomy can be incorporated, even via small changes in policies or via management-employee relationships.

There may also be other organizational cultural factors that have been shown to improve performance through intrinsic motivation; practitioners can look for research that would serve to inform their evidence-based practices. Regardless of which organizational cultural factor is ultimately utilized, by addressing intrinsic motivation through organizational culture, motives will no longer be the neglected performance factor. However, practitioners also need to remember the other performance factors that could be creating issues, explore the depth of each factor, and consider the interplay between all the factors. Bringing motives into the forefront does not negate the importance and impact of the other performance factors. The BEM needs to be considered as a whole model that is one tool of several practitioners use when analyzing performance issues and not something that is used in isolation.

Suggestions for Further Research

There are several suggestions for future research. First, there should be a call for more empirical studies that investigate the linkage between organizational culture (or specific organizational cultural factors), intrinsic motivation, and performance. Second, the Parker et al. (2003) study could be replicated and adjusted to investigate the difference between extrinsic and intrinsic motivation. Their study used a specific meta-analytic technique that allowed the researchers to compile data from studies that did not contain all three variables and then link those variables through structural equation modeling (Viswesvaran & Ones, 1995). Third, the autonomy study could be replicated to look for moderators. Fourth, a meta-analysis could be performed on the relationship between specific organizational cultural factors and performance only to determine which factors have the greatest impact on performance. A fifth suggestion would be to compare different types of organizational climates (e.g., safety climate, service climate) to determine if specific types of organizational climates have more impact on intrinsic motivation and performance than others.

Summary

Overall, the study showed that the relationship between organizational culture, intrinsic motivation, and performance is complicated. No conclusions can be drawn for organizational culture as a whole, but the specific organizational cultural factors of autonomy and meaningful work are correlated with the other variables. In the case of autonomy, intrinsic motivation partially mediates the relationship with performance. The results of the autonomy study are only generalizable within the study parameters. Small data sets were a particularly problematic limitation of the study.

This study has several implications for practitioners and research. For practitioners, the study can offer another methodology by which to assist clients by helping organizations include autonomy of employees as part of their organizational culture. For researchers, the study leads to many more research questions that can help inform the direction of future research.

**APPENDIX A: SAMPLE EMAIL TO RESEARCHER TO ASK FOR STUDY
CORRELATIONS**

To: [Researcher Name]

Subject: request for data from a published study

Hello! I'm a doctoral student at Wayne State University in instructional technology and performance improvement. I'm researching the relationship between corporate culture, intrinsic motivation, and performance and am conducting a systematic review and meta-analysis.

I came across your article [insert article title] from [insert article date].

I don't see the correlation between the research variables of motivation and organizational culture. Would you happen to have that correlation?

Also, as part of the systematic review process, I need to reach out to researchers in my topic to try to uncover additional studies. Would you happen to know of any studies, published or unpublished, that specifically look at corporate culture, intrinsic motivation, and performance?

Thank you for your time!

Patti Radakovich

**APPENDIX B: SAMPLE EMAIL TO RESEARCHER TO ASK FOR ADDITIONAL
STUDIES**

To: [Researcher Name]

Subject: inquiry on autonomy and intrinsic motivation studies

Hello! I'm a doctoral student at Wayne State University in instructional technology and performance improvement. I'm researching the relationship between corporate culture, intrinsic motivation, and performance. I'm conducting a systematic review and meta-analysis and one of the variables I'm looking at in particular is autonomy (as a corporate cultural factor).

I came across several of your articles that I am reviewing, including [insert article title] and [insert article title].

As part of the systematic review process, I need to reach out to researchers in my topic to try to uncover additional studies. Would you happen to know of any studies, published or unpublished, that specifically look at autonomy, intrinsic motivation, and performance?

Thank you for your time and assistance!

Patti Radakovich

APPENDIX C: STUDY 1 (AUTONOMY) SEARCH LOG REDACTED SAMPLE

Ref Code	Title	Author	Date	Included in MA	Level of Review	Reason for Exclusion
A1	Attachment Moderates the Effects of Autonomy-Supportive and Controlling Interpersonal Primes on Intrinsic Motivation	Milyavskaya, Marina; McClure, M. Joy; Ma, Denise; Koestner, Richard; Lydon, John	2012	No	Study	This study does not look at the desired variables and it was conducted using student surveys, not in a business environment. The study looks at autonomy support, self-determined motivation, and future work intentions and daily hassles. Intentions and hassles are outcomes, not performance measures.
A10	A Motivational Model of Daily Hassles, Physical Symptoms, and Future Work Intentions Among Police Officers	Otis, Nancy and Pelletier, Luc G.	2005	No	Study	This study does not contain the desired variables and is not a business setting.
A100	Choice and ego-depletion: The moderating role of autonomy	Moller, A. C., Deci, E. L. and Ryan, R. M.	2006	No	Study	This paper does not present empirical research.
A101	Corporate Humanistic Responsibility: Social Performance Through Managerial Discretion of the HRM	Arnaud, S. and Wasieleski, D. M.	2014	No	Study	This study does not measure intrinsic motivation.
A102	Designing Learning Environments in Assembly Lines Through Self-Determination	Nukta, A., Haueis, M., Spitzer, M. and Hille, K.	2011	No	Study	This study most likely does not contain the desired variables based on the abstract. However, attempts to obtain the study through various sources to double check failed, so it was excluded based on the abstract.
A103	Differences in work motivation and job satisfaction between physicians and nurses	Grujicic, M., Sipetic, S., Cvejic, M. M., Novakovic, B. and Bata, J. J.	2012	No	Abstract	

APPENDIX D: STUDY 1 (AUTONOMY) CODING SHEET

ID	Title	Author	Year	Publication Source: (Journal/University (if dissertation)/Other Type of Proceeding	Synopsis of Study and Findings related to the Meta- Analysis
A3	Comparative Effects of Personal And Situational Influences	Colarelli, Dean, & Konstans	1987	Journal of Applied Psychology	This study was a longitudinal study that collected data from the same participants one year apart. Entry-level, new hire accountants and their supervisors made up the study population. The goal of the study was to determine if personal or situational factors had an effect on outcomes. The situational variables positively correlated with performance and internal work motivation, but motivation and performance had a negative correlation.
A8	Relative Importance of Key Job Dimensions and Leadership Behaviors in Motivating Salesperson Work Performance	Tyagi	1985	Journal of Marketing	This study looked at how key job dimensions and leadership behavior impacts salesperson motivation and performance. The study found that both job dimensions and leadership behavior can improve motivation and performance, but job dimensions are more likely to affect intrinsic motivation, therefore, redesigning jobs along them has a stronger influence.
A22	Intrinsic motivation as a moderator on the relationship between perceived job autonomy and work performance	Dysvik & Kuvaas	2011	European Journal of Work & Organizational Psychology	This study explored the relationship between autonomy, intrinsic motivation, and work performance and whether intrinsic motivation was a moderator between the other two variables. Performance measures were split into work quality and work effort, with work quality of the output being closest to the operational definition of performance in this meta-analysis. The study found that intrinsic motivation moderated the relationship between autonomy and work quality, but not work effort. This moderating effect occurred for individuals high in intrinsic motivation.
A22-2					
A27	Investigating the influences of core self-evaluations, job autonomy, and intrinsic motivation on in-role job performance	Joo, Jeung, & Yoon	2010	Human Resource Development Quarterly	This study explored the relationship between autonomy, self-evaluations, intrinsic motivation, and work performance. The study found that intrinsic motivation fully mediated the relationship between autonomy and performance.
A48	The role of external customer mind-set among service employees	Iyer & Johlke	2015	Journal of Services Marketing	This study developed and tested a model of external customer mind-set (ECMS) of front-line employees and the relationship of antecedents and outcomes to ECMS. The study found that job autonomy is positively associated with ECMS and also with work motivation and performance.
A70	Motivation at work: A partial test of the Vallerand (1997) hierarchical model of intrinsic and extrinsic motivation	Walker	2002	University of Houston	This study looked at a portion of Vallerand's model of motivation in a work context. Relationships were found among the variables, expect between work motivation and performance.
A77	A test of hypotheses derived from self-	Kuvaas	2009	Employee Relations	This study looked at the relationship between intrinsic motivation and work performance and what factors might affect that relationship. The study found that the relationship between job autonomy and work

ID	Title	Author	Year	Publication Source: (Journal/University (if dissertation)/Other Type of Proceeding	Synopsis of Study and Findings related to the Meta-Analysis
	determination theory among public sector employees				performance is partially mediated by intrinsic motivation.
A79	Close monitoring as a contextual stimulator: How need for structure affects the relation between close monitoring and work outcomes	Rietzschel, Slijkhuis, & Van Yperen	2014	European Journal of Work and Organizational Psychology	This study looked at how the personal need for structure related to close monitoring and other variables. The study found that autonomy was related to intrinsic motivation and innovative performance, but innovative performance and intrinsic motivation were not related.
A81	Different relationships between perceptions of developmental performance appraisal and work performance	Kuvaas	2007	Personnel Review	This study looked at the relationship between employee perceptions of performance appraisals and work performance. The study found a strong relationship between autonomy orientation and performance.
A82	Employee reactions to job characteristics	Hackman & Lawler	1971	Journal of Applied Psychology	This study tested the relationship between the job Characteristics Model and employee reactions to those characteristics. The study found that autonomy, along with variety, were the biggest predictors of intrinsic motivation and work quality (performance).
A85	Impact of job characteristics on retail salespeople's reactions to their jobs	Dubinsky & Skinner	1984	Journal of Retailing	This study looked at the relationship of retail salespeople's reactions to their jobs and job characteristics. The study found there was a correlation between autonomy and performance and autonomy and intrinsic motivation.
A88	The effects of job enrichment on employee satisfaction, motivation, involvement, and performance: A field experiment	Orpen	1979	Human Relations	This study was a field experiment whereby the jobs of half of a company's clerical staff were enriched along the job dimensions from the Job Characteristics Model. The study found the enriched employees had increased intrinsic motivation (among other factors), but it did not lead to an increase in performance. The study presented two separate study populations: enriched and unenriched employees; all measures are reported post-enrichment. Due to the experimental design of the study, it is not natural occurring. However, because the experiment was conducted in an actual work environment, it is being included in the meta-analysis.
A88-2					
A91	A profile approach to self-determination theory motivations at work	Moran, Diefendorff, Kim, & Liu	2012	Journal of Vocational Behavior	This study looked at how different types of motivation impacted employee outcomes using cluster analysis of the motivation measures. The study revealed there were five distinct cluster patterns of motivation. While this cluster analysis is not of relevance to the larger study, correlations between the desired variables are measured making this study relevant to the meta-analysis.
A163	A self-determination perspective of strengths use at work: Examining its determinant	Kong & Ho	2016	The Journal of Positive Psychology	This study looked at how strengths use affects performance. Relationships were found between autonomy support, intrinsic motivation, and task performance.

ID	Title	Author	Year	Publication Source: (Journal/University (if dissertation)/Other Type of Proceeding	Synopsis of Study and Findings related to the Meta- Analysis
	and performance implications				
MW9	The Job Characteristics Model of Motivation in a Mental Hospital Setting: A Partial Test and Extension to Expectancy and Self- Consistency Theories	Campbell	1980	The University of Nebraska - Lincoln	This study was a replication of the relationships within the Hackman-Oldham Job Characteristic Model (JCM) and integration of Expectancy Theory and Self-Consistency Theory in a state-operated mental hospital. Direct care workers were given a questionnaire and performance review data were collected from the personnel department. The study replicated the relationships outlined in the JCM. It also found a positive relationship between Expectancy Theory variables and the Job Characteristics Model for the dimensions evaluated.

ID	Cited by	Country	Type of Company: (Public/Private/ Non-Profit/ Government)	Type of Company: Industry	Number of companies	All study variables
A3	228	US	unknown - probably public	accounting	11 "Big Eight" accounting firms	Personal variables: cognitive ability, undergraduate GPA, socioeconomic status, partnership goal - first day, partnership goal - year one Situational variables: autonomy, feedback, job context Dependent variables: performance, promotability, job satisfaction, internal work motivation, organizational commitment, turnover
A8	241	unknown	unknown	life insurance	1	Job Dimensions: job skill variety, task identity, task significance, job autonomy, job feedback, agent feedback Leadership characteristics: leader trust and support, leader goal emphasis, interaction and facilitation, psychological influence, hierarchical influence Outcome variables: intrinsic motivation, extrinsic motivation, performance
A22	51	Norway	unknown	international software technology company	1	Demographics: gender, tenure, position Perceived job autonomy Intrinsic motivation Performance measures: work quality, work effort
A22- 2		Norway	unknown	financial institution	1	Demographics: gender, education, tenure, base pay, level Perceived job autonomy Intrinsic motivation Performance measures: work quality, work effort
A27	44	Korea	for-profit	Fortune Global 100	1	Core self-evaluations Job autonomy Intrinsic motivation In-role job performance
A48	1	US	multiple	multiple	multiple	Antecedents: role ambiguity, role conflict, job satisfaction, job autonomy, customer ambiguity External customer mind-set Outcomes: work motivation, job performance

ID	Cited by	Country	Type of Company: (Public/Private/ Non-Profit/ Government)	Type of Company: Industry	Number of companies	All study variables
A70	3	US	unknown	mid-size oil company	1	Perceived autonomy support Pay satisfaction Perceived job characteristics Perceived work autonomy Perceived work competence Self-determined work motivation Job satisfaction Performance
A77	64	Norway	multiple	multiple	multiple	Control variables: education, basic pay, tenure, gender, managerial responsibility, municipality, administration, culture (national), technical, social welfare, local healthcare, children and youngsters, schools, other Independent variables: job autonomy, supervisor support, task interdependence Dependent variable: work performance Mediating variable: intrinsic motivation
A79	11	Netherlands	multiple	chemical industry, consultancy, medical organization	3	Control variables: length of time in job, length of time supervising Personal need for structure Close monitoring Autonomy Role clarity Intrinsic work motivation Job satisfaction Innovative job performance
A81	101	Norway	unknown	savings bank	1	Control variables: age, gender, education, managerial responsibility, team size Independent variable: developmental performance appraisal Dependent variable: work performance Moderating/mediating variables: affective commitment, intrinsic motivation, autonomy orientation
A82	3031	US	unknown	telephone company	1	Level of intrinsic motivation Focus of motivation variables: taking personal responsibility, doing large quantities of work, doing high quality work Rated performance: quantity, quality, overall effectiveness General job satisfaction Job involvement Absenteeism Specific satisfaction items: self-esteem obtained from job, personal growth and development, prestige of job inside company, amount of close supervision received, independent thought and action, security, pay, feeling of worthwhile accomplishment, participation in job-related decisions, development of close friendships, promotion, respect and fair treatment from boss
A85	133	US	unknown	department store chain	1	Job dimensions: variety, autonomy, task identify, feedback Overall job satisfaction Role conflict Role ambiguity Work motivation Organizational commitment Performance

ID	Cited by	Country	Type of Company: (Public/Private/ Non-Profit/ Government)	Type of Company: Industry	Number of companies	All study variables
A88	182	US	government	quasi-federal	1	Job Characteristics: skill variety, task identity, task significance, autonomy, feedback Work satisfaction Job involvement Intrinsic (internal) motivation Job performance/productivity Absenteeism Turnover Growth need strength Contextual satisfaction
A88-2		US	government	quasi-federal	1	
A91	48	China	multiple	multiple	12	Social support Job characteristics: job autonomy, skill variety, task identity, task significance, feedback Motivation: external motivation, introjected motivation, identified motivation, integrated motivation, intrinsic motivation need satisfaction In-role performance
A163	2	US	multiple	multiple	multiple	Control variables: gender, organizational tenure Autonomy support Strengths use Intrinsic motivation Independent self-construal Work outcomes: task performance, helping behaviors
MW9	No data	US	State-operated	mental hospital	1	Job characteristics: skill variety, task identity, task significance, autonomy, feedback from job, feedback from agents, dealing with people, motivating potential score Critical psychological states: experienced meaningfulness, experienced responsibility, knowledge of results Personal and work outcomes: general satisfaction, internal work motivation, performance evaluation, absenteeism, turnover (surrogate), satisfaction with pay, satisfaction with security, satisfaction with social, satisfaction with supervision, satisfaction with growth, performance to outcome (E-2), performance to outcome (extrinsic), performance to outcome (intrinsic) Moderator measures: growth need strength ("would like" format), growth need strength ("job choice" format), self-esteem, desire for job enrichment

ID	Type of Employees/ Participant Selection	Data Collection Method (Type of Study)	Source of Surveys	Independent Variable (A) = Organizational Cultural Factor (autonomy or meaningful work)	Dependent Variable (B) = Intrinsic Motivation	Dependent Variable (C) = Performance
A3	entry level only	1) longitudinal study - self-report questionnaires 2) supervisor-reported performance questionnaire and performance rating	A) Job Diagnostic Survey (1980) B) Job Diagnostic Survey (1980) C) Composite of annual performance rating and two question supervisor survey	autonomy	internal work motivation	performance
A8	salespeople only	self-report questionnaire	A) adapted from Hackman and Oldman (1980) B) independent scale: valence, expectancy, and instrumentality constructs were measured and then factor analysis performed C) independent questionnaire	job autonomy	intrinsic motivation	performance
A22	random sampling	online self-report questionnaire	A) Nine-item instrument validated by Morgeson and Humphrey (2006) and Kuvaas (2009) B) Six-item instrument validated by Dysvik and Kuvaas (2008) C) Ten-item instrument validated by Kuvaas and Dysvik (2009)	perceived job autonomy	intrinsic motivation	work quality
A22-2	random sampling	1) online self-report questionnaire 2) online line manager questionnaire	A) Nine-item instrument validated by Morgeson and Humphrey (2006) and Kuvaas (2009) B) Six-item instrument validated by Dysvik and Kuvaas (2008) C) Ten-item instrument validated by Kuvaas and Dysvik (2009) modified to line manager-report	perceived job autonomy	intrinsic motivation	work quality
A27	convenience sampling	cross-sectional self-report questionnaire	A) Job Diagnostic Survey (1980) B) Five-item instrument developed by Tierney et al (1999) C) Five-item scale developed by Podsakoff and MacKenzie (1989)	job autonomy	intrinsic motivation	in-role job performance
A48	random sample of front-line (direct contact with external customers) only	self-report questionnaire	A) Items from Sims et al (1976) B) Work motivation scale adapted from Oliver and Anderson (1994) C) Items adapted from Behrman and Perreault (1982)	job autonomy	work motivation	job performance
A70	self-selected	1) self-report questionnaire 2) company assessment of individual performance	A) Items taken from Basic Need Satisfaction at Work Scale (Deci et al 2001) B) Blais Work Motivation Inventory (1994) C) Performance competitive ranking measures from company	perceived work autonomy	self-determined work motivation	overall performance
A77	various	online self-report questionnaire	A) Nine-item scale validated by Morgeson and Humphrey (2003, 2006) B) Six-item scale derived from Cameron and Pierce (1994) and Kuvaas (2006) C) Six-item scale validated by Brockner et al (1992), May et al (2002), and Kuvaas (2006)	job autonomy	intrinsic motivation	work performance

ID	Type of Employees/ Participant Selection	Data Collection Method (Type of Study)	Source of Surveys	Independent Variable (A) = Organizational Cultural Factor (autonomy or meaningful work)	Dependent Variable (B) = Intrinsic Motivation	Dependent Variable (C) = Performance
A79	various	1) self-report questionnaire 2) supervisor questionnaire	A) Eleven-item scale developed by Van Veldhoven (1996) B) Twelve-item Work Motivation Scale (Blais et al, 1993) C) Nine-item scale developed by Janssen (2001)	job autonomy	intrinsic work motivation	innovative job performance
A81	not part of corporate management group	online self-report questionnaire	A) Eight-item scale validated by Martinsen (2004) B) Six-item scale derived from Cameron and Pierce (1994) C) Six-item scale validated by Brockner et al (1992) and May et al (2002)	autonomy orientation	intrinsic motivation	work performance
A82	variety of workers (non supervisor)	1) self-report questionnaire 2) supervisor questionnaire	A) Internally-validated questionnaire B) Internally-validated questionnaire C) Internally-validated questionnaire	autonomy	level of intrinsic motivation	rated performance - quality
A85	retail salespeople	1) Self-report questionnaire 2) Year-to-date sales	A) modified version of Job Characteristics Inventory (Sims et al, 1976) B) Six-item scale from Hackman and Oldman (1976) C) Year-to-date sales	autonomy	work motivation	performance
A88	clerical	1) self-report questionnaire 2) supervisor ratings plus group productivity indices	A) Job Diagnostic Survey (Hackman and Oldman, 1975) B) Job Diagnostic Survey (Hackman and Oldman, 1975) C) individual supervisor ratings plus group productivity indices	autonomy	internal motivation	performance ratings
A88-2	clerical	1) self-report questionnaire 2) supervisor ratings plus group productivity indices	A) Job Diagnostic Survey (Hackman and Oldman, 1975) B) Job Diagnostic Survey (Hackman and Oldman, 1975) C) individual supervisor ratings plus group productivity indices	autonomy	internal motivation	performance ratings
A91	various	1) self-report questionnaire: employee 2) self-report questionnaire: supervisor	A) Nine-item scale from Morgeson and Humphrey (2006) B) Scale adapted from Ryan and Deci (2000) theory as well as from other researchers C) Scale from Williams and Anderson (1991)	job autonomy	intrinsic motivation	in-role performance
A163	various	1) online self-report questionnaire 2) online supervisor questionnaire	A) Nine-item Autonomy Support Scale (Moreau and Mageau, 2012) B) Motivation at Work Scale (Gagne et al, 2010) C) Blend of items from Williams and Anderson's (1991) In-role Performance Scale and Interpersonal Organizational Citizenship Behavior Scale	leader autonomy support	intrinsic motivation	task performance
MW9	direct care workers	1) self-report questionnaire 2) performance evaluation data from personnel dept	A - Job Diagnostics Survey (Hackman & Oldman, 1974) B - Job Diagnostics Survey (Hackman & Oldman, 1974) C - performance evaluation data - State of Iowa Confidential Performance Review/Evaluation	autonomy	internal work motivation	performance evaluation

ID	Sample Size (N)	Correlation of AB	Correlation of BC	Correlation of AC	Reliability of A	Reliability of B	Reliability of C
A3	280	0.16	-0.05	0.2	0.74	0.67	0.82
A8	94	0.39	0.57	0.45	0.66	0.76	0.814
A22	199	0.39	0.27	0.36	0.94	0.88	0.8
A22-2	103	0.53	0.25	0.17	0.93	0.92	0.86
A27	283	0.52	0.44	0.4	0.71	0.84	0.83
A48	362	0.493	0.552	0.45	0.86	0.85	0.9
A70	121	0.398	-0.027	0.14	0.77	0.89	1
A77	779	0.38	0.31	0.18	0.92	0.82	0.79
A79	295	0.15	0.06	0.19	0.89	0.91	0.95
A81	434	0.12	0.29	0.39	0.7	0.86	0.75
A82	208	0.3	0.13	0.16	0.77	0.72	0.79
A85	116	0.368	0.157	0.217	0.74	0.81	1
A88	36	0.16	-0.2	0.09	0.66	0.76	0.82
A88-2	36	0.3	-0.18	-0.44	0.66	0.76	0.82
A91	225	0.29	0.18	0.13	0.91	0.88	0.78
A163	194	0.45	0.23	0.38	0.85	0.94	0.87
MW9	202	0.38	0.15	0.22	0.66	0.76	1

Note: The numbers highlighted in gray are imputed.

ID	Note
A3	Hackman and Oldham's (1980) definition of internal work motivation from the Job Characteristics Model is very similar to the operational definition of intrinsic motivation so this study and others that use this measure can be included in the meta-analysis.
A8	The reliabilities for autonomy and internal motivation were imputed from the Job Diagnostic Survey study (Hackman and Oldham, 1975), because that is the scale they used. The reliability for performance was imputed by taking the average reliability of other self-reported performance scales in this meta-analysis (A22, A27, A48, A77, A81). With the exception of A77 and A81, which were studies conducted by the same researchers, none of the scales used were the same, so an average of all of the scales was the best estimate of the reliability.
A22	There were two factors for work performance: work effort and work quality. Work quality was closest to the operational definition of performance so it was chosen to represent that variable.
A22-2	There are two separate studies in this study with different populations so both can be used for the meta-analysis.
A27	
A48	Motivation factor appears to be a combination of work and intrinsic motivation and therefore is included since it does measure intrinsic, albeit partially.
A70	Perceived work autonomy is the desired measure, so it was chosen over perceived autonomy support. In this case, self-determined work motivation measures intrinsic motivation (as well as other types) but is being used as the intrinsic motivation measure. The reliability for performance was imputed as 1 because the number came from a company performance review, not a researcher survey; while the company's method is not completely objective, all company provided measures of performance will be treated as objective data, which has a reliability of 1, for the purposes of this meta-analysis.
A77	
A79	Intrinsic work motivation is the same construct as the operational definition of intrinsic motivation. This study looks at innovative performance instead of overall performance. The meta-analysis will be run with and without these data to see if it changes the findings.
A81	Autonomy orientation refers to how people perceive their own autonomy so it is essentially the same construct as autonomy.
A82	There were multiple measures of performance; the quality measure was selected as it most closely aligns with the operational definition of performance.
A85	Hackman and Oldham's (1980) definition of work motivation from the Job Characteristics Model is very similar to the operational definition of intrinsic motivation so this study can be included in the meta-analysis. The reliability for performance was imputed as 1 because the data were obtained from objective measures.
A88	The reliabilities for autonomy and internal motivation were imputed from the Job Diagnostic Survey study (Hackman and Oldham, 1975), because that is the scale they used. The reliability for performance was imputed from study A3 because it was also a composite rating; A3's performance was measured as a composite of an annual performance review and a two question supervisor feedback survey. The performance ratings were a combination of individual supervisor ratings (a single question on general competence) and group productivity indices. The study did not report how the performance ratings were calculated. Even though the measure does include a component of group performance, the study is included as it also contains a measure of individual performance.
A88-2	This study contained two separate study populations. It is an experimental design which is not naturally occurring, so the meta-analysis will be run with and without these data for comparison.
A91	
A163	Leader autonomy support is a measure of the worker perceived autonomy on the job. Task performance is the same construct as job performance in this study.
MW9	Hackman and Oldham's (1980) definition of internal work motivation from the Job Characteristics Model is very similar to the operational definition of intrinsic motivation so this study can be included in the meta-analysis. The reliabilities for autonomy and internal work motivation were imputed from the Job Diagnostic Survey study (Hackman and Oldham, 1975), because that is the scale they used and it was the first Hackman and Oldham study that reported reliabilities. The reliability for performance was imputed as 1 because the number came from a company performance review, not a researcher survey; while the company's method is not completely objective, all company provided measures of performance will be treated as objective data, which has a reliability of 1, for the purposes of this meta-analysis.

APPENDIX E: STUDY 1 (AUTONOMY) OUTLIER ANALYSIS

Outlier Analysis for Auto_AB

```

> r <- c(.16, .39, .39, .53, .52, .493, .398, .38, .15, .12, .3, .368, .16, .
3, .29, .45, .38 )
>
> n <-c(280, 94, 199, 103, 283, 362, 121, 779, 295, 434, 208, 116, 36, 36, 22
5, 194, 202)
>
> ID <- c("a3", "a8", "a22", "a22-2", "a27", "a48", "a70", "a77", "a79", "a81
", "a82", "a85", "a88", "a88-2", "a91", "a163", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
      r    n   ID
1 0.160 280   a3
2 0.390  94   a8
3 0.390 199  a22
4 0.530 103 a22-2
5 0.520 283  a27
6 0.493 362  a48
7 0.398 121  a70
8 0.380 779  a77
9 0.150 295  a79
10 0.120 434  a81
11 0.300 208  a82
12 0.368 116  a85
13 0.160  36  a88
14 0.300  36 a88-2
15 0.290 225  a91
16 0.450 194 a163
17 0.380 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
      r    n   ID   yi    vi
1 0.160 280   a3 0.1614 0.0036
2 0.390  94   a8 0.4118 0.0110
3 0.390 199  a22 0.4118 0.0051
4 0.530 103 a22-2 0.5901 0.0100
5 0.520 283  a27 0.5763 0.0036
6 0.493 362  a48 0.5400 0.0028
7 0.398 121  a70 0.4213 0.0085
8 0.380 779  a77 0.4001 0.0013
9 0.150 295  a79 0.1511 0.0034
10 0.120 434  a81 0.1206 0.0023
11 0.300 208  a82 0.3095 0.0049
12 0.368 116  a85 0.3861 0.0088
13 0.160  36  a88 0.1614 0.0303
14 0.300  36 a88-2 0.3095 0.0303
15 0.290 225  a91 0.2986 0.0045
16 0.450 194 a163 0.4847 0.0052
17 0.380 202  mw9 0.4001 0.0050
> res <- rma(yi, vi, data=dat)
> res

```

Random-Effects Model (k = 17; tau² estimator: REML)

```
tau^2 (estimated amount of total heterogeneity): 0.0177 (SE = 0.0084)
tau (square root of estimated tau^2 value):      0.1332
I^2 (total heterogeneity / total variability):   79.76%
H^2 (total variability / sampling variability):  4.94
```

```
Test for Heterogeneity:
Q(df = 16) = 86.9167, p-val < .0001
```

```
Model Results:
```

```
estimate      se      zval      pval      ci.lb      ci.ub
  0.3637    0.0378    9.6295    <.0001    0.2897    0.4378
```

```
***
```

```
---
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
>
```

```
> predict(res, transf=transf.ztor, digits=2)
```

```
pred ci.lb ci.ub cr.lb cr.ub
  0.35  0.28  0.41  0.09  0.56
```

```
> inf <- influence(res)
```

```
> inf
```

```
  rstudent  dffits  cook.d  cov.r  tau2.del  QE.del  hat
1  -1.4929 -0.4002  0.1476  0.9949   0.0161  75.6150  0.0668
2   0.2855  0.0650  0.0044  1.1017   0.0188  86.6277  0.0497
3   0.3192  0.0813  0.0070  1.1267   0.0190  86.2767  0.0625
4   1.4239  0.3301  0.1047  1.0045   0.0167  81.2956  0.0514
5   1.5895  0.4324  0.1685  0.9749   0.0156  72.2897  0.0670
6   1.3125  0.3625  0.1243  1.0234   0.0166  73.5484  0.0695
7   0.3578  0.0854  0.0076  1.1087   0.0189  86.4000  0.0544
8   0.2625  0.0724  0.0057  1.1546   0.0193  85.0468  0.0750
9  -1.5929 -0.4296  0.1666  0.9771   0.0157  73.6616  0.0674
10 -1.9827 -0.5596  0.2529  0.8986   0.0139  60.0522  0.0711
11 -0.3626 -0.0950  0.0095  1.1262   0.0190  86.4473  0.0631
12  0.1377  0.0320  0.0011  1.1139   0.0190  86.8120  0.0537
13 -0.9360 -0.1644  0.0271  1.0366   0.0179  85.6549  0.0297
14 -0.2495 -0.0449  0.0020  1.0608   0.0184  86.8445  0.0297
15 -0.4402 -0.1159  0.0142  1.1238   0.0189  86.1377  0.0642
16  0.8160  0.2095  0.0448  1.0871   0.0182  83.5962  0.0621
17  0.2412  0.0612  0.0040  1.1303   0.0191  86.5116  0.0627
```

```
  weight  dfb  inf
1  6.6839 -0.3989
2  4.9670  0.0647
3  6.2473  0.0813
4  5.1441  0.3314
5  6.6960  0.4306
6  6.9524  0.3613
7  5.4434  0.0852
8  7.4994  0.0730
9  6.7425 -0.4277
10 7.1137 -0.5511
11 6.3091 -0.0950
12 5.3667  0.0319
13 2.9700 -0.1641
```

```

14 2.9700 -0.0446
15 6.4151 -0.1161
16 6.2109 0.2096
17 6.2684 0.0613
> plot(Inf)

```

Outlier Analysis for Auto_AC

```

>
> r <- c(.2, .45, .36, .17, .4, .45, .14, .18, .19, .39, .16, .217, .09, -.44
, .13, .38, .22)
>
> n <-c(280, 94, 199, 103, 283, 362, 121, 779, 295, 434, 208, 116, 36, 36, 22
5, 194, 202)
>
> ID <- c("a3", "a8", "a22", "a22-2", "a27", "a48", "a70", "a77", "a79", "a81
", "a82", "a85", "a88", "a88-2", "a91", "a163", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
      r    n   ID
1  0.200 280  a3
2  0.450  94  a8
3  0.360 199  a22
4  0.170 103 a22-2
5  0.400 283  a27
6  0.450 362  a48
7  0.140 121  a70
8  0.180 779  a77
9  0.190 295  a79
10 0.390 434  a81
11 0.160 208  a82
12 0.217 116  a85
13 0.090  36  a88
14 -0.440  36 a88-2
15 0.130 225  a91
16 0.380 194  a163
17 0.220 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
      r    n   ID      yi      vi
1  0.200 280  a3  0.2027 0.0036
2  0.450  94  a8  0.4847 0.0110
3  0.360 199  a22 0.3769 0.0051
4  0.170 103 a22-2 0.1717 0.0100
5  0.400 283  a27 0.4236 0.0036
6  0.450 362  a48 0.4847 0.0028
7  0.140 121  a70 0.1409 0.0085
8  0.180 779  a77 0.1820 0.0013
9  0.190 295  a79 0.1923 0.0034
10 0.390 434  a81 0.4118 0.0023
11 0.160 208  a82 0.1614 0.0049
12 0.217 116  a85 0.2205 0.0088
13 0.090  36  a88 0.0902 0.0303
14 -0.440  36 a88-2 -0.4722 0.0303
15 0.130 225  a91 0.1307 0.0045
16 0.380 194  a163 0.4001 0.0052

```

```
17 0.220 202 mw9 0.2237 0.0050
> res <- rma(yi, vi, data=dat)
> res
```

Random-Effects Model (k = 17; tau² estimator: REML)

```
tau^2 (estimated amount of total heterogeneity): 0.0216 (SE = 0.0099)
tau (square root of estimated tau^2 value):      0.1471
I^2 (total heterogeneity / total variability):   82.78%
H^2 (total variability / sampling variability):   5.81
```

```
Test for Heterogeneity:
Q(df = 16) = 80.0770, p-val < .0001
```

Model Results:

```
estimate      se      zval      pval      ci.lb      ci.ub      ***
  0.2512    0.0408    6.1545    <.0001    0.1712    0.3311
```

```
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
> predict(res, transf=transf.ztor, digits=2)
```

```
pred ci.lb ci.ub cr.lb cr.ub
0.25 0.17 0.32 -0.05 0.50
```

```
>
```

```
> inf <- influence(res)
```

```
> inf
```

	rstudent	dffits	cook.d	cov.r	tau2.del	QE.del	hat	weight	dfb	inf
1	-0.2921	-0.0454	0.0023	1.1696	0.0242	78.5869	0.0660	6.5977	-0.0455	
2	1.3446	0.2955	0.0847	1.0148	0.0206	75.9187	0.0511	5.1053	0.2964	
3	0.7781	0.2193	0.0507	1.1232	0.0231	77.8688	0.0623	6.2295	0.2194	
4	-0.4422	-0.0831	0.0073	1.1218	0.0233	79.0142	0.0526	5.2649	-0.0827	
5	1.1281	0.2974	0.0877	1.0628	0.0214	73.2723	0.0661	6.6078	0.2973	
6	1.6671	0.3982	0.1343	0.9267	0.0179	62.4362	0.0682	6.8205	0.3946	
7	-0.6380	-0.1398	0.0203	1.1032	0.0228	77.9407	0.0553	5.5317	-0.1396	
8	-0.4441	-0.0936	0.0096	1.1675	0.0239	71.9832	0.0727	7.2659	-0.0943	
9	-0.3595	-0.0653	0.0047	1.1639	0.0240	78.0019	0.0665	6.6465	-0.0656	
10	1.0749	0.2945	0.0870	1.0769	0.0217	70.8048	0.0695	6.9530	0.2946	
11	-0.5470	-0.1200	0.0153	1.1314	0.0233	77.3611	0.0628	6.2821	-0.1201	
12	-0.1669	-0.0108	0.0001	1.1490	0.0240	79.7510	0.0546	5.4636	-0.0108	
13	-0.7133	-0.1244	0.0156	1.0517	0.0221	78.9601	0.0321	3.2067	-0.1238	
14	-3.5767	-0.6973	0.4002	0.6772	0.0124	61.5725	0.0321	3.2067	-0.7789	
15	-0.7559	-0.1866	0.0358	1.0982	0.0224	75.2851	0.0637	6.3719	-0.1867	
16	0.9266	0.2492	0.0640	1.0985	0.0225	76.8574	0.0620	6.1985	0.2492	
17	-0.1573	-0.0072	0.0001	1.1708	0.0243	79.5575	0.0625	6.2475	-0.0072	

```
> plot(inf)
```

Outlier Analysis for Auto_BC

```
r <- c(-.05, .57, .27, .25, .44, .552, -.027, .31, .06, .29, .13, .157, -.2,
-.18, .18, .23, .15)
```

```
>
```

```
> n <-c(280, 94, 199, 103, 283, 362, 121, 779, 295, 434, 208, 116, 36, 36, 22,
5, 194, 202)
```

```
>
```



```

> ID <- c("a3", "a8", "a22", "a22-2", "a27", "a48", "a70", "a77", "a79", "a81",
", "a82", "a85", "a88", "a88-2", "a91", "a163", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
   r      n   ID
1 -0.050 280   a3
2  0.570  94   a8
3  0.270 199  a22
4  0.250 103 a22-2
5  0.440 283  a27
6  0.552 362  a48
7 -0.027 121  a70
8  0.310 779  a77
9  0.060 295  a79
10 0.290 434  a81
11 0.130 208  a82
12 0.157 116  a85
13 -0.200  36  a88
14 -0.180  36 a88-2
15 0.180 225  a91
16 0.230 194  a163
17 0.150 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
   r      n   ID   yi    vi
1 -0.050 280   a3 -0.0500 0.0036
2  0.570  94   a8  0.6475 0.0110
3  0.270 199  a22  0.2769 0.0051
4  0.250 103 a22-2  0.2554 0.0100
5  0.440 283  a27  0.4722 0.0036
6  0.552 362  a48  0.6213 0.0028
7 -0.027 121  a70 -0.0270 0.0085
8  0.310 779  a77  0.3205 0.0013
9  0.060 295  a79  0.0601 0.0034
10 0.290 434  a81  0.2986 0.0023
11 0.130 208  a82  0.1307 0.0049
12 0.157 116  a85  0.1583 0.0088
13 -0.200  36  a88 -0.2027 0.0303
14 -0.180  36 a88-2 -0.1820 0.0303
15 0.180 225  a91  0.1820 0.0045
16 0.230 194  a163 0.2342 0.0052
17 0.150 202  mw9  0.1511 0.0050
> res <- rma(yi, vi, data=dat)
> res

Random-Effects Model (k = 17; tau^2 estimator: REML)

tau^2 (estimated amount of total heterogeneity): 0.0431 (SE = 0.0177)
tau (square root of estimated tau^2 value):      0.2077
I^2 (total heterogeneity / total variability):   90.55%
H^2 (total variability / sampling variability):  10.58

Test for Heterogeneity:
Q(df = 16) = 146.6331, p-val < .0001

Model Results:

estimate      se      zval      pval      ci.lb      ci.ub      ***
0.2131    0.0544    3.9164    <.0001    0.1064    0.3197

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> predict(res, transf=transf.ztor, digits=2)

```

```

pred ci.lb ci.ub cr.lb cr.ub
0.21 0.11 0.31 -0.20 0.56
> inf <- influence(res)
> inf
  rstudent  dffits  cook.d  cov.r  tau2.del  QE.del  hat  weight  dfb  inf
1  -1.3038 -0.3545 0.1176 1.0034 0.0401 117.9347 0.0633 6.3349 -0.3538
2   2.0664 0.4470 0.1708 0.8890 0.0353 132.6596 0.0547 5.4711 0.4506
3   0.2928 0.0891 0.0085 1.1425 0.0467 146.5761 0.0614 6.1389 0.0891
4   0.1865 0.0593 0.0037 1.1327 0.0466 146.6307 0.0557 5.5729 0.0592
5   1.2597 0.3210 0.0994 1.0324 0.0415 133.0811 0.0634 6.3402 0.3206
6   2.2557 0.5372 0.2168 0.8230 0.0317 95.1226 0.0645 6.4487 0.5311
7  -1.1015 -0.2764 0.0748 1.0376 0.0420 136.5943 0.0574 5.7377 -0.2765
8   0.5131 0.1489 0.0238 1.1396 0.0463 143.1138 0.0667 6.6661 0.1494
9  -0.7195 -0.1807 0.0337 1.1008 0.0447 133.9906 0.0636 6.3602 -0.1809
10  0.4032 0.1197 0.0154 1.1448 0.0466 145.9218 0.0651 6.5147 0.1201
11 -0.3728 -0.0828 0.0073 1.1327 0.0462 143.0052 0.0617 6.1676 -0.0829
12 -0.2368 -0.0453 0.0022 1.1303 0.0464 145.4241 0.0570 5.6963 -0.0452
13 -1.6103 -0.3389 0.1091 0.9629 0.0394 139.4996 0.0403 4.0320 -0.3434
14 -1.5237 -0.3202 0.0981 0.9746 0.0400 140.1247 0.0403 4.0320 -0.3237
15 -0.1379 -0.0206 0.0005 1.1463 0.0469 145.1918 0.0622 6.2160 -0.0206
16  0.0992 0.0404 0.0018 1.1470 0.0469 146.4968 0.0612 6.1220 0.0404
17 -0.2782 -0.0575 0.0035 1.1384 0.0465 144.1376 0.0615 6.1488 -0.0575
> plot(inf)

```

```
>
```

APPENDIX F: STUDY 1 (AUTONOMY) PATH ANALYSIS

L I S R E L 9.20 (STUDENT)

BY

Karl G. Jöreskog & Dag Sörbom

This program is published exclusively by
 Scientific Software International, Inc.
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 Universal Copyright Convention.

The following lines were read from file C:\Users\Patricia\Google Drive\Dissertation
 material\Calculations\Lisrel\SYNTAX1.spl:

```
Title: Mediation Partial
ni = 3
observed variables: auto im perf
Correlation:
1.0
0.409 1.0
0.313 0.293 1.0
Sample size = 3967
Latent variables: autolv imlv perflv
auto = 1*autolv
im = 1*imlv
perf = 1*perflv
imlv = autolv
perflv = imlv
perflv = autolv
let the error variance of auto equal to 0.214
let the error variance of im equal to 0.175
let the error variance of perf equal to 0.142
lisrel otuput: ss sc ef
end of problem
```

Mediation Partial

Correlation Matrix

	im	perf	auto
im	1.000		
perf	0.293	1.000	
auto	0.409	0.313	1.000

Total Variance = 3.000 Generalized Variance = 0.724

Largest Eigenvalue = 1.679 Smallest Eigenvalue = 0.590

Condition Number = 1.687

Mediation Partial

Parameter Specifications

BETA

	imlv	perflv
imlv	0	0
perflv	1	0

GAMMA

autolv

```

imlv      2
perflv   3

```

PHI

```

      autolv
-----
      4

```

PSI

```

      imlv      perflv
-----
      5          6

```

Mediation Partial

Number of Iterations = 0

LISREL Estimates (Maximum Likelihood)

LAMBDA-Y

```

      imlv      perflv
-----
im      1.000      - -
perflv  - -      1.000

```

LAMBDA-X

```

      autolv
-----
auto    1.000

```

BETA

```

      imlv      perflv
-----
imlv    - -      - -
perflv  0.213      - -
         (0.022)
         9.540

```

GAMMA

```

      autolv
-----
imlv    0.520
         (0.019)
         27.818
perflv  0.288
         (0.023)
         12.318

```

Covariance Matrix of ETA and KSI

```

      imlv      perflv      autolv
-----
imlv    0.825
perflv  0.293      0.858
autolv  0.409      0.313      0.786

```

PHI

```

      autolv
-----
      0.786

```

(0.022)
35.006

PSI

Note: This matrix is diagonal.

	imlv	perflv
	-----	-----
	0.612	0.706
	(0.019)	(0.020)
	32.261	35.989

Squared Multiple Correlations for Structural Equations

	imlv	perflv
	-----	-----
	0.258	0.178

NOTE: R² for Structural Equations are Hayduk's (2006) Blocked-Error R²

Reduced Form

	autolv

imlv	0.520
	(0.019)
	27.815
perflv	0.398
	(0.019)
	20.589

Squared Multiple Correlations for Reduced Form

	imlv	perflv
	-----	-----
	0.258	0.145

THETA-EPS

	im	perf
	-----	-----
	0.175	0.142

Squared Multiple Correlations for Y - Variables

	im	perf
	-----	-----
	0.825	0.858

THETA-DELTA

	auto

	0.214

Squared Multiple Correlations for X - Variables

	auto

	0.786

Log-likelihood Values

	Estimated Model	Saturated Model
	-----	-----
Number of free parameters (t)	6	6
-2ln(L)	10619.358	10619.358
AIC (Akaike, 1974)*	10631.358	10631.358
BIC (Schwarz, 1978)*	10669.073	10669.073

*LISREL uses $AIC = 2t - 2\ln(L)$ and $BIC = t\ln(N) - 2\ln(L)$

Goodness-of-Fit Statistics

Degrees of Freedom for (C1)-(C2) 0
 Browne's (1984) ADF Chi-Square (C2_NT) 0.0 (P = 1.0000)

The Model is Saturated, the Fit is Perfect !

Mediation Partial

Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.908	- -
perf	- -	0.926

LAMBDA-X

	autolv
auto	0.887

BETA

	imlv	perflv
imlv	- -	- -
perflv	0.208	- -

GAMMA

	autolv
imlv	0.508
perflv	0.275

Correlation Matrix of ETA and KSI

	imlv	perflv	autolv
imlv	1.000		
perflv	0.348	1.000	
autolv	0.508	0.381	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	0.742	0.822

Regression Matrix ETA on KSI (Standardized)

	autolv
imlv	0.508
perflv	0.381

Mediation Partial

Completely Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.908	- -
perf	- -	0.926

LAMBDA-X

```

      autolv
-----
auto    0.887

```

BETA

```

      imlv    perflv
-----
imlv    - -
perflv  0.208  - -

```

GAMMA

```

      autolv
-----
imlv    0.508
perflv  0.275

```

Correlation Matrix of ETA and KSI

```

      imlv    perflv    autolv
-----
imlv    1.000
perflv  0.348    1.000
autolv  0.508    0.381    1.000

```

PSI

Note: This matrix is diagonal.

```

      imlv    perflv
-----
      0.742    0.822

```

THETA-EPS

```

      im    perf
-----
      0.175    0.142

```

THETA-DELTA

```

      auto
-----
      0.214

```

Regression Matrix ETA on KSI (Standardized)

```

      autolv
-----
imlv    0.508
perflv  0.381

```

Mediation Partial

Total and Indirect Effects

Total Effects of KSI on ETA

```

      autolv
-----
imlv    0.520
        (0.019)
        27.818

perflv  0.398
        (0.019)
        20.592

```

Indirect Effects of KSI on ETA

```

      autolv
-----
imlv    - -

```

perflv 0.111
 (0.012)
 9.209

Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	0.213 (0.022) 9.540	- -

Largest Eigenvalue of B*B' (Stability Index) is 0.045

Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	1.000	- -
perf	0.213 (0.022) 9.540	1.000

Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.213 (0.022) 9.540	- -

Total Effects of KSI on Y

	autolv

im	0.520 (0.019) 27.818
perf	0.398 (0.019) 20.592

Mediation Partial

Standardized Total and Indirect Effects

Standardized Total Effects of KSI on ETA

	autolv

imlv	0.508
perflv	0.381

Standardized Indirect Effects of KSI on ETA

	autolv

imlv	- -
perflv	0.106

Standardized Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -

perflv 0.208 - -

Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.908	- -
perf	0.193	0.926

Completely Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.908	- -
perf	0.193	0.926

Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.193	- -

Completely Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.193	- -

Standardized Total Effects of KSI on Y

	autolv

im	0.461
perf	0.353

Completely Standardized Total Effects of KSI on Y

	autolv

im	0.461
perf	0.353

Time used 0.047 seconds

APPENDIX G: STUDY 2 (MEANINGFUL WORK) SEARCH LOG REDACTED

SAMPLE

Ref Code	Title	Author	Date	Included in MA	Level of Review	Reason for Exclusion
MW1	Job Design and the Psychological Status of Taiwanese Pharmacists on Job Outcomes: An Application of the Job Characteristics Model	Lin, Blossom Yen-Ju; Yeh, Ying-Chen; Lin, Wen-Hung	2010	No	Study	Meaningful work is not a factor in this study, but it does have autonomy. This study looks at job autonomy and work outcomes (work satisfaction, intent to transfer, and intent to leave). Intrinsic motivation and performance were not variables.
	Mission possible? The performance of prosocially motivated employees depends on manager trustworthiness	A. M. S. Grant, John J.	2009	No	Abstract	This study measures prosocial motivation, not intrinsic motivation.
	Job-Content Perceptions, Performance-Reward Expectancies, and Absenteeism Among Low-Wage Public-Sector Clerical Employees	R. R. S. Hirschfeld, Leigh P., Bedeian, Arthur G.	2002	No	Abstract	This study does not measure performance or intrinsic motivation.
MW42	Technological Differences in Job Characteristics, Employee Satisfaction, and Motivation: A Synthesis of Job Design Research and Sociotechnical Systems Theory	D. M. Rousseau	1977	No	Study	This study does not measure performance or intrinsic motivation.

APPENDIX H: STUDY 2 (MEANINGFUL WORK) CODING SHEET

ID	Title	Author	Year	Publication Source: (Journal/University (if dissertation)/Other Type of Proceeding)
MW10	Motivational drivers that fuel employees to champion the hospitality brand	Xiong & King	2015	International Journal of Hospitality Management
A8	Relative Importance of Key Job Dimensions and Leadership Behaviors in Motivating Salesperson Work Performance	Tyagi	1985	Journal of Marketing
A88	The effects of job enrichment on employee satisfaction, motivation, involvement, and performance: A field experiment	Orpen	1979	Human Relations
A88-2				
A91	A profile approach to self-determination theory motivations at work	Moran, Diefendorff, Kim, & Liu	2012	Journal of Vocational Behavior
MW9	The Job Characteristics Model of Motivation in a Mental Hospital Setting: A Partial Test and Extension to Expectancy and Self-Consistency Theories	Campbell	1980	The University of Nebraska - Lincoln

Note: The numbers highlighted in gray are imputed.

ID	Synopsis of Study and Findings related to the Meta-Analysis
MW10	This study looked at what drives employees to promote their company's brand. All of the variables were measured at the individual level through an online self-reported survey of various hotel employees in the US. The study found that brand meaningfulness and brand value-fit had a significant positive impact on pro-brand motivation, which was a strong predictor of employee brand performance. It also found that intrinsic motivation to work moderated the positive relationship between pro-brand motivation and brand performance, but it did not impact brand performance alone. Although this study is specifically about brand meaningfulness and performance, it is included in the meta-analysis to see how it compares to generalized meaningfulness and performance in other studies. Intrinsic motivation was used as the study variable over pro-brand motivation because the operational definition of intrinsic motivation in this brand study matches the operational definition of intrinsic motivation in the larger study.
A8	This study looked at how key job dimensions and leadership behavior impacts salesperson motivation and performance. The study found that both job dimensions and leadership behavior can improve motivation and performance, but job dimensions are more likely to affect intrinsic motivation, therefore, redesigning jobs along them has a stronger influence. This study was included after expanding the systematic review to include task significance.
A88	This study was a field experiment whereby the jobs of half of a company's clerical staff were enriched along the job dimensions from the Job Characteristics Model. The study found the enriched employees had increased intrinsic motivation (among other factors), but it did not lead to an increase in performance. The study presents two separate study populations: enriched and unenriched employees; all measures are reported post-enrichment. Due to the experimental design of the study, it is not natural occurring. However, because the experiment was conducted in an actual work environment, it is being included in the meta-analysis. This study was included after expanding the systematic review to include task significance.
A88-2	
A91	This study looked at how different types of motivation impacted employee outcomes using cluster analysis of the motivation measures. The study revealed there were five distinct cluster patterns of motivation. While this cluster analysis is not of relevance to the larger study, correlations between the desired variables are measured making this study relevant to the meta-analysis. This study was included after expanding the systematic review to include task significance.
MW9	This study was a replication of the relationships within the Hackman-Oldham Job Characteristic Model (JCM) and integration of Expectancy Theory and Self-Consistency Theory in a state-operated mental hospital. Direct care workers were given a questionnaire and performance review data were collected from the personnel department. The study replicated the relationships outlined in the JCM. It also found a positive relationship between Expectancy Theory variables and the Job Characteristics Model for the dimensions evaluated.

ID	All study variables
MW10	Brand meaningfulness Brand value-fit Pro-brand motivation Intrinsic motivation to work Brand performance
A8	Job Dimensions: job skill variety, task identity, task significance, job autonomy, job feedback, agent feedback Leadership characteristics: leader trust and support, leader goal emphasis, interaction and facilitation, psychological influence, hierarchical influence Outcome variables: intrinsic motivation, extrinsic motivation, performance
A88	Job Characteristics: skill variety, task identity, task significance, autonomy, feedback Work satisfaction Job involvement Intrinsic (internal) motivation Job performance/productivity Absenteeism Turnover Growth need strength Contextual satisfaction
A88-2	
A91	Social support Job characteristics: job autonomy, skill variety, task identity, task significance, feedback Motivation: external motivation, introjected motivation, identified motivation, integrated motivation, intrinsic motivation need satisfaction In-role performance
MW9	Job characteristics: skill variety, task identity, task significance, autonomy, feedback from job, feedback from agents, dealing with people, motivating potential score Critical psychological states: experienced meaningfulness, experienced responsibility, knowledge of results Personal and work outcomes: general satisfaction, internal work motivation, performance evaluation, absenteeism, turnover (surrogate), satisfaction with pay, satisfaction with security, satisfaction with social, satisfaction with supervision, satisfaction with growth, performance to outcome (E-2), performance to outcome (extrinsic), performance to outcome (intrinsic) Moderator measures: growth need strength ("would like" format), growth need strength ("job choice" format), self-esteem, desire for job enrichment

ID	Cited by	Country	Type of Company: (Public/Private/Non-Profit/Government)	Industry	Number of companies	Type of Employees/ Participant Selection	Data Collection Method (Type of Study)
MW10	7	US	chain hotels independent hotels	hotel employees	more than 1	entry level supervisor middle management senior management	online self-reported survey
A8	241	unknown	unknown	life insurance	1	salespeople	self-report questionnaire
A88	182	US	government	quasi-federal	1	clerical	1) self-report questionnaire 2) supervisor ratings plus group productivity indices
A88-2		US	government	quasi-federal	1	clerical	1) self-report questionnaire 2) supervisor ratings plus group productivity indices
A91	48	China	multiple	multiple	12	unknown	1) self-report questionnaire: employee 2) self-report questionnaire: supervisor
MW9	No data	US	State-operated	mental hospital	1	direct care workers	1) self-report questionnaire 2) performance evaluation data from personnel dept

ID	Source of Surveys
MW10	A) Scale adapted from Hackman & Oldham (1974, 1975, 1976) & Spreitzer (1995) B) Scale adapted from Grant (2008) C) Four-item scale directly adopted from employee brand equipment measurement scale (King et al., 2012)
A8	A) Scale adapted from Hackman & Oldham (1980) B) Independent scale: valence, expectancy, and instrumentality constructs were measured and then factor analysis performed C) Independent questionnaire
A88	A) Job Diagnostic Survey (Hackman & Oldham, 1975) B) Job Diagnostic Survey (Hackman & Oldham, 1975) C) individual supervisor ratings plus group productivity indices
A88-2	A) Job Diagnostic Survey (Hackman & Oldham, 1975) B) Job Diagnostic Survey (Hackman & Oldham, 1975) C) individual supervisor ratings plus group productivity indices
A91	A) Job Diagnostic Survey (Hackman & Oldham, 1975) B) Scale adapted from Ryan & Deci (2000) theory as well as from other researchers C) Scale from Williams & Anderson (1991)
MW9	A) Job Diagnostics Survey (Hackman & Oldham, 1974) B) Job Diagnostics Survey (Hackman & Oldham, 1974) C) performance evaluation data - State of Iowa Confidential Performance Review/Evaluation

ID	Predictor Variable (A) = Organizational Cultural Factor (autonomy or meaningful work)	Outcome Variable (B) = Intrinsic Motivation	Outcome Variable (C) = Performance
MW10	brand meaningfulness	intrinsic motivation to work	brand performance
A8	task significance	intrinsic motivation	performance
A88	task significance	internal motivation	performance ratings
A88-2	task significance	internal motivation	performance ratings
A91	task significance	intrinsic motivation	in-role performance
MW9	meaningfulness	internal work motivation	performance evaluation

ID	Sample Size (N)	Correlation of AB	Correlation of BC	Correlation of AC	Reliability of A	Reliability of B	Reliability of C
MW10	202	0.488	0.516	0.79	0.908	0.935	0.923
A8	94	0.35	0.57	0.28	0.66	0.76	0.814
A88	36	0.07	-0.2	-0.36	0.66	0.76	0.82
A88-2	36	0.25	-0.18	0.11	0.66	0.76	0.82
A91	225	0.28	0.18	0.13	0.76	0.88	0.78
MW9	202	0.66	0.15	0.29	0.74	0.76	1

Note: The numbers highlighted in gray are imputed.

ID	Note
MW10	The study states that brand meaningfulness is similar to perceived work meaningfulness, but focuses on the meaningfulness of delivering the brand. Intrinsic motivation to work is the same construct as intrinsic motivation. Brand performance refers to the behaviors and actions of employees that are in line with their company's brand.
A8	The reliabilities for task significance and internal motivation were imputed from the Job Diagnostic Survey study (Hackman & Oldham, 1975), because that is the scale they used. This study was added after expanding the definition of meaningfulness to task significance. The reliability for performance was imputed by taking the average reliability of other self-reported performance scales in this meta-analysis (A22, A27, A48, A77, A81). With the exception of A77 and A81 which were studies conducted by the same researchers, none of the scales used were the same, so an average of all of the scales was the best estimate of the reliability.
A88	The reliabilities for task significance and internal motivation were imputed from the Job Diagnostic Survey study (Hackman & Oldham, 1975), because that is the scale they used. The reliability for performance was imputed from study A3 because it was also a composite rating; A3's performance was measured as a composite of an annual performance review and a two question supervisor feedback survey. The performance ratings were a combination of individual supervisor ratings (a single question on general competence) and group productivity indices. The study did not report how the performance ratings were calculated. Even though the measure does include a component of group performance, the study is included as it also contains a measure of individual performance. This study was added after expanding the definition of meaningfulness to task significance.
A88-2	This study contained two separate study populations. It is an experimental design which is not naturally occurring, so the meta-analysis will be run with and without these data for comparison.
A91	This study was added after expanding the definition of meaningfulness to task significance.
MW9	Hackman and Oldham's (1980) definition of internal work motivation from the Job Characteristics Model is very similar to the operational definition of intrinsic motivation so this study can be included in the meta-analysis. The reliabilities for meaningfulness and internal work motivation were imputed from the Job Diagnostic Survey study (Hackman & Oldham, 1975), because that is the scale they used and it was the first Hackman and Oldham study that reported reliabilities. The reliability for performance was imputed as 1 because the number came from a company performance review, not a researcher survey; while the company's method is not completely objective, all company provided measures of performance will be treated as objective data, which has a reliability of 1, for the purposes of this meta-analysis.

APPENDIX I: STUDY 2 (MEANINGFUL WORK) OUTLIER ANALYSIS

Outlier Analysis for MW_AB

```

>
> r <- c(.488, .35, .07, .25, .28, .66)
>
> n <-c(202, 94, 36, 36, 225, 202)
>
> ID <- c("mw10", "a8", "a88", "a88-2", "a91", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
      r    n   ID
1 0.488 202 mw10
2 0.350  94  a8
3 0.070  36  a88
4 0.250  36 a88-2
5 0.280 225  a91
6 0.660 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
      r    n   ID   yi    vi
1 0.488 202 mw10 0.5334 0.0050
2 0.350  94  a8  0.3654 0.0110
3 0.070  36  a88 0.0701 0.0303
4 0.250  36 a88-2 0.2554 0.0303
5 0.280 225  a91 0.2877 0.0045
6 0.660 202  mw9 0.7928 0.0050
> res <- rma(yi, vi, data=dat)
> res

Random-Effects Model (k = 6; tau^2 estimator: REML)

tau^2 (estimated amount of total heterogeneity): 0.0508 (SE = 0.0398)
tau (square root of estimated tau^2 value):      0.2253
I^2 (total heterogeneity / total variability):   85.86%
H^2 (total variability / sampling variability):  7.07

Test for Heterogeneity:
Q(df = 5) = 36.6528, p-val < .0001

Model Results:

estimate      se      zval      pval      ci.lb      ci.ub      ***
  0.4104    0.1027    3.9967    <.0001    0.2092    0.6117

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

> predict(res, transf=transf.ztor, digits=2)
  pred ci.lb ci.ub cr.lb cr.ub
  0.39  0.21  0.55 -0.07  0.71
> inf <- influence(res)
> inf
  rstudent  dffits  cook.d  cov.r  tau2.del  QE.del  hat  weight  dfb  inf
1  0.5378  0.2893  0.1027  1.4795  0.0634  35.8453  0.1891  18.9068  0.2920

```

```

2 -0.1606 -0.0332 0.0014 1.4942 0.0656 35.3356 0.1708 17.0805 -0.0332
3 -1.3656 -0.5439 0.2646 0.9840 0.0422 30.9053 0.1301 13.0104 -0.5544
4 -0.5525 -0.1973 0.0423 1.2850 0.0578 34.9378 0.1301 13.0104 -0.1949
5 -0.5194 -0.2187 0.0565 1.4290 0.0607 25.3374 0.1908 19.0850 -0.2206
6 2.8588 1.1372 0.4547 0.5070 0.0146 10.2225 0.1891 18.9068 1.0683 *
> plot(inf)
> ds[,]
      r   n  ID
6 0.66 202 mw9

```

Outlier Analysis for MW_AC

```

> r <- c(.79, .28, -.36, .11, .13, .29)
>
> n <-c(202, 94, 36, 36, 225, 202)
>
> ID <- c("mw10", "a8", "a88", "a88-2", "a91", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
      r   n  ID
1 0.79 202 mw10
2 0.28  94  a8
3 -0.36  36 a88
4 0.11  36 a88-2
5 0.13 225  a91
6 0.29 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
      r   n  ID      yi      vi
1 0.79 202 mw10 1.0714 0.0050
2 0.28  94  a8  0.2877 0.0110
3 -0.36  36 a88 -0.3769 0.0303
4 0.11  36 a88-2 0.1104 0.0303
5 0.13 225  a91 0.1307 0.0045
6 0.29 202  mw9 0.2986 0.0050
> res <- rma(yi, vi, data=dat)
> res

```

Random-Effects Model (k = 6; tau² estimator: REML)

```

tau^2 (estimated amount of total heterogeneity): 0.2070 (SE = 0.1396)
tau (square root of estimated tau^2 value):      0.4550
I^2 (total heterogeneity / total variability):    96.12%
H^2 (total variability / sampling variability):   25.77

```

```

Test for Heterogeneity:
Q(df = 5) = 131.6005, p-val < .0001

```

Model Results:

```

estimate      se      zval      pval      ci.lb      ci.ub
 0.2678    0.1918    1.3958    0.1628   -0.1082    0.6437

```

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

> predict(res, transf=transf.ztor, digits=2)
  pred ci.lb ci.ub cr.lb cr.ub
  0.26 -0.11  0.57 -0.60  0.84
> inf <- influence(res)
> inf
  rstudent  dffits  cook.d  cov.r  tau2.del  QE.del  hat  weight  dfb  inf
1  3.9035  1.6030  0.5796  0.3088  0.0428  14.7796  0.1735  17.3549  1.5241  *
2  0.0476  0.0343  0.0015  1.5067  0.2627  130.0431  0.1688  16.8801  0.0343
3 -1.6477 -0.7141  0.3930  0.8869  0.1526  110.2281  0.1551  15.5063 -0.7226
4 -0.3178 -0.1269  0.0192  1.4272  0.2518  128.4955  0.1551  15.5063 -0.1262
5 -0.2890 -0.1196  0.0177  1.4842  0.2572  107.2572  0.1740  17.3976 -0.1200
6  0.0713  0.0454  0.0026  1.5195  0.2638  128.2425  0.1735  17.3549  0.0456
> plot(inf)
> ds[1,]
      r    n  ID
1 0.79 202 mw10

```

Outlier Analysis for MW_BC

```

> r <- c(.516, .57, -.2, -.18, .18, .15)
>
> n <-c(202, 94, 36, 36, 225, 202)
>
> ID <- c("mw10", "a8", "a88", "a88-2", "a91", "mw9")
> ds <- cbind(data.frame(r, n, ID))
> ds
      r    n  ID
1 0.516 202 mw10
2 0.570  94  a8
3 -0.200  36  a88
4 -0.180  36 a88-2
5 0.180 225  a91
6 0.150 202  mw9
> dat <- escalc(measure="ZCOR", ri=r, ni=n, data = ds)
> dat
      r    n  ID      yi      vi
1 0.516 202 mw10  0.5709 0.0050
2 0.570  94  a8   0.6475 0.0110
3 -0.200  36  a88 -0.2027 0.0303
4 -0.180  36 a88-2 -0.1820 0.0303
5 0.180 225  a91  0.1820 0.0045
6 0.150 202  mw9  0.1511 0.0050
> res <- rma(yi, vi, data=dat)
> res

```

Random-Effects Model (k = 6; tau² estimator: REML)

```

tau^2 (estimated amount of total heterogeneity): 0.1072 (SE = 0.0761)
tau (square root of estimated tau^2 value):      0.3274
I^2 (total heterogeneity / total variability):   92.77%
H^2 (total variability / sampling variability):   13.82

```

Test for Heterogeneity:

Q(df = 5) = 49.0896, p-val < .0001

Model Results:

```
estimate      se      zval      pval      ci.lb      ci.ub
  0.2158    0.1417    1.5229    0.1278   -0.0619    0.4936
```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
> inf <- influence(res)
```

```
> inf
```

```
  rstudent  dffits  cook.d  cov.r  tau2.del  QE.del    hat  weight    dfb  inf
1  1.2159  0.5594  0.2874  1.1260   0.0980  28.9376  0.1790  17.9004  0.5579
2  1.5232  0.6548  0.3438  0.9690   0.0838  36.3828  0.1700  16.9970  0.6540
3 -1.3083 -0.5519  0.2684  1.0077   0.0909  40.5032  0.1461  14.6092 -0.5576
4 -1.2217 -0.5134  0.2401  1.0483   0.0949  41.2022  0.1461  14.6092 -0.5173
5 -0.0852 -0.0122  0.0002  1.5579   0.1410  45.0201  0.1798  17.9838 -0.0123
6 -0.1753 -0.0544  0.0038  1.5420   0.1395  43.4442  0.1790  17.9004 -0.0548
```

```
> plot(inf)
```

APPENDIX J: STUDY 2 (MEANINGFUL WORK - ALL) PATH ANALYSIS

L I S R E L 9.20 (STUDENT)

BY

Karl G. Jöreskog & Dag Sörbom

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 Universal Copyright Convention.

The following lines were read from file C:\Users\Patricia\Google Drive\Dissertation
 material\Calculations\Lisrel\SYNTAX2.spl:

```
Title: Mediation Partial
ni = 3
observed variables: mw im perf
Correlation:
1.0
0.528 1.0
0.428 0.321 1.0
Sample size = 795
Latent variables: mwlv imlv perflv
mw = 1*mwlv
im = 1*imlv
perf = 1*perflv
imlv = mwlv
perflv = imlv
perflv = mwlv
let the error variance of mw equal to 0.269
let the error variance of im equal to 0.191
let the error variance of perf equal to 0.141
lisrel otuput: ss sc ef
end of problem
```

Mediation Partial

Correlation Matrix

	im	perf	mw
im	1.000		
perf	0.321	1.000	
mw	0.528	0.428	1.000

Total Variance = 3.000 Generalized Variance = 0.580

Largest Eigenvalue = 1.857 Smallest Eigenvalue = 0.452

Condition Number = 2.027

Mediation Partial

Parameter Specifications

BETA

	imlv	perflv
imlv	0	0
perflv	1	0

GAMMA

mwlv

```

imlv      2
perflv    3

```

PHI

```

      mwlv
-----
      4

```

PSI

```

      imlv      perflv
-----
      5          6

```

Mediation Partial

Number of Iterations = 0

LISREL Estimates (Maximum Likelihood)

LAMBDA-Y

```

      imlv      perflv
-----
im      1.000      - -
perflv  - -      1.000

```

LAMBDA-X

```

      mwlv
-----
mw      1.000

```

BETA

```

      imlv      perflv
-----
imlv    - -      - -
perflv  0.028      - -
         (0.067)
         0.416

```

GAMMA

```

      mwlv
-----
imlv    0.722
         (0.043)
         16.679
perflv  0.565
         (0.073)
         7.716

```

Covariance Matrix of ETA and KSI

```

      imlv      perflv      mwlv
-----
imlv    0.809
perflv  0.321      0.859
mwlv    0.528      0.428      0.731

```

PHI

```

      mwlv
-----
      0.731

```

(0.050)
14.574

PSI

Note: This matrix is diagonal.

imlv	perflv
-----	-----
0.428	0.608
(0.038)	(0.042)
11.233	14.515

Squared Multiple Correlations for Structural Equations

imlv	perflv
-----	-----
0.471	0.292

NOTE: R² for Structural Equations are Hayduk's (2006) Blocked-Error R²

Reduced Form

	mwlv

imlv	0.722
	(0.043)
	16.668
perflv	0.585
	(0.045)
	12.957

Squared Multiple Correlations for Reduced Form

imlv	perflv
-----	-----
0.471	0.292

THETA-EPS

im	perf
-----	-----
0.191	0.141

Squared Multiple Correlations for Y - Variables

im	perf
-----	-----
0.809	0.859

THETA-DELTA

mw

0.269

Squared Multiple Correlations for X - Variables

mw

0.731

Log-likelihood Values

	Estimated Model	Saturated Model
	-----	-----
Number of free parameters (t)	6	6
-2ln(L)	1952.042	1952.042
AIC (Akaike, 1974)*	1964.042	1964.042
BIC (Schwarz, 1978)*	1992.112	1992.112

*LISREL uses $AIC = 2t - 2\ln(L)$ and $BIC = t\ln(N) - 2\ln(L)$

Goodness-of-Fit Statistics

Degrees of Freedom for (C1)-(C2)	0
Maximum Likelihood Ratio Chi-Square (C1)	0.0 (P = 1.0000)
Browne's (1984) ADF Chi-Square (C2_NT)	0.0 (P = 1.0000)

The Model is Saturated, the Fit is Perfect !

Mediation Partial

Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.899	- -
perf	- -	0.927

LAMBDA-X

	mwlv
mw	0.855

BETA

	imlv	perflv
imlv	- -	- -
perflv	0.027	- -

GAMMA

	mwlv
imlv	0.687
perflv	0.522

Correlation Matrix of ETA and KSI

	imlv	perflv	mwlv
imlv	1.000		
perflv	0.385	1.000	
mwlv	0.687	0.540	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	0.529	0.708

Regression Matrix ETA on KSI (Standardized)

	mwlv
imlv	0.687
perflv	0.540

Mediation Partial

Completely Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.899	- -
perf	- -	0.927

LAMBDA-X

	mwlv
mw	0.855

BETA

	imlv	perflv
imlv	- -	- -
perflv	0.027	- -

GAMMA

	mwlv
imlv	0.687
perflv	0.522

Correlation Matrix of ETA and KSI

	imlv	perflv	mwlv
imlv	1.000		
perflv	0.385	1.000	
mwlv	0.687	0.540	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	0.529	0.708

THETA-EPS

	im	perf
	0.191	0.141

THETA-DELTA

	mw
	0.269

Regression Matrix ETA on KSI (Standardized)

	mwlv
imlv	0.687
perflv	0.540

Mediation Partial

Total and Indirect Effects

Total Effects of KSI on ETA

	mwlv
imlv	0.722 (0.043) 16.679
perflv	0.585 (0.045) 12.965

Indirect Effects of KSI on ETA

	mwlv
imlv	- -

perflv 0.020
 (0.048)
 0.418

Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	0.028 (0.067) 0.416	- -

Largest Eigenvalue of B*B' (Stability Index) is 0.001

Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	1.000	- -
perf	0.028 (0.067) 0.416	1.000

Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.028 (0.067) 0.416	- -

Total Effects of KSI on Y

	mwlv

im	0.722 (0.043) 16.679
perf	0.585 (0.045) 12.965

Mediation Partial

Standardized Total and Indirect Effects

Standardized Total Effects of KSI on ETA

	mwlv

imlv	0.687
perflv	0.540

Standardized Indirect Effects of KSI on ETA

	mwlv

imlv	- -
perflv	0.018

Standardized Total Effects of ETA on ETA

	imlv	perflv
	-----	-----

imlv	- -	- -
perflv	0.027	- -

Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.899	- -
perf	0.025	0.927

Completely Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.899	- -
perf	0.025	0.927

Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.025	- -

Completely Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.025	- -

Standardized Total Effects of KSI on Y

	mwlv

im	0.618
perf	0.501

Completely Standardized Total Effects of KSI on Y

	mwlv

im	0.618
perf	0.501

Time used 0.062 seconds

APPENDIX K: STUDY 2 (MEANINGFUL WORK – SPECIFIC TERM ONLY) PATH ANALYSIS

L I S R E L 9.20 (STUDENT)

BY

Karl G. Jöreskog & Dag Sörbom

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The following lines were read from file C:\Users\Patricia\Google Drive\Dissertation material\Calculations\Lisrel\SYNTAX2a.spl:

```
Title: Mediation Partial
ni = 3
observed variables: mwo im perf
Correlation:
1.0
0.67 1.0
0.62 0.38 1.0
Sample size = 404
Latent variables: mwo lv imlv perflv
mwo = 1*mwo lv
im = 1*imlv
perf = 1*perflv
imlv = mwo lv
perflv = imlv
perflv = mwo lv
let the error variance of mwo equal to 0.176
let the error variance of im equal to 0.153
let the error variance of perf equal to 0.039
lisrel otuput: ss sc ef
end of problem
```

Mediation Partial

Correlation Matrix

	im	perf	mwo
	-----	-----	-----
im	1.000		
perf	0.380	1.000	
mwo	0.670	0.620	1.000

Total Variance = 3.000 Generalized Variance = 0.338

Largest Eigenvalue = 2.122 Smallest Eigenvalue = 0.256

Condition Number = 2.878

Mediation Partial

Parameter Specifications

BETA

	imlv	perflv
	-----	-----
imlv	0	0
perflv	1	0

GAMMA

```

          mwolv
          -----
    imlv      2
    perflv    3

```

PHI

```

          mwolv
          -----
            4

```

PSI

```

          imlv      perflv
          -----
            5          6

```

Mediation Partial

Number of Iterations = 0

LISREL Estimates (Maximum Likelihood)

LAMBDA-Y

```

          imlv      perflv
          -----
    im      1.000      - -
    perf     - -      1.000

```

LAMBDA-X

```

          mwolv
          -----
    mwo      1.000

```

BETA

```

          imlv      perflv
          -----
    imlv     - -      - -
    perflv   -0.411    - -
              (0.111)
              -3.691

```

GAMMA

```

          mwolv
          -----
    imlv      0.813
              (0.046)
              17.502
    perflv    1.086
              (0.115)
              9.434

```

Covariance Matrix of ETA and KSI

```

          imlv      perflv      mwolv
          -----
    imlv      0.847
    perflv    0.380      0.961
    mwolv     0.670      0.620      0.824

```

PHI

```

      mwolv
      -----
      0.824
      (0.070)
      11.711
  
```

PSI
 Note: This matrix is diagonal.

```

      imlv      perflv
      -----
      0.302      0.444
      (0.040)    (0.050)
      7.515      8.803
  
```

Squared Multiple Correlations for Structural Equations

```

      imlv      perflv
      -----
      0.643      0.538
  
```

NOTE: R² for Structural Equations are Hayduk's (2006) Blocked-Error R²

Reduced Form

```

      mwolv
      -----
imlv  0.813
      (0.047)
      17.480
perflv 0.752
      (0.049)
      15.430
  
```

Squared Multiple Correlations for Reduced Form

```

      imlv      perflv
      -----
      0.643      0.485
  
```

THETA-EPS

```

      im      perf
      -----
      0.153      0.039
  
```

Squared Multiple Correlations for Y - Variables

```

      im      perf
      -----
      0.847      0.961
  
```

THETA-DELTA

```

      mwo
      -----
      0.176
  
```

Squared Multiple Correlations for X - Variables

```

      mwo
      -----
      0.824
  
```

Log-likelihood Values

	Estimated Model	Saturated Model
	-----	-----
Number of free parameters(t)	6	6
-2ln(L)	773.782	773.782

AIC (Akaike, 1974)*	785.782	785.782
BIC (Schwarz, 1978)*	809.791	809.791

*LISREL uses $AIC = 2t - 2\ln(L)$ and $BIC = t\ln(N) - 2\ln(L)$

Goodness-of-Fit Statistics

Degrees of Freedom for (C1)-(C2)	0
Maximum Likelihood Ratio Chi-Square (C1)	0.0 (P = 1.0000)
Browne's (1984) ADF Chi-Square (C2_NT)	0.0 (P = 1.0000)

The Model is Saturated, the Fit is Perfect !

Mediation Partial

Standardized Solution

LAMBDA-Y

	imlv	perflv
	-----	-----
im	0.920	- -
perf	- -	0.980

LAMBDA-X

	mwolv

mwo	0.908

BETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	-0.386	- -

GAMMA

	mwolv

imlv	0.802
perflv	1.006

Correlation Matrix of ETA and KSI

	imlv	perflv	mwolv
	-----	-----	-----
imlv	1.000		
perflv	0.421	1.000	
mwolv	0.802	0.697	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	-----	-----
	0.357	0.462

Regression Matrix ETA on KSI (Standardized)

	mwolv

imlv	0.802
perflv	0.697

Mediation Partial

Completely Standardized Solution

LAMBDA-Y

	imlv	perflv
	-----	-----

im	0.920	- -
perf	- -	0.980

LAMBDA-X

	mwolv

mwo	0.908

BETA

	imlv	perflv
-----	-----	-----
imlv	- -	- -
perflv	-0.386	- -

GAMMA

	mwolv

imlv	0.802
perflv	1.006

Correlation Matrix of ETA and KSI

	imlv	perflv	mwolv
-----	-----	-----	-----
imlv	1.000		
perflv	0.421	1.000	
mwolv	0.802	0.697	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
-----	-----	-----
	0.357	0.462

THETA-EPS

	im	perf
-----	-----	-----
	0.153	0.039

THETA-DELTA

	mwo

	0.176

Regression Matrix ETA on KSI (Standardized)

	mwolv

imlv	0.802
perflv	0.697

Mediation Partial

Total and Indirect Effects

Total Effects of KSI on ETA

	mwolv

imlv	0.813
	(0.046)
	17.502
perflv	0.752
	(0.049)
	15.449

Indirect Effects of KSI on ETA

	mwolv

imlv	- -
perflv	-0.334
	(0.097)
	-3.429

Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	-0.411	- -
	(0.111)	
	-3.691	

Largest Eigenvalue of B*B' (Stability Index) is 0.169

Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	1.000	- -
perf	-0.411	1.000
	(0.111)	
	-3.691	

Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	-0.411	- -
	(0.111)	
	-3.691	

Total Effects of KSI on Y

	mwolv

im	0.813
	(0.046)
	17.502
perf	0.752
	(0.049)
	15.449

Mediation Partial

Standardized Total and Indirect Effects

Standardized Total Effects of KSI on ETA

	mwolv

imlv	0.802
perflv	0.697

Standardized Indirect Effects of KSI on ETA

	mwolv

imlv	- -
perflv	-0.309

Standardized Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	-0.386	- -

Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.920	- -
perf	-0.378	0.980

Completely Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.920	- -
perf	-0.378	0.980

Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	-0.378	- -

Completely Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	-0.378	- -

Standardized Total Effects of KSI on Y

	mwolv

im	0.738
perf	0.683

Completely Standardized Total Effects of KSI on Y

	mwolv

im	0.738
perf	0.683

Time used 0.031 seconds

APPENDIX L: STUDY 3 (ORGANIZATIONAL CULTURE) SEARCH LOG

REDACTED SAMPLE

Ref Code	Title	Author	Date	Included in MA	Level of Review	Reason for Exclusion
	Psychological pressure and athletes' perception of motivational climate in team sports	R. Barić	2011	No	Title	Setting: Sports
	The relationship of middle school students' perception of motivational climate in physical training classes and intrinsic motivation, self-efficacy, and physical performance	Y. Z. Fang, Peili	2000	No	Title	Setting: Sports
C1	The Effect of Professional Culture on Intrinsic Motivation Among Physicians in an Academic Medical Center	K. Janus	2014	No	Study	This study does not measure performance.
	Measuring Autonomy Support in University Students: The Spanish Version of the Learning Climate Questionnaire	J. L. L. Nunez, J.; Grijalvo, F., Albo, J. M.	2012	No	Title	Setting: academics
	Linking managerial practices and leadership style to innovative work behavior The role of group and psychological processes	C. M. Odoardi, F., Boudrias, J. S., Battistelli, A.	2015	No	Abstract	Subject: managerial and leadership styles
C2	Job Performance: Mediate Mechanism of Work Motivation	A. D. Taghipour, R., H. D. Uzunboylu, M.	2013	No	Study	This study does not look at culture or climate.

APPENDIX M: STUDY 3 (ORGANIZATIONAL CULTURE) CODING SHEET

ID	Title	Author	Year	Publication Source: (Journal/University (if dissertation))/Other Type of Proceeding	Synopsis of Study and Findings related to the Meta-Analysis
C64	A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels.	Neal & Griffin	2006	Journal of Applied Psychology	This study was a longitudinal study of safety climate, behavior, and motivation. The study found that the variables are related and the impact can be measured with a lag of two years.
C67	The impact of organizational climate on safety climate and individual behavior	Neal, Griffin, & Hart	2000	Safety Science	This study looked at the impact of organizational climate on safety climate and behavior. The study found that safety climate had an impact on safety performance which was mediated by motivation. Also organizational climate had a significant impact on safety climate.
C73	Investigating the moderating effects of service climate on personality, motivation, social support, and performance among flight attendants	Chen & Kao	2014	Tourism Management	This study looked at service climate and its effect on motivation and performance among other variables. The study found a relationship between all the variables.

ID	All study variables	Cited by	Country	Type of Company: (Public/ Private/ Non-Profit/ Government)	Industry	Number of companies	Type of Employees/ Participant Selection
C64	Safety climate Safety motivation Safety behaviors: Safety compliance, safety participation	616	Australia	unknown	hospital	1	nursing, administration, technical support, social work, medical
C67	Organizational climate Safety climate Safety motivation Safety performance: Safety compliance, safety participation Safety	955	Australia	unknown	hospital	1	various
C73	Proactive personality Intrinsic motivation Extrinsic motivation Social support Service climate Service performance	4	Taiwan	unknown	airline	1	flight attendants

ID	Data Collection Method (Type of Study)	Source of Surveys	Predictor Variable (A) = Organizational culture/climate	Outcome Variable (B) = Intrinsic Motivation	Outcome Variable (C) = Performance
C64	self-report questionnaire	Scale from Neal et al. (2000)	safety climate	safety motivation	safety compliance
C67	self-report questionnaire	Unclear - May come from Organizational Climate Scale (Hart et al., 1996)	safety climate	safety motivation	safety compliance
C73	self-report questionnaire	A) three-items adapted from service climate scale (Kelley, 1992) B) three-item scale developed by Tierney et al. (1999) C) two-items adapted from Lubatkin et al. (2006)	service climate	intrinsic motivation	service performance

ID	Sample Size (N)	Correlation of AB	Correlation of BC	Correlation of AC	Reliability of A	Reliability of B	Reliability of C
C64	135	0.56	0.79	0.48	0.94	0.85	0.92
C67	525	0.4	0.75	0.42	0.93	0.93	0.94
C73	205	0.43	0.83	0.36	0.82	0.96	0.99

ID	Note
C64	<p>This study measured safety climate and was a longitudinal study that conducted the same survey two years apart. Data is presented for both years only for employees that answered the survey for both years. According to Littell et al. (2008), only one data set from a study population may be used in a meta-analysis and the data set that is most relevant to the research should be chosen. Because this meta-analysis is attempting to look at the relationship of all three variables, the data from the latest data set is used because there was more time for the variables to have an effect on each other. There are two measures of safety behavior; safety compliance was chosen because it is a measure of how safety is incorporated into the performance of the job.</p>
C67	<p>This study measured safety climate and was also conducted in an Australian hospital by the same researchers in C64. Per personal communication with the researchers, the same hospital was used for both studies, but the studies were carried out in different years and there was a fair amount of turnover and organizational change. Even though there is some overlap with the study populations, the sample size is almost four times that of the other study. This study was included in the meta-analysis because there are more unique samples in this study than overlapping samples. Although there was a measure of organizational climate, safety climate was selected for the meta-analysis as the climate factor because it aligns with the other studies which are also looking at a specific type of climate.</p>
C73	<p>This study measured service climate.</p>

APPENDIX N: STUDY 3 (ORGANIZATIONAL CULTURE) PATH ANALYSIS

L I S R E L 9.20 (STUDENT)

BY

Karl G. Jöreskog & Dag Sörbom

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The following lines were read from file C:\Users\Patricia\Google Drive\Dissertation
 material\Calculations\Lisrel\SYNTAX3.spl:

```
Title: Mediation Partial
ni = 3
observed variables: cul im perf
Correlation:
1.0
0.472 1.0
0.449 0.827 1.0
Sample size = 865
Latent variables: cullv imlv perflv
cul = 1*cullv
im = 1*imlv
perf = 1*perflv
imlv = cullv
perflv = imlv
perflv = cullv
let the error variance of cul equal to 0.103
let the error variance of im equal to 0.087
let the error variance of perf equal to 0.05
lisrel otuput: ss sc ef
end of problem
```

Mediation Partial

Correlation Matrix

	im	perf	cul
im	1.000		
perf	0.827	1.000	
cul	0.472	0.449	1.000

Total Variance = 3.000 Generalized Variance = 0.242

Largest Eigenvalue = 2.185 Smallest Eigenvalue = 0.173

Condition Number = 3.559

Mediation Partial

Parameter Specifications

BETA

	imlv	perflv
imlv	0	0
perflv	1	0

GAMMA

cullv


```

imlv      2
perflv    3

```

PHI

```

      cullv
-----
      4

```

PSI

```

      imlv      perflv
-----
      5          6

```

Mediation Partial

Number of Iterations = 0

LISREL Estimates (Maximum Likelihood)

LAMBDA-Y

```

      imlv      perflv
-----
im      1.000      - -
perf    - -      1.000

```

LAMBDA-X

```

      cullv
-----
cul     1.000

```

BETA

```

      imlv      perflv
-----
imlv    - -      - -
perflv  0.889      - -
        (0.026)
        34.433

```

GAMMA

```

      cullv
-----
imlv    0.526
        (0.034)
        15.687
perflv  0.033
        (0.026)
        1.262

```

Covariance Matrix of ETA and KSI

```

      imlv      perflv      cullv
-----
imlv    0.913
perflv  0.827      0.950
cullv   0.472      0.449      0.897

```

PHI

```

      cullv
-----
      0.897

```

(0.048)
18.655

PSI

Note: This matrix is diagonal.

	imlv	perflv
	-----	-----
	0.665	0.200
	(0.038)	(0.015)
	17.717	13.050

Squared Multiple Correlations for Structural Equations

	imlv	perflv
	-----	-----
	0.272	0.789

NOTE: R² for Structural Equations are Hayduk's (2006) Blocked-Error R²

Reduced Form

	culv

imlv	0.526
	(0.034)
	15.678
perflv	0.501
	(0.034)
	14.722

Squared Multiple Correlations for Reduced Form

	imlv	perflv
	-----	-----
	0.272	0.237

THETA-EPS

	im	perf
	-----	-----
	0.087	0.050

Squared Multiple Correlations for Y - Variables

	im	perf
	-----	-----
	0.913	0.950

THETA-DELTA

	cul

	0.103

Squared Multiple Correlations for X - Variables

	cul

	0.897

Log-likelihood Values

	Estimated Model	Saturated Model
	-----	-----
Number of free parameters(t)	6	6
-2ln(L)	1368.491	1368.491
AIC (Akaike, 1974)*	1380.491	1380.491
BIC (Schwarz, 1978)*	1409.067	1409.067

*LISREL uses $AIC = 2t - 2\ln(L)$ and $BIC = t\ln(N) - 2\ln(L)$

Goodness-of-Fit Statistics

Degrees of Freedom for (C1)-(C2)	0
Maximum Likelihood Ratio Chi-Square (C1)	0.0 (P = 1.0000)
Browne's (1984) ADF Chi-Square (C2_NT)	0.0 (P = 1.0000)

The Model is Saturated, the Fit is Perfect !

Mediation Partial

Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.956	- -
perf	- -	0.975

LAMBDA-X

	cullv
cul	0.947

BETA

	imlv	perflv
imlv	- -	- -
perflv	0.871	- -

GAMMA

	cullv
imlv	0.522
perflv	0.032

Correlation Matrix of ETA and KSI

	imlv	perflv	cullv
imlv	1.000		
perflv	0.888	1.000	
cullv	0.522	0.486	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	0.728	0.211

Regression Matrix ETA on KSI (Standardized)

	cullv
imlv	0.522
perflv	0.486

Mediation Partial

Completely Standardized Solution

LAMBDA-Y

	imlv	perflv
im	0.956	- -
perf	- -	0.975

LAMBDA-X

	cullv
cul	0.947

BETA

	imlv	perflv
imlv	- -	- -
perflv	0.871	- -

GAMMA

	cullv
imlv	0.522
perflv	0.032

Correlation Matrix of ETA and KSI

	imlv	perflv	cullv
imlv	1.000		
perflv	0.888	1.000	
cullv	0.522	0.486	1.000

PSI

Note: This matrix is diagonal.

	imlv	perflv
	0.728	0.211

THETA-EPS

	im	perf
	0.087	0.050

THETA-DELTA

	cul
	0.103

Regression Matrix ETA on KSI (Standardized)

	cullv
imlv	0.522
perflv	0.486

Mediation Partial

Total and Indirect Effects

Total Effects of KSI on ETA

	cullv
imlv	0.526 (0.034) 15.687
perflv	0.501 (0.034) 14.730

Indirect Effects of KSI on ETA

	cullv
imlv	- -

perflv 0.468
 (0.033)
 14.258

Total Effects of ETA on ETA

	imlv	perflv
	-----	-----
imlv	- -	- -
perflv	0.889	- -
	(0.026)	
	34.433	

Largest Eigenvalue of B*B' (Stability Index) is 0.790

Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	1.000	- -
perf	0.889	1.000
	(0.026)	
	34.433	

Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.889	- -
	(0.026)	
	34.433	

Total Effects of KSI on Y

	cullv

im	0.526
	(0.034)
	15.687
perf	0.501
	(0.034)
	14.730

Mediation Partial

Standardized Total and Indirect Effects

Standardized Total Effects of KSI on ETA

	cullv

imlv	0.522
perflv	0.486

Standardized Indirect Effects of KSI on ETA

	cullv

imlv	- -
perflv	0.454

Standardized Total Effects of ETA on ETA

	imlv	perflv
	-----	-----

imlv	- -	- -
perflv	0.871	- -

Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.956	- -
perf	0.849	0.975

Completely Standardized Total Effects of ETA on Y

	imlv	perflv
	-----	-----
im	0.956	- -
perf	0.849	0.975

Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.849	- -

Completely Standardized Indirect Effects of ETA on Y

	imlv	perflv
	-----	-----
im	- -	- -
perf	0.849	- -

Standardized Total Effects of KSI on Y

	cullv

im	0.498
perf	0.474

Completely Standardized Total Effects of KSI on Y

	cullv

im	0.498
perf	0.474

Time used 0.047 seconds

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ABSTRACT**THE RELATIONSHIP BETWEEN ORGANIZATIONAL CULTURE, INTRINSIC MOTIVATION, AND EMPLOYEE PERFORMANCE: A SYSTEMATIC REVIEW AND META-ANALYSIS**

by

PATRICIA S. RADAKOVICH**December 2016****Advisor:** Ingrid Guerra-Lopez, PhD**Major:** Instructional Technology (Performance Improvement)**Degree:** Doctor of Philosophy

The purpose of this study was to explore the relationship between specific organizational cultural factors (autonomy and meaningful work), intrinsic motivation, and employee performance through a systematic review and meta-analysis. Three separate studies were performed, one for each predictor variable: autonomy, meaningful work, and organizational culture/climate. The meta-analyses included only studies that contained correlations for all three variables and were set in a business environment. The first study concluded that autonomy is a predictor of performance; this relationship is partially mediated through intrinsic motivation. The second study concluded that meaningful work is a predictor of performance. The third study was conducted for comparative purposes only and no solid conclusions could be drawn from this study. The data sets for studies two and three were small, which led to some problematic results and the use of caution when interpreting them. The overall study helped to provide another method for practitioners to assist organizations in increasing intrinsic motivation and performance of employees by having organizational cultures that support the autonomy of employees. This study uncovered several

additional suggestions for further research, including more empirical research into the main variables of the study.

AUTOBIOGRAPHICAL STATEMENT

Patricia S. Radakovich is a performance improvement practitioner. She holds a Bachelor of Arts in Anthropology/Archaeology and a Bachelor of Business Administration from the University of Michigan, a Master of Arts in Performance Improvement and Instructional Design from the University of Michigan-Dearborn, and a Master of Business Administration from Madonna University. She is a Certified Performance Technologist through the International Society of Performance Improvement and a Certified Professional in Learning and Performance through the Association for Talent Development. In her spare time, she runs Basil's Buddies—an animal welfare organization she founded—and cares for hospice animals. She is also a speaker, writer, and advocate for both health and animals.