

The Effects of Cognitive Reflection Exercises on Employee Engagement: A Positive  
Intervention and Study of the Role of Cognition in Increasing Engagement in the  
Workplace

A DISSERTATION  
SUBMITTED TO THE FACULTY OF THE  
UNIVERSITY OF MINNESOTA  
BY

Douglas P. Giddings

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

Theresa M. Glomb, Advisor

May 2020



## **Acknowledgements**

This dissertation is something of a paradox. A person can read it in a matter of hours (long hours though they may be), yet it took a small eternity to write. While my name stands alone beneath the title, its very existence would not have been possible without the help of countless others. I'm grateful for the opportunity to acknowledge a few of those who have played a key role in the creation of this dissertation and my journey at the University of Minnesota.

First, I wish to express my heartfelt and sincere appreciation for my advisor, mentor, and friend, Theresa Glomb. Thank you, Theresa, for guiding me through these past six years, for helping me shape and hone my ideas and bring them to life, for your positive attitude, and for the constant reminder to work hard, have fun, choose kind, and be present.

Thank you to the other members of my dissertation committee—Michelle Duffy, Betty Zhou, and Aaron Schmidt. Michelle, you have been there from my first days at Carlson, and I am grateful for the mentor and friend you have been along the way. Betty, thank you for your boundless knowledge of quantitative methods and for letting me come to you any time I had a question. (And there were many questions.) Aaron, thank you for crossing the river in all kinds of weather to listen to my work, share your perspective, and enrich my research.

I am deeply indebted to the rich community of scholars at the Carlson School of Management and those who have played a role in my development over the years, particularly to Connie Wanberg and Mary Zellmer-Bruhn. I am similarly grateful to Joyce Bono at the University of Florida and Ellen Kossek at Purdue University. I would

have been lost without the guidance and support of those who selflessly continue to mentor burgeoning researchers.

I would like to thank my friends and fellow students—those who have supported me from back home, my fellow WORgers, and those pursuing their own degrees at universities across the United States. I would particularly like to thank Greg Beaver and Bori Csillag for talking shop when I needed help, and offering much-needed distractions when I didn't. Most of all, I am grateful to Liz Adair and Sima Sajjadi. Thank you both for your friendship, relentless support, and encouragement. I'm pretty sure our never-ending conversations added at least an extra year to my time in the program (because if Sima can't work, *no one* can work), but I wouldn't have it any other way. Liz and Sima, when I think of my journey through graduate school, I think of you. Cheers to the best cohort ever.

I would especially like to thank my family, including the Henrie family, who have all been so supportive from afar. In particular, I would like to thank my parents, who have always been my biggest advocates and have never uttered a word of complaint at our being away from home, even though I know it's hard. Thanks, Mom and Dad, for the love and encouragement, for understanding, and for the late-night texts we've shared.

To Brooklin, Ryan, and Beckett: Thanks for putting up with me for all these years. Having a parent in graduate school is never easy, and a manuscript like this may seem like precious little to show for your sacrifice, but together we've learned that we can do hard things. Thanks for giving me a reason to keep fighting when things got tough.

Last, but never least, I would like to extend my eternal gratitude to my wife, Konnie. This dissertation may have my name on it, but it's a journey we traveled together. I couldn't have done it without you. Thank you for your endless love and support, and for being my best friend. How can I begin to thank someone who means as much to me as you? And once I start, how would I ever stop? Simply, all I can say is this: I'll love you 'till forever.

## **Abstract**

The employee engagement literature suggests that in order to increase engagement in the workplace, the number and availability of job resources (e.g., performance feedback, social support, autonomy, etc.) to which employees have access must also increase. This dissertation explores the role of cognition in employee engagement interventions by creating and testing a theoretical model that proposes the relationship between job resources and engagement is mediated by increased cognitive perceptions of those resources (perceptions of resource presence, and perceptions of resource importance). I tested hypotheses by creating a cognitive reflection intervention, similar to those used in the positive organizational scholarship literature, which asked participant to briefly reflect, at the end of each workday, and write about a positive experience they had related to one of five specific job resources. This intervention lasted for five weeks, and included pretest-posttest surveys to analyze overall changes to employee engagement and other key outcomes, as well as five end-of-week surveys to assess within-person changes in outcomes during the intervention period. The active-treatment condition was then compared to results from an active-control condition (who were asked to reflect about positive events more generally, rather than focusing specifically on job resources) and a no-treatment condition. Results revealed no significant changes to engagement for participants assigned to the active-treatment condition, or in differences between the active-treatment group and the other two conditions. Nevertheless, engagement scores for both reflection conditions increased or remained steady during the intervention period, while engagement scores for the no-treatment condition decreased. I conclude with a discussion of findings, theoretical and practical implications, and study limitations.

## Table of Contents

	Page
List of Tables .....	vi
List of Figures .....	viii
Chapter 1: Introduction .....	1
Chapter 2: Theory and Hypothesis Development .....	6
Chapter 3: Methods .....	30
Chapter 4: Results .....	49
Chapter 5: Discussion .....	88
References .....	161
Appendix A: Intervention Instructions .....	179
Appendix B: Surveys .....	181
Appendix C: Univariate Model Tests .....	192

## List of Tables

	Page
Table 1: Background survey: Standardized item loadings in the higher-order factor model for engagement .....	105
Table 2: Background survey: Standardized item loadings in the five-factor model for perceptions of presence .....	106
Table 3: Background survey: Standardized item loadings in the five-factor model for perceptions of importance .....	107
Table 4: Post-study survey: Standardized item loadings in the higher-order factor model for engagement .....	108
Table 5: Post-study survey: Standardized item loadings in the five-factor model for perceptions of presence .....	109
Table 6: Post-study survey: Standardized item loadings in the five-factor model for perceptions of importance .....	110
Table 7: Weekly survey: Standardized item loadings from the multi-level confirmatory factor analysis of the higher-order factor model for engagement .....	111
Table 8: Weekly survey: Standardized item loadings from the multi-level confirmatory factor analysis of the five-factor model for perceptions of presence .....	112
Table 9: Weekly survey: Standardized item loadings from multi-level confirmatory factor analysis of the five-factor model for perceptions of importance .....	113
Table 10: Background survey: Means, standard deviations, Cronbach's alpha, and zero-order correlations .....	114
Table 11: Post-study survey: Means, standard deviations, Cronbach's alpha, and zero-order correlations .....	117
Table 12: Weekly survey: Means, standard deviations, Cronbach's alpha, and zero-order correlations .....	119
Table 13: Pre- and post-intervention means and standard deviations of study variables by condition .....	121
Table 14: Engagement differences by treatment condition: Analysis of covariance planned comparison results .....	123
Table 15: Regression coefficients and standard errors for the engagement-turnover intentions mediation model (no-treatment condition as referent group) .....	124
Table 16: Regression coefficients and standard errors for the engagement-turnover intentions mediation model (active-control condition as referent group) .....	125
Table 17: Regression coefficients and standard errors for the engagement-performance mediation model (no-treatment condition as referent group) .....	126



## List of Tables (continued)

Table 18: Regression coefficients and standard errors for the engagement- turnover intentions mediation model (active-control condition as referent group) .....	127
Table 19: Summary of indirect effects estimated from the engagement- turnover intentions/job performance mediation models .....	128
Table 20: Regression coefficients for parallel multiple mediation model: Perceptions of presence (Referent group: No-treatment condition) .....	129
Table 21: Regression coefficients for parallel multiple mediation model: Perceptions of presence (Referent group: Active-control condition) .....	130
Table 22: Regression coefficients for parallel multiple mediation model: Perceptions of importance (Referent group: No-treatment condition) .....	131
Table 23: Regression coefficients for parallel multiple mediation model: Perceptions of importance (Referent group: Active-control condition) .....	132
Table 24: Summary of indirect effects estimated from the parallel multiple mediation models for perceptions of presence .....	133
Table 25: Summary of indirect effects estimated from the parallel multiple mediation models for perceptions of importance .....	134
Table 26: Regression coefficients and standard errors for the moderation Model .....	135
Table 27: Final univariate models by variable for latent growth modeling .....	136
Table 28: Fit statistics for linear growth models of weekly outcomes by Condition .....	137
Table 29: Parameter estimates for linear growth models of weekly outcomes by condition .....	139

## List of Figures

	<b>Page</b>
Figure 1: Theoretical model .....	141
Figure 2: Example timeline for participants assigned to the active-treatment Condition .....	142
Figure 3: Timeline for participants assigned to the active-control condition .....	142
Figure 4: Timeline for participants assigned to the no-treatment condition .....	142
Figure 5: A comparison of pre- and post-study means of employee engagement by condition .....	143
Figure 6: A comparison of pre- and post-study means of study variables, excluding engagement .....	144
Figure 7: Comparison of within-person slopes/trajectories of univariate variables by condition .....	152
Figure 8: A comparison of pre- and post-study means of employee engagement by condition (from Supplemental Analysis 2, using updated active- control condition) .....	160

## **Chapter 1: Introduction**

The topic of employee engagement has garnered tremendous attention over the past 20 years. Engagement, or being energetically absorbed in and dedicated to one's work, has been a topic of particular importance for practitioners, and is a predominant theme in the practitioner literature (Shuck & Wollard, 2010). According to a research report from the Society for Human Resource Management, maintaining high levels of employee engagement is *the most* pressing human capital challenge faced in today's organizations (Society for Human Resource Management, 2015). This emphasis on employee engagement has been attributed to its connection to several key organizational outcomes, including increased productivity, business profitability, employee retention, and customer perceptions (for a review, see Shuck & Wollard, 2010). Despite its importance, a recent report stated that 85% of adults worldwide are either not engaged, or are actively disengaged (Gallup, 2017). According to the same report, only 31% of employees in the United States and Canada are engaged, and those numbers are considerably smaller in East Asia and Western Europe.

The source of employee engagement is primarily attributed to the existence of job resources in the workplace (e.g., Halbesleben, 2010). These resources, such as autonomy, supervisor feedback, and social support, stimulate engagement by helping employees achieve work goals, reduce job demands, and stimulate personal growth (Bakker, Demerouti, & Sanz-Vergel, 2014). As a result, researchers and organizations have made efforts to increase employee engagement by increasing job resources available to their workforce through engagement interventions. These interventions function under the primary assumption that in order to build an increasingly engaged workforce, the

resources to which employees have access need to increase. For example, a study of nurses in Japan found a significant increase in employee engagement among those who were provided non-skilled assistants to help with routine (but demanding) work tasks during visits to treat home-bound patients (Naruse et al., 2014). Another study (Chen, Westman, & Eden, 2009) investigated an organization about to implement a new IT system, and found employees who received additional training about resources available to help them navigate the new system had higher levels of engagement after the transition than before, whereas those who did not receive the training reported a decrease in engagement levels.

While researchers have found interventions designed to increase job resources at work to be largely effective at significantly increasing employees' levels of engagement (for a review, see Knight, Patterson, & Dawson, 2017), less known is an understanding of *how* and *why* these interventions work. The prevalent belief is an assumption that engagement is fostered through the acquisition of additional resources, although little is known of the mechanisms driving these changes in employee engagement. For instance, what role, if any, do cognitive processes play in the relationship between job resources and engagement? Can increases in engagement be solely attributed to an increase in resources, as is commonly believed, or is it more important that those resources are both salient and important to the recipient? In other words, are changes in cognitions about resources the key driver of changes in engagement? Despite generally encouraging findings from engagement-building intervention research, questions regarding the role of cognitive mechanisms in driving the efficacy of these interventions remain largely unanswered.

The purpose of this dissertation is to 1) test the efficacy of a cognitive reflection intervention on employee engagement and related outcomes, and 2) explore cognitive mechanisms to better understand how and why this intervention works. The intervention introduced in this dissertation is based on the cognitive appraisal literature (Lazarus, 1991) and suggests job resources lead to enhanced employee engagement through a cognitive process whereby resources are favorably appraised and interpreted (e.g., Langston, 1994) by the individual employee. Unlike most engagement interventions, which change the level of a given resource, this intervention attempts to increase engagement levels by asking participants to positively reflect on existing resources, rather than adding new or additional resources. I propose reflecting on resources one already has will increase an individual's perceptions of the *presence* and *importance* of those resources, thereby leading to higher levels of engagement. Thus, in addition to testing a new intervention designed to increase employee engagement, I also test cognitive perceptions of resources as mechanisms contributing to the overall effectiveness of that intervention.

After outlining my theoretical model, I test my hypotheses using a sample of employees from a public school district in the Midwestern United States. This sample included teachers, administrative staff, and paraprofessionals (e.g., classroom aides). Participants were randomly assigned to one of three conditions (active-treatment group, active-control group, and non-active control/no-treatment group), and those assigned to the first two conditions were asked to complete daily reflection assignments for five consecutive weeks. Participants in the active-treatment condition were asked to reflect on five different job resources (autonomy, task variety, job significance, feedback, and

social support), with each week of the intervention dedicated to daily reflections of a different resource. The active-control group used a similar cognitive reflection exercise, but participants were asked to reflect more generally on good things that happened each day during the study period, rather than focus on specific job resources. Participants in all three conditions were asked to complete weekly surveys used to measure engagement levels, perceptions of job resources, and outcomes. I measured and analyzed these data at both the between-person and within-person level. First, I assessed the overall effectiveness of the intervention at the between-person level, comparing participants assigned to the active-treatment condition to those assigned to control groups. Second, I explored the mediating effects of cognitive perceptions of resources to understand how cognition serves as a mechanism linking the resource-engagement relationship. Third, I examined more nuanced changes that occurred within-person during the intervention period, in an effort to determine the extent to which positively reflecting on existing job resources influences employees' changing levels of engagement.

This dissertation contributes to the engagement, workplace intervention, and positive organizational scholarship literatures. First, I contribute to the employee engagement literature by exploring key mechanisms driving the relationship between job resources and engagement. A closer examination of these mechanisms will contribute to a better understanding of how job resources lead to increasingly engaged employees, not simply through the presence of additional resources themselves, as is tacitly assumed in the engagement literature, but through changes in employees' cognitive perceptions of those resources. Second, I contribute to the workplace intervention literature by introducing a new kind of engagement intervention. Rather than adding new job

resources, I propose a small, practical intervention that seeks to build employee engagement through cognitive reflection exercises. Third, I contribute to the positive organizational scholarship literature by testing the benefits of positive reflection exercises in new ways and by expanding the broader efficacy and generalizability of reflecting on positive daily events. While many positive reflection interventions ask participants to reflect on dynamic personal experiences, I use these exercises to focus on more stable features of the working environment. Such use is relatively uncommon in the positive organizational literature, and further explores the limits of these useful tools.

## **Chapter 2: Theory and Hypothesis Development**

Employee engagement first appeared on the stage of management research in 1990, when Kahn described it as the harnessing of organization members' selves to their work roles, whereby workers "employ and express themselves physically, cognitively, and emotionally during role performances" (Kahn, 1990: 694). However, the construct remained relatively obscure for the better part of the next decade, until there began a dramatic rise in engagement research that built over the next 20 years and continues to thrive. Today, employee engagement is most commonly defined as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002). Engaged employees put a great deal of effort and energy into their work (Bakker et al., 2014). This energy is characterized as vigor, which also indicates high levels of resilience in overcoming challenges and a tendency to invest in one's work (Bakker & Demerouti, 2008). Dedication refers to being strongly involved in one's work and dedicated employees often experience a sense of significance, enthusiasm, and pride (Bakker & Bal, 2010). Absorption is characterized by being fully concentrated and happily engrossed in one's work (Bakker & Demerouti, 2008; Bakker et al., 2014). Thus, engaged employees work hard, focus on tasks at hand, and are energetically engrossed in their work, both physically and mentally.

Some researchers have suggested engagement is simply a reconstitution of existing constructs—of "old wine in new bottles." However, additional studies have provided both theoretical and empirical evidence distinguishing engagement from similar constructs such as workaholism (Schaufeli, Taris, & Bakker, 2006; Bakker, Schaufeli, Leiter, & Taris, 2008), organizational commitment (Hallberg & Schaufeli, 2006), and job



embeddedness (Halbesleben & Wheeler, 2008). Engagement has been empirically distinguished from several other similar-yet-distinct constructs, such as extra-role behavior, job involvement, personal initiative, organizational commitment, positive affectivity, and flow (for a review, see Schaufeli & Bakker, 2010). In addition, meta-analytic results (Christian, Garza, & Slaughter, 2011) suggest engagement is unique from job-related attitudes (e.g., job satisfaction). Although engagement is highly correlated with burnout, empirical evidence suggests burnout and engagement are separate constructs rather than opposite ends of the same continuum (Bakker et al., 2008; Crawford, LePine, & Rich, 2010). Thus, despite some similarities to existing concepts, employee engagement is a distinct construct that goes beyond existing job attitudes or workplace behaviors, and deserves further empirical attention.

Engagement has been linked to important outcomes, including employees' personal lives and also specific work-related outcomes. In diary studies, daily work engagement was found to be a significant predictor of daily learning pursuit and personal initiative (Sonnentag, 2003), and also led to higher daily levels of happiness in both employees and their significant others (Rodriguez-Muñoz, Sanz-Vergel, Demerouti, & Bakker, 2014). Engagement has been linked to higher levels of positive affect (Bakker, 2009) and better employee health (Halbesleben, 2010), including fewer physical complaints, such as headaches, stomachaches, and chest pain (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004; Bakker & Demerouti, 2008), as well as reduced mental complaints (Shirom, 2003). Regarding work-related outcomes, considerable attention has been paid to the relationship between engagement and work performance. For example, Halbesleben & Wheeler (2008) found employee engagement

at Time 1 to be linked to higher levels of employee task performance two months later. Employee engagement has also been linked to increases in employee creativity and innovation at work (Gawke, Gorgievski, & Bakker, 2017; Orth & Volmer, 2017; Bakker & Albrecht, 2018). In addition to individual-level performance, engagement has been linked to team- and firm-level performance outcomes. At the team level, engaged employees are more likely to perform organizational citizenship behaviors (OCB) and other extra-role behaviors, going beyond their own tasks to help coworkers (e.g., Demerouti & Bakker, 2006; Bakker et al., 2004). Employee engagement has also been shown to lead to significant changes in firm-level performance, including increased client satisfaction and a firm's overall financial performance (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). In addition, meta-analyses provide further support for significant relationships between employee engagement and employee performance, organizational commitment, turnover intentions, and well-being (Halbesleben, 2010; Christian et al., 2011).

### **Employee Engagement and Job Resources**

Studies have consistently shown employee engagement to be significantly associated with job resources (e.g., Bakker, Demerouti, & Euwema, 2005; Crawford et al., 2010; Bakker et al., 2014). In fact, job resources are generally viewed as the most important predictors of engagement (e.g., Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, Van Veldhoven, & Xanthopoulou, 2010; Nahrgang, Morgeson, & Hofman, 2011). Job resources, such as autonomy, task variety, social support from supervisors and coworkers, performance feedback, and task significance, lead to an increase in employee engagement because they 1) reduce job demands and the

physical and psychological costs associated with such demands, 2) serve to help employees achieve work goals, and 3) stimulate personal growth, learning, and development (Demerouti et al., 2001; Schaufeli & Bakker, 2004; Bakker & Demerouti, 2007, 2008, 2017). This process of how job resources affect work engagement is encapsulated in the Job Demands-Resources model (JD-R; Demerouti et al., 2001; Bakker et al., 2005; for reviews, see Bakker & Demerouti, 2014, 2017), which is the primary model used to explain how resources and demands from one's work affect both employee engagement and burnout. According to the JD-R, existing job resources work both independently and in partnership with employees' personal resources (e.g., optimism, resilience, etc.) to buffer the effects of job demands, such as work pressure, time constraints, and emotional/physical demands, and build up and support reservoirs of engagement through increased vigor, dedication, and absorption (for meta-analyses, see Halbesleben, 2010; Crawford et al, 2010; Nahrgang et al., 2011). In addition to the JD-R, the Conservation of Resources (COR) theory is also commonly used to explain the relationship between job resources and employee engagement. According to the COR model, employees seek to retain and even increase valuable resources at work. Thus, employees with more job resources are less likely to experience loss of existing resources and are more likely to seek to accumulate additional resources in the future (Hobfoll, 2002).

### **Interventions Used to Increase Employee Engagement**

Engagement interventions have typically subscribed to the JD-R and COR approaches and attempt to increase employees' engagement levels by giving them access to more resources (Bakker & Demerouti, 2014; Bakker et al., 2014). Interventions that

seek to build engagement through increased resources customarily take one of two approaches. The first approach is through a top-down process, whereby organizations and supervisors are instructed in ways in which they can provide employees with additional job resources such as autonomy, task variety, or regular performance feedback, or employees themselves are granted additional job resources as part of the intervention. For example, an intervention with police officers in Australia increased employee engagement by training supervisors in ways to better educate and coach employees (Biggs, Brough, & Barbour, 2014). In another intervention study, manufacturing employees in Spain were provided additional resources as part of a job redesign strategy (Cifre, Salanova, & Rodriguez-Sanchez, 2011). Employees were moved to positions that better fit their personal competencies, and were then given more autonomy and control over how they accomplished their work. In addition, employees were given more detailed job training about their specific roles, as well as increased social support. As predicted, these changes led to increased levels of employee engagement.

The second way researchers have used interventions to increase engagement in the workplace is to provide employees additional resources through a bottom-up approach. In this way, employees are taught to develop their own resources, either through job crafting exercises or through efforts to increase personal resources (e.g., Demerouti, 2014; Luthans & Youssef-Morgan, 2017). In a study with teachers, van Wingerden, Bakker, and Derks (2017) conducted a series of training sessions designed to teach participants how to individually craft elements of their jobs, such as the frequency or type of support they receive from their coworkers, and soliciting constructive feedback from students and parents. In addition, researchers have recommended personal resource

interventions designed to build employees' levels of psychological capital (PsyCap: hope, self-efficacy, resilience, and optimism; for a review, see Luthans & Youssef-Morgan, 2017) as a way to also build employee engagement from the bottom-up (Alessandri, Consiglio, Luthans, & Borgogni, 2018).

Whether through top-down or bottom-up processes, the theoretical approach is the same: researchers and practitioners currently seek to increase employee engagement by increasing employees' access to job resources. Such increases in resources, however, can be time-consuming, disruptive, and expensive to implement. Many organizations may not have the capacity to make changes to existing processes, or to face the demands they may incur from adding new resources. Furthermore, the addition of new resources may fail to address the underlying mechanisms that truly drive the relationship between job resources and employee engagement. While empirical evidence offers substantial support for job resources as an antecedent to employee engagement, and the majority of engagement interventions seek to increase employee engagement by increasing resources, theory suggests engagement may also increase as existing job resources become more salient and important, and employees change the way they think about those resources they already have. Thus, in this dissertation I depart from traditional practice and study the role of cognition on employee engagement through the use of a positive reflection intervention.

### **Positive Reflection Interventions**

Positive reflection interventions are facets of a broader group of interventions that came about in the early 2000s as part of the positive psychology movement (Seligman & Csikszentmihalyi, 2000). Positive reflection interventions are cognitive exercises

whereby participants think about what has gone well in their lives. The temporal nature of positive reflection interventions tend to vary, ranging from a reflection of what went well earlier that day, to a reflection of any time in the past when participants felt they had performed or behaved to the very best of their abilities (e.g., Seligman, Steen, Park, & Peterson, 2005). The purpose of these exercises is to counteract humankind's natural tendency to ruminate on negative events, which can lead to depression, anxiety, and other negative outcomes, and focus instead on the positive (Seligman, 2012). From a research perspective, one of the benefits of positive reflection exercises over other positive interventions is they don't rely on participants sharing social elements, or capitalizing on events by sharing them with others, but rather positive reflection is an internal process (Gable, Reis, Impett, & Asher, 2004). This means the outcomes of reflection interventions are not potentially confounded by exogenous social influences (e.g., sharing positive events with others). Empirical studies state that positive reflection interventions lead to greater well-being and lower depression in patients with mild-to-moderate levels of depression (Seligman et al., 2005; Seligman, Rashid, & Parks, 2006; for a meta-analysis, see Sin & Lyubomirsky, 2009). While workplace studies of positive reflection interventions are still in their relative infancy, research suggests positive work reflections can also lead to increased employee well-being, positive affect, and health, as well as reduced stress (e.g., Sonnentag & Fritz, 2015; Sonnentag & Grant, 2012; Daniel & Sonnentag, 2014; Bono, Glomb, Shen, Kim, & Koch, 2013).

Bono et al. (2013) propose four theoretical explanations for the efficacy of positive reflection interventions, in addition to mechanisms generally noted for positive events. First, as mentioned above, positive reflection interventions work against the

human tendency to focus on negative events. Positive reflections break the habitual cycle of negative rumination by moving one's focus to positive events, allowing individuals to experience more positive emotions and concomitant positive effects (Fredrickson, 2001). Second, positive reflection may counteract the effects of hedonic adaptation, whereby people grow accustomed to their circumstances (Diener & Diener, 1996). By focusing on positive events, individuals may be less likely to grow accustomed to and thereby overlook positive events in their lives (Frijda, 1988). Third, reflecting on positive events allow individuals to relive those events, making them more accessible to one's memory. As positive events are more prominent in one's mind, individuals may further benefit from increased resources resulting from prolonging or rekindling such memories (Bryant, 1989; Sonnentag & Grant, 2012). Fourth, a cognitive adaptation explanation suggests identifying the cause of positive events allows individuals to make sense of those events and incorporate them into their understanding of the world and themselves (Janoff-Bulman, 1992).

### **Cognitive Appraisal Theory and a Cognitive Reflection Intervention**

In addition to mechanisms explaining the efficacy of positive reflection interventions in general, positive reflections may also lead to increased employee engagement through a process of enhanced cognition. Specifically, positive reflection exercises focused on job resources may lead an individual to change the way he/she thinks about existing resources—both in terms of how present or salient those resources are, as well as how important a given resource is to that individual. According to the cognitive appraisal model (Lazarus, 1991), a cognitive appraisal process is necessary for an external event, experience, or resource to fully exercise its influence on individuals.

This appraisal takes place through two processes: a primary appraisal, where one decides whether an event (or resource) is good or bad and whether it blocks or facilitates goals, and a secondary appraisal, whereby one attempts to understand the meaning of the event (Lazarus, 1991). In the face of negative events, this secondary appraisal is tied to coping processes (Lazarus & Folkman, 1984). Conversely, individuals can take advantage of positive events through *capitalization*, which is a cognitive process of favorably appraising and interpreting a positive experience (Langston, 1994).

Reflecting about existing resources at one's job may serve as a cognitive reappraisal of those resources, and capitalization allows employees to more fully benefit from their positive influence (Jiang & Johnson, 2018). In addition, reflecting on positive events from one's workplace may rekindle, prolong, or even amplify the benefits that come from those events (Jiang & Johnson, 2018; Bryant, 1989; Sonnentag & Grant, 2012). However, individuals may not naturally be inclined to reflect on existing job resources and capitalize on their benefits, as humankind has a greater tendency to focus on the negative aspects of life, rather than the positive (e.g., Seligman et al., 2006). Langston (1994) suggests strength from positive events comes, in part, when individuals maximize the significance of those events and make them more memorable to the self. Thus, when employees reflect on positive events at work, such as writing about a positive social interaction they had with a coworker earlier that day, they are capitalizing on those events, making them more memorable, and maximizing their significance. More specifically, when employees reflect on existing resources they already have at work, they can maximize the benefits of those resources.



One way positive reflection can help employees maximize the benefits of existing job resources is due to increased *perceptions of presence* of those resources. The more employees think about existing resources, the more likely they are to recognize the presence of those resources, or that those resources even exist. As mentioned above, positive reflection may help to counteract the effects of hedonic adaptation, whereby people become accustomed to their circumstances (Diener & Diener, 1996). For example, an employee may become so accustomed to daily, informal performance feedback from her supervisor that she may fail to recognize that feedback for what it is (i.e., a valuable job resource). However, by asking that employee to reflect (and write about) examples of when she received feedback that helped improve her performance, the presence of those daily, informal feedback sessions may become more present or salient in that employee's mind.

A second way positive reflection exercises may enhance or maximize the benefits of existing job resources is through increased *perceptions of importance* of those resources. The importance of a specific resource or experience to an individual is one of the key factors in cognitive appraisal (Frijda, Kuipers, & Ter Schure, 1989). In addition, the Conservation of Resources theory states that the appraisal of resources can lead to heightened perceptions of importance of those resources, particularly in the face of impending or recent resource loss (Hobfoll, 2002; for a review, see Hobfoll, Halbesleben, Neveu, & Westman, 2018). Thus, as resources become more present or salient to individuals via cognitive reflection exercises, those same resources also become increasingly more important as individuals recognize their existence. While both perceptions are distinct and may differ in their influence over individual workers,

increased perceptions of presence and perceptions of importance are likely to co-occur simultaneously as employees reflect about existing job resources.

As job resources are intimately linked with employee engagement, individuals who are regularly asked to think about the positive aspects of existing resources at work through a cognitive reflection intervention that compares pre-study scores to changes in post-study scores should experience significantly greater increases in employee engagement than those who are asked to reflect about other things while assigned to an active-control group, or those who do nothing as part of a non-active control group. Thus,

*Hypothesis 1: At the between-person level, participants assigned to the active-treatment condition of the cognitive reflection intervention will experience significantly greater overall changes in employee engagement from the pre-study survey to the post-study survey than those assigned to the active-control or no-treatment conditions.*

### **Within-Person Changes in Engagement**

Much of the engagement literature has treated employee engagement as a stable, trait-like characteristic. However, some research has suggested engagement is more fluid, and notes that while engagement is relatively enduring, it can also be state-like and fluctuate within-person over time (e.g., Sonnentag, 2003; Xanthopoulou et al., 2009; Schaufeli et al., 2002) and contains both trait-like and state-like components (Dalal, Brummel, Wee, & Thomas, 2008). For example, van Woerkom, Oerlemans, and Bakker (2016) found in a study of civil engineers that weekly variations in workers' use of

personal resources were significantly linked with weekly changes in employee engagement. Additionally, a study of Dutch teachers revealed that weekly levels of work engagement predicted weekly levels of job performance, both in the same week and also one week later (Bakker & Bal, 2010). While most interventions have looked at employee engagement at the between-person level, determining whether the overall treatment effectively increases employee engagement at a broader level, it is important to look at the influence an intervention has on within-person changes in engagement as well. By looking at within-person changes in engagement throughout the treatment period, researchers will be better equipped to understand the temporal influence of an intervention and determine how its effects unfold over time. In addition, examining the effects of an intervention on employee engagement on a weekly or even daily level will also enable researchers to better understand the influence of engagement on more fluid within-person outcomes, such as health complaints or depletion. As employee engagement has been shown to vary at both a between-person and a within-person level, I predict participants who are asked to regularly think about the positive aspects of existing job resources through a cognitive reflection intervention will experience significantly greater increases in employee engagement over time throughout the intervention period than those assigned to other treatment conditions.

*Hypothesis 2: At the within-person level, participants assigned to the active-treatment condition of the cognitive reflection intervention will experience significantly greater increases in employee engagement over time (i.e., a steeper*

*slope trajectory) than those assigned to the active-control or no-treatment conditions.*

### **Outcomes and Employee Engagement as a Mediator**

Employee engagement is linked to a number of important outcomes, especially in the workplace (for a review, see Bakker et al., 2014). Of particular importance to organizations, engagement is significantly associated with lower levels of employee turnover intentions and higher levels of job performance. Engaged employees are less likely to plan on quitting their jobs (Saks, 2006); meta-analytic evidence suggests engagement is significantly linked to reduced levels of employee turnover intentions, or intentions to quit (Halbesleben, 2010). As employees are more absorbed in and dedicated to their jobs, they are less likely to look elsewhere for employment. One reason for this relationship is because organizations provide employees with the job resources that ultimately lead to their engagement at work. As employees view themselves as beneficiaries of these resources, they are more likely to reciprocate by pouring energy and dedication into their job, rather than looking for employment elsewhere (Agarwal, Datta, Blake-Beard, & Bhargava, 2012).

Engaged employees are also more likely to experience higher levels of job performance, which refers to how well an employee performs the duties required by the job (Borman & Motowidlo, 1997). If engagement is defined as vigor, absorption, and dedication, then an employee who is highly engaged at work is likely to bring greater levels of energy and passion to their job; engaged employees will direct more persistence and focus toward their work duties, which should translate to higher levels of in-role task

performance. In a meta-analysis, Christian et al. (2011) found a main effect between employee engagement and job performance, supporting the supposition that higher levels of engagement are tied to significantly higher levels of job performance. In addition, the Christian et al. (2011) meta-analysis found engagement significantly mediates the relationship between job characteristics or resources (including autonomy, task significance, feedback, and social support) and job performance, above and beyond the effects of attitudes such as job satisfaction, organizational commitment, and job involvement.

If employee engagement is both theoretically and empirically connected to turnover intentions and job performance, then an intervention designed to increase engagement levels should also positively affect subsequent outcomes, including decreased levels of turnover intentions and increased levels of job performance. Thus, at the between-person level, engagement serves as a key mediator between a positive reflection intervention and important outcomes.

*Hypothesis 3: At the between-person level, employee engagement mediates the relationship between treatment condition and A) turnover intentions and B) job performance, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly higher levels of employee engagement, which will lead to significantly lower levels of employee turnover intentions and significantly higher levels of job performance, than those assigned to the active-control or no-treatment conditions.*

As mentioned previously, employee engagement has been shown to contribute to decreased health complaints (see also Hallberg & Schaufeli, 2006; Shimazu, Schaufeli, Kubota, & Kawakami, 2012; Freeney & Fellenz, 2013). While general health concerns can be measured in broad terms between-persons, research suggests it can also be broken down into more specific classifications (i.e. physical complaints, mental complaints, depletion) and measured at more frequent intervals to assess within-person changes (e.g., Bono et al., 2013). There is little existing empirical evidence to suggest within-person levels of employee engagement have a significant impact on within-person health outcomes. However, drawing from separate studies of within-person changes in both engagement and employee health, and combined with research that empirically links engagement and health at the between-person level, I anticipate within-person levels of employee engagement will have a significant impact on within-person levels of weekly employee health outcomes such as physical complaints, mental complaints, and end-of-week depletion. Based on this supposition, an intervention designed to increase employee engagement at the within-person level should also have a significant effect on employees' within-person levels of physical complaints, mental complaints, and depletion. Specifically, I propose a cognitive reflection intervention will be significantly related to increases in within-person employee engagement, which will then lead to significant decreases in within-person physical complaints, mental complaints, and depletion. The intervention alone will not have a significant effect on these within-person outcomes, as simply reflecting on job resources are not likely to decrease employees' health complaints. Instead, the relationship between the intervention and within-person health

outcomes will be fully mediated by changes in employee engagement over time at the within-person level.

*Hypothesis 4: At the within-person level, employee engagement mediates the relationship between treatment condition and A) physical complaints, B) mental complaints, and C) depletion, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience steeper (positive) slope trajectories of employee engagement over time, which will then lead to significantly lower levels of physical complaints, mental complaints, and depletion, than those assigned to the active-control or no-treatment conditions.*

### **Mediators: Perceptions of Job Resources**

As mentioned earlier, a positive reflection intervention leads to increased employee engagement through a process of enhanced cognition. Specifically, positive reflections of existing job resources serve as a form of cognitive reappraisal that increases an individual's perceptions of those resources, which then leads to increased levels of employee engagement. This change in resource perceptions likely occurs through two simultaneous cognitive events, including increased *perceptions of presence* and *perceptions of importance* of a given resource. Thus, at both the between-person and within-person level, positive reflections of existing job resources will lead to increased perceptions of resources through changes in both perceived resource presence and importance, which will then lead to increased levels of employee engagement.

A number of resources have been suggested in research exploring the relationship between job resources and employee engagement, however, there is not a single taxonomy of characteristics that is generally accepted or adopted by researchers. Therefore, in looking at changes in perceptions of resources, I focus on five particular job resources that have been empirically linked to employee engagement through meta-analysis: autonomy, task variety, job significance, feedback, and social support from coworkers (Christian et al., 2011). The first four resources were included in Hackman and Oldham's (1976) original job characteristics model (JCM), which outlined five core characteristics that make work more enjoyable for employees, thereby increasing employee motivation and productivity. According to Hackman and Oldham (1976), autonomy is the degree to which a job provides substantial freedom, independence, or discretion to the employee in determining the procedures and timing to be used in carrying out work tasks. Task variety is the extent to which a job requires a variety of different activities, utilizing an employee's different skills and talents, in carrying out one's work. Job significance consists of the degree to which a job has a substantial impact on the lives or work of other people. Feedback is defined as the extent to which an individual obtains direct and clear information about the effectiveness of his or her performance when performing work duties. In all four of these job characteristics, greater levels of each resource (e.g., more autonomy) is desirable and generally results in stronger employee motivation and better performance (Hackman & Oldham, 1975, 1980). Following the Christiansen et al. (2011) meta-analysis, which adapted a conceptual framework from Macey and Schneider (2008) in studying antecedents of work engagement, I have adopted four of the original job characteristics from the JCM,



while omitting task identity, or the degree to which a job requires completing a task from beginning to end with a visible outcome. Finally, I have also elected to include social support from coworkers as the fifth and final job resource in my study. While not a characteristic of the job itself (as are autonomy, task variety, job significance, and feedback), social support, defined as the extent to which an employee receives opportunities for assistance and advice from coworkers (e.g., Christian et al., 2011), is a characteristic of the context and environment in which an employee works. In addition, social support serves as a resource to employees both in the ways it provides opportunities for employees to learn important job-related skills from one another, and also as a form of social interaction and emotional support used to buffer against job-related strain. Meta-analytic results suggest social support is a significant antecedent of employee engagement (Christian et al., 2011). While the Christian et al. (2011) meta-analysis has identified additional job characteristics as significant antecedents of employee engagement (i.e., physical demands, job complexity, work conditions, and problem solving), for the sake of parsimony I have selected those five characteristics with the highest mean corrected correlations with employee engagement.

Thus, I explore how the relationship between a positive reflection intervention and employee engagement is mediated by perceptions of resources. More precisely, I examine how this relationship is mediated by employees' perceptions of presence and perceptions of importance of five specific job resources: autonomy, task variety, job significance, feedback, and social support.

*Hypothesis 5: At the between-person level, employee post-study perceptions of resource presence mediates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly higher levels of perceptions of presence of A) autonomy, B) task variety, C) job significance, D) feedback, and E) social support, which will then lead to higher levels of employee engagement, than those assigned to the active-control or no-treatment conditions.*

*Hypothesis 6: At the between-person level, employee post-study perceptions of resource importance mediates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly higher levels of perceptions of importance of A) autonomy, B) task variety, C) job significance, D) feedback, and E) social support, which will then lead to higher levels of employee engagement, than those assigned to the active-control or no-treatment conditions.*

*Hypothesis 7: At the within-person level, employee perceptions of resource presence mediates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly steeper (positive) slope trajectories of perceptions of presence of A) autonomy, B) task variety, C)*

*job significance, D) feedback, and E) social support over time, which will lead to steeper (positive) slopes of employee engagement over time, than those assigned to the active-control or no-treatment conditions.*

*Hypothesis 8: At the within-person level, employee perceptions of resource importance mediates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly steeper (positive) slope trajectories of perceptions of importance of A) autonomy, B) task variety, C) job significance, D) feedback, and E) social support over time, which will lead to steeper (positive) slopes of employee engagement over time, than those assigned to the active-control or no-treatment conditions.*

### **Moderators: Workload**

While ample research suggests job resources are the strongest predictors of employee engagement, engagement can be affected by the presence of job demands, as well (Bakker et al., 2014). Job demands are aspects of the job that require attention and response (Schaufeli & Bakker, 2004), or things “that have to be done” (Jones & Fletcher, 1996: 34), demanding sustained physical, emotional, or cognitive effort (Demerouti et al., 2001). Examples of key job demands include workload, role stress, work pressure, and role conflict. Job demands have been linked to numerous deleterious outcomes, including physiological and psychological health concerns, absenteeism, and burnout from work (e.g., Lee & Ashforth, 1996; Alarcon, 2011; Bakker et al., 2014); the main effects of

these relationships are well-established. However, research studying interaction effects of job demands suggest workplace demands may also play a role in explaining the positive impact job resources can have on more desirable outcomes, such as engagement (e.g., Hakanen, Bakker, & Demerouti, 2005). Hobfoll (2002) stated that job resources become salient in the context of resource loss, implying job resources become more salient and influential when coupled with job demands, such as workload (Bakker et al., 2008; Bakker & Demerouti, 2007). Thus, the presence of high job demands may ultimately trigger the significance of job resources, thereby allowing employees to more fully benefit from their presence and availability.

For example, Seers, McGee, Serey, and Graen (1983) found social support to be a significant predictor of job satisfaction, but only for those employees with high role conflict. Seers et al. (1983) suggest that for those employees facing low levels of job demands (i.e., role conflict), social support is an unnecessary resource. However, for those experiencing high levels of job demands, employees are more likely to use available job resources (i.e., social support) as a coping mechanism to buffer against the strain of such demands (Bakker et al., 2007). More recently, van Woerkom, Bakker, and Nishii (2016) found similar results, suggesting the promotion of employees' personal-strengths use in the workplace significantly reduced strain-induced absenteeism, particularly in the face of high job demands. In an engagement context, Bakker et al. (2007) found the relationship between job resources and engagement was particularly high for teachers who experienced high levels of pupil misbehavior in their school classrooms. The results of these interactions suggest job resources are particularly relevant under highly demanding conditions. Conversely, job resources may be of less

concern to employees who face fewer demands and stressors in the job (Bakker et al., 2007).

Given these findings, a positive reflection intervention should succeed in increasing employee engagement, particularly in the face of high job demands. Although there are many job demands that influence the resource-engagement relationship, workload is an especially persistent demand among today's workforce across a broad spectrum of occupations (Huyghebaert, Gillet, Beltou, Tellier, & Fouquereau, 2018). Workload refers to the amount of work an employee is required to complete in a given amount of time, along with the effort required to complete it (Nixon, Mazzola, Bauer, Krueger, & Spector, 2011), and meta-analyses indicate prolonged exposure to heavy workloads can lead to numerous physical and mental health complaints, as well as increased turnover intentions (Bowling, Alarcon, Bragg, & Hartman, 2015; Nixon et al., 2011). In addition, empirical findings suggest workload, as a job stressor or demand, influences employees at both the between-person and within-person levels (for a review, see Sonnentag & Fritz, 2015). Thus, as a job demand, workload will likely moderate the relationship between a positive reflection intervention and employee engagement at both the between-person and within-person levels, such that the intervention will lead to higher levels of employee engagement in the face of heavier workloads.

*Hypothesis 9: At the between-person level, workload moderates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience significantly higher levels of employee engagement than those*

*assigned to the active-control or no-treatment conditions only when workload levels are high.*

*Hypothesis 10: At the within-person level, workload moderates the relationship between treatment condition and employee engagement, such that participants assigned to the active-treatment condition of a cognitive reflection intervention will experience steeper (positive) slope trajectories of employee engagement over time than those assigned to the active-control or no-treatment conditions only when workload levels are high.*

Putting all of these elements together, my full theoretical model (Figure 1) predicts that, at the between-person level, a positive reflection intervention that asks employees to reflect about existing job resources serves as a form of cognitive reappraisal and leads to increased levels of employee engagement, particularly when workload levels are high. This relationship between treatment condition and engagement is mediated by increased employee perceptions of presence and importance of job resource. Consequently, heightened engagement levels also lead to significantly improved outcomes at the between-person level, including lower levels of employee turnover intentions and higher levels of employee job performance. At the within-person level, my full theoretical model predicts a positive reflection intervention leads to significantly steeper (positive) slope trajectories of employee engagement through the mechanisms of increased employee perceptions of presence and perceptions of importance of job

resources, particularly in the face of heavy workload, which then leads to significantly decreased levels of within-person physical complaints, mental complaints, and depletion.

To test my hypotheses, I designed a positive reflection intervention and assessed its efficacy by comparing participants assigned to active-treatment, active-control, and no-treatment conditions using data from surveys collected before, during, and after the intervention period. An overview of the study is discussed in the next chapter of this dissertation, along with an examination of analyses and results.

## **Chapter 3: Methods**

### **Overview**

I conducted a pretest-posttest field experiment to assess the efficacy of a cognitive reflection intervention for increasing employee engagement. This study comprised of two primary groups, including an active-treatment group who participated in the daily intervention, and an active-control group who conducted a similar cognitive exercise. In addition, a third group completed both pretest and posttest surveys at the beginning and end of the study, but did not complete any daily cognitive reflection exercises or weekly surveys as part of the study. Following the active phase of the study, participants were asked to complete a post-study survey used to measure changes in baseline data. Comparisons of pretest-posttest data were conducted to assess the overall efficacy of the intervention, while data from end-of-week surveys were used to analyze changes in key variables over time during the intervention period.

### **Sample**

Participants were recruited from a public school district in the Midwestern United States (hereafter referred to as ABC Public Schools). The district includes approximately 850 employees at nine schools, ranging from pre-Kindergarten to high school. As part of a broader, district-wide engagement survey, 282 employees completed the background survey. Of those 282 employees, 163 registered to participate in the study (57.8%). Twenty-one participants later withdrew voluntarily from the study during the course of the five-week intervention. The final sample consisted of 142 participants (87.12%).

Study participants were predominantly female (81.6%) and white (96.5%), which was representative of the larger population of district employees. The mean age of



participants was 41.01 years. The majority of participants were married (71.6%) and had an average of 1.99 children. Sixty percent of participants had earned graduate degrees (e.g., Master's degree), while 2.1% graduated from high school or received a G.E.D, 13.5% attended some college or technical training beyond high school (1-3 years), 15.6% earned a bachelor's degree, and 8.5% attended some graduate school. The mean participant tenure at the school district was 8.32 years, with an average tenure in the current job of 4.97 years. While 58.2% of participants were teachers, the remaining participants worked in a number of different roles across the organization, including support staff/paraprofessionals (11.3%), secretarial/clerical (4.3%), English learning language (ELL) services for children who speak English as a second language (5.7%), maintenance/custodial (1.4%), food & nutrition services (1.4%), and school health services (0.7%).

Analysis revealed a statistically significant difference in education levels when comparing those in the final sample who completed the study to those who enrolled but later withdrew during the study period ( $B = -.279$ ;  $p < .01$ ), with those who withdrew indicating lower education levels than those who remained in the study. Of those who withdrew from the study, 28.6% earned a graduate or professional degree (14.3% high school diploma/G.E.D.; 19.0% some college; 33.3% bachelor's degree; 4.8% some graduate school). However, these differences in education do not appear to be related to differences in age, gender, race, or job type. Additionally, when comparing the final study sample to those employees who completed the background survey but chose to not participate in the study, analysis revealed a significant difference in age ( $B = .202$ ;  $p <$

.05). Non-participating employees were, on average, 43.43 years old, or approximately 2.5 years older than those who participated in the study.

## **Procedure**

### *Recruitment and Background Survey*

The Executive Director of Educational Services (the Director) for ABC Public Schools sent an email to all district employees asking them to participate in a district-wide survey referred to as the “ABC Workplace Environment Survey.” Employees were informed the purpose of this online survey was to assess the general working environment at ABC Public Schools, including questions about how employees feel about their jobs, workload levels, engagement, stress, and overall health and well-being. In addition, the Workplace Environment Survey collected demographic information such as gender, age, race, employment tenure, etc. Employees were notified the survey was being conducted by researchers from the Carlson School of Management at the University of Minnesota (providing the names and contact information of the researchers), and were assured of complete confidentiality. The Director’s email further informed district employees that at the end of the Workplace Environment Survey, they would be provided an opportunity to voluntarily enroll in a paid study with the same researchers from the University of Minnesota. At the bottom of the email was a link to the Workplace Environment Survey, which took approximately 15-20 minutes to complete.

Following completion of the Workplace Environment Survey was an invitation to voluntarily participate in a paid study called “Flourish: The University of Minnesota Employee Well-Being Initiative.” A link took interested employees to a separate web

page that included more information about the study, as well as a consent form and registration for those who wished to enroll. This page also made clear to employees that the study was being conducted by researchers from the University of Minnesota, participation was voluntary and confidential, and choosing not to participate or withdrawing from the study would in no way affect their current or future relations with either ABC Public Schools or the University of Minnesota. Study registration was open to employees who were 18 years or older, had worked at ABC Public Schools for at least three months, and worked a minimum of 15 hours per week across an average of four days per week. Additionally, school principals, vice-principals, and district-level administrators were excluded from participation in the study.

For those employees who registered to participate in the study, their completed Workplace Environment Surveys became their background survey for the study. These data were used to assess baseline levels of key variables prior to the active phase of the study, and was linked to their other surveys completed throughout the study.

#### *Active Phase of the Study*

Approximately one week following the end of the registration period, participants were randomly assigned to one of two conditions (active treatment and active control) and the active phase of the study began. This phase took place over the course of five consecutive weeks, or 25 work days.

Each weekday, Monday through Thursday, participants were sent an email at 2:00 p.m. containing a link to a positive daily reflection exercise. In addition to the email, 44.19% of participants elected to receive daily text messages at the same time, which also contained links to the reflection exercises. While the specific contents of these exercises

varied by week and condition (see below for more information), the overall premise of these exercises remained the same: participants were asked to take a few moments and reflect on something positive that happened earlier in the day, and then write a few sentences about that event or experience. Each daily reflection exercise took approximately 3-5 minutes to complete.

Each Friday at 10:30 a.m., participants were sent an email (and, optionally, a text message) containing a link to an online end-of-week survey. These surveys asked participants about their experiences during the previous week, including items about engagement, perceptions of resources, workload, and health outcomes, as well as items about stress, diet, sleep, and exercise. Specific questions, and the order in which those questions were presented to participants in the survey, did not vary from week to week. Each end-of-week survey took approximately 8-10 minutes to complete.

Links to the daily reflection exercises were sent at 2:00 p.m. each day in an effort to reach employees toward the end of the workday (some schools dismissed students at 2:30 p.m. each day), allowing participants more time to reflect upon good things that had happened over the course of the day. Conversely, links to the weekly surveys were sent at 10:30 a.m. to accommodate a request from the school district, who asked that participating employees be allowed to complete these Friday surveys during their lunch breaks. These end-of-week surveys did not require the same reflection of events from earlier in the day as did the daily reflection exercises and were able to capture experiences from the week, except for potentially Friday afternoon (1:37 p.m. was the average completion time of the end-of-week surveys). Participants were encouraged to complete the daily reflection exercises and end-of-week surveys before leaving work

each day, although they were also allowed to complete the surveys at a later time as long as responses were submitted before participants went to bed each night. Average completion time for the daily reflection surveys was 3:43 p.m.

While the background and post-study surveys collected general or overall measures of key variables (e.g., “To what extent do you experience the following health symptoms *in general*?”), the weekly surveys measured many of these same variables but specifically in reference to that previous week (e.g., “To what extent did you experience the following health symptoms *this past week*?”). The general nature of the items contained in the background and post-study surveys allowed me to examine the overall effectiveness of the intervention in relation to levels of engagement, perceptions of resources, and key outcomes, whereas the end-of-week surveys enabled me to look at the fluidity of these variables and determine how outcomes changed over time as a result of the intervention.

#### *Post-Study Survey*

One week following the end of the active phase of the study, participants were emailed a link to the post-study survey. This survey was identical to the background survey in that it measured general assessments of employee engagement, perceptions of resources, workload, and key outcomes. Unlike the background survey, however, the post-study survey did not measure demographic variables as these items would not have changed during the active phase of the study. At the end of the post-study survey, participants were also asked the extent to which they discussed the details of the study with other employees of ABC Public Schools. The post-study survey took approximately 13-15 minutes to complete.

Following completion of the post-study survey, each participant was given a letter thanking them for participating in Flourish: The University of Minnesota Employee Well-Being Initiative, and explaining the purpose of the study. Each letter also contained a VISA cash card as compensation for participating in the study. Participants who completed the post-study survey, as well as at least 85% of the daily reflection exercises and weekly surveys, received \$100. Compensation was prorated for those who participated in the study but completed less than 85% of the daily surveys.

## **Conditions**

### *Active-Treatment Condition*

A total of 66 participants were randomly assigned to the active-treatment condition. Those assigned to this condition were asked to reflect specifically on different job resources, and positive ways in which those resources have affected themselves and others. I created five reflection exercises, each based on the five job characteristics previously identified: autonomy, task variety, job significance, feedback, and social support. These exercises were based on the positive reflection exercises originally created by Martin Seligman and his collaborators (for examples, see Seligman et al., 2005; 2006). While the foundational elements of these exercises require participants to reflect upon something positive that has happened and record a brief description of that event, other researchers have demonstrated that the context of these exercises can effectively be altered to fit a given situation or empirical focus without altering the efficacy of the positive reflection intervention itself (e.g., Gander, Proyer, Ruch, & Wyss, 2013; Giannopoulos & Vella-Brodrick, 2011). In following this stream of research, the five positive reflection exercises assigned to the active-treatment group were specifically

designed to focus participants' attention toward the existence and benefits of different resources in the workplace, while still maintaining those foundational elements that make up an effective positive reflection exercise.

For example, the daily Feedback exercise asked participants to reflect on a time earlier that day when they received positive feedback about their job, either from their supervisor, students, or parents, and how such feedback made them feel or helped them become a better employee. The Job Significance exercise asked participants to think about a time at work that day in which, by doing their job, they were able to make a positive difference. (For full reflection instructions, see Appendix A.) During the active phase of the study, participants were asked to reflect on a single job resource each day for four consecutive workdays (Monday through Thursday), and then the following week they were asked to reflect on a different resource for four consecutive days. This process continued for five weeks until participants assigned to the active treatment condition had spent a week reflecting on each of the five different job resources. The order of the five reflection exercises in the active-treatment condition varied randomly by participant. This randomization of the order of reflection exercises helped to ensure internal validity by counteracting any possible order effect that could have potentially arisen by having all participants reflect on the same resources in the same order. See Figure 2 for an example timeline for participants assigned to the active-treatment condition.

#### *Active-Control Condition*

Seventy-six participants were assigned to the active-control condition. This condition was created to be similar to those exercises used in the active-treatment condition, except instead of reflecting specifically on job resources, participants assigned

to this condition were asked to reflect on good things that happened in general during the previous 24 hours, either at home or at work. (For full reflection instructions, see Appendix A.) This condition was included to help rule out one of the primary alternative explanations in this study: that positive reflections *themselves*, or positive reflections in general, lead to increases in employee engagement and subsequent outcomes, rather than reflections specifically about job resources, as I have hypothesized. By comparing those assigned to the active-treatment group to those assigned to the active-control group, I was able to determine whether general positive reflections could be ruled out as a viable explanation of the relationship between a cognitive reflection intervention about job resources and employee engagement. While participants assigned to the active-treatment condition reflected and wrote about a new job resource each week, those assigned to the active-control condition were given the same general reflection assignment each day (Monday through Thursday) throughout all five weeks of the active phase of the study. See Figure 3 for an example timeline for participants assigned to the active-control condition.

#### *No-Treatment Condition*

Initially, this study was designed to evenly (and randomly) distribute participant assignments across three conditions, including a no-treatment condition where participants would not complete any daily reflection exercises Monday through Thursday, but would still be asked to complete the weekly surveys distributed each Friday. See Figure 4 for an example timeline for participants assigned to the no-treatment condition, as it was originally designed. Unfortunately, there were not enough study participants to be able to fully populate three conditions, so all participants were



randomly distributed between the active-treatment and active-control conditions during the active phase of the study. This means I was not able to collect weekly data from a no-treatment group and this condition was excluded from within-person analyses. I was, however, able to recruit enough additional participants to include a no-treatment condition for the between-person analyses.

With approval from the school district, I reached out via email to those employees of ABC Public Schools who had completed the Workplace Environment Survey but did not register to participate in the study, and asked them to complete the post-study survey as well. While these employees did not officially participate in the study, they played an important role in helping to determine the overall effectiveness of the intervention as they served as a non-active control group to whom the results of the active-treatment group could be compared for the between-person analysis. Of the 119 ABC employees who took the Workplace Environment Survey but did not register to participate in the Flourish study, 43 (36.13%) agreed to take the post-study survey. These employees signed an online consent form granting permission for their post-study survey to be linked to their Workplace Environment Survey, and allowing their results from both surveys to be used in my study. Employees in the no-treatment group were each compensated with \$10 in cash. Employees in the no-treatment group completed the post-survey study during the same week as study participants assigned to the active-treatment and active-control conditions. This way, the same number of weeks elapsed between the background survey and the post-study survey for participants in all three conditions. While employees assigned to the no-treatment condition completed both the background and post-study

surveys, they did not complete any of the daily reflection exercises or weekly surveys during the active phase of the study.

#### *Average Number of Daily Reflection Responses per Condition*

Out of 20 possible daily reflection exercises (Monday through Thursday for five weeks), participants assigned to the active-treatment condition completed an average of 17.82 daily reflection exercises (SD = 2.45, ranging from 9 to 20). Participants assigned to the active-control condition completed an average of 18.09 exercises (SD = 2.08, ranging from 12 to 20). A chi-squared test suggests condition assignment was independent of the number of daily reflection exercises completed ( $X^2(9) = 13.22, p = .15$ ). While all 142 study participants completed at least one daily reflection exercise, 130 participants (91.55%) completed at least 15 (75%) of the daily exercises (72 in the active-control condition, and 58 in the active-treatment condition).

Because of the random nature of the study condition assignments, with participants in the same schools assigned to both the active-treatment condition and the active-control condition, it was important that participants not discuss details about the study with one another. In an effort to reduce threats to internal validity (Shadish, Cook, & Campbell, 2002), participants were instructed to not share information about the contents of their daily reflection exercises with anyone in their organization until after completion of the post-study survey and the study had officially ended. At the end of the post-study survey, I asked participants two questions in regards to this sharing of study information: “Did you discuss the details of this study, and in particular the daily reflection exercises, with other employees at ABC Public Schools?” (1 = “Yes,” 2 = “No”), and “If yes, please indicate how often you discussed the details of this study with

other employees of ABC Public Schools” (0 = “Not applicable/never,” 5 = “Very frequently”). In response to the first question, 79.58% of participants indicated they had not discussed details of the study with other district employees (1.80; SD = .41). Of those who did discuss study details with others, 90.63% indicated these discussions took place “very rarely,” “rarely,” or “occasionally.” These responses suggest the social sharing of information between participants was not a factor in this study.

### **Measures: Background Survey**

*Employee Engagement* was measured by nine items from the short version of the Utrecht Work Engagement Scale (UWES), created by Schaufeli, Bakker, and Salanova (2006). While the original version of the UWES consists of 17 items, the short version has been found to be a more parsimonious measure of employee engagement and is more psychometrically reliable than the original 17-item scale (Mills, Culbertson, & Fullagar, 2012). The nine-item version of the UWES is comprised of three facets, namely vigor, absorption, and dedication, with three items used to measure each facet. Findings suggest it is appropriate to use either the three-factor or one-factor model of engagement, although some researchers recommend using a one-factor model for the sake of parsimony (e.g., Seppala et al., 2008). Responses were measured on a 7-point Likert-type scale (1 = “never” to 7 = “always”) and asked participants to indicate how they *generally* feel at work. Sample items for vigor, absorption, and dedication include “When I get up in the morning, I feel like going to work,” “I am immersed in my work,” and “My job inspires me” ( $\alpha = .88$ ).

*Perceptions of Resources* were assessed for autonomy, task variety, job significance, feedback, and social support in two ways. First, *perceptions of presence* of

existing job resources was measured using the Work Design Questionnaire (WDQ; Morgeson & Humphrey, 2006). The WDQ was created to integrate previously identified work characteristics into a more inclusive taxonomy than had previously been used, and includes original items as well as items drawn and adapted from existing work-design surveys (e.g., Hackman & Oldham, 1974; 1980; Idaszak & Drasgow, 1987; Campion & McClelland, 1991; Karasek et al., 1998; Sims, Szilagyi, & Keller, 1976; for a review of the WDQ, see Morgeson & Humphrey, 2006). Participants indicated the accuracy of 20 statements, including “This job allows me to make decisions about what methods I use to complete my work” (autonomy; 3 items;  $\alpha = .89$ ), “This job involves doing a number of different things” (task variety; 4 items;  $\alpha = .89$ ), “The results of my work are likely to significantly affect the lives of other people” (job significance; 4 items;  $\alpha = .87$ ), “I receive feedback on my performance from other people in my organization (such as my manager or coworkers)” (feedback; 3 items;  $\alpha = .92$ ), and “I have the opportunity to develop close friendships in my job” (social support; 6 items;  $\alpha = .81$ ). Second, *perceptions of importance* of existing job resources was measured using two items, written by me, for four of the five job characteristics (autonomy, task variety, job significance, and feedback), and using four items to measure the fifth job characteristic (social support). Participants indicated the extent to which they agreed with the following statements: “Having autonomy, or the freedom to make decisions about how I complete my work, is important to me,” and “Deciding on my own how I go about doing my work is important to me” (autonomy;  $\alpha = .90$ ); “Having variety in the tasks I do at work is important to me,” and “Doing a number of different things at my job is important to me” (task variety;  $\alpha = .93$ ); “Having a job that significantly affects the lives of others is

important to me,” and “Doing work that significantly impacts people outside of the organization is important to me” (job significance;  $\alpha = .82$ ); and “Receiving feedback from others about my job performance is important to me,” and “Receiving information from other people in the organization (such as my manager or coworkers) about the effectiveness of my job performance is important to me” (feedback;  $\alpha = .95$ ). For social support, the four items were “Having the opportunity to develop close friendships at my job is important to me,” “Having the chance to get to know other people at my job is important to me,” “Working with people who take a personal interest in me is important to me,” and “Giving/receiving social support from others at work is important to me” ( $\alpha = .92$ ). All items were measured on a 5-point scale (1 = “strongly disagree” to 5 = “strongly agree”).

*Workload* was measured using three items from Bolino and Turnley (2005), who adapted the items from Schaubroeck, Cotton, and Jennings (1989) and Beehr, Walsh, and Taber (1976). The stem asked participants to “indicate the extent to which [they] agree or disagree with the following statements *in general*.” The items are “The amount of work I am expected to do is too great,” “I never seem to have enough time to get everything done at work,” and “It often seems like I have too much work for one person to do.” Responses were measured using a 5-point scale (1 = “strongly disagree” to 5 = “strongly agree”) ( $\alpha = .89$ ).

*Job Performance* was measured using five items from the in-role job performance facet of the employee performance scale (Turnley, Bolino, Lester, & Bloodgood, 2003) adapted from a job performance scale originally developed by Williams and Anderson (1991). The in-role job performance facet consisted of six items, but I dropped one item

(“I sometimes neglect aspects of the job I am obligated to perform”) due to its unacceptably low factor loading as cited by Turnley et al. (2003). The remaining items were measured using a 5-point scale (1 = “strongly disagree” to “5 = “strongly agree”), and asked participants to indicate how much they agreed with the following statements about their job performance *during the last month*. Sample items include “I fulfilled all the responsibilities specified in my job description” and “I conscientiously performed tasks that were expected of me” ( $\alpha = .78$ ).

*Turnover Intentions* was measured by two items from Bentein, Vandenberg, Vandenberghe, and Stinglhamber (2005), adapted from Hom and Griffeth (1991) and Jaros (1997). The items are “I often think about quitting this organization,” and “I intend to search for a position with another employer within the next year” ( $\alpha = .76$ ). Responses were measured using a 5-point scale (1 = “strongly disagree” to 5 = “strongly agree”).

*Physical Complaints* and *Mental Complaints* were both measured using scales from Bono et al. (2013), which were adapted from health-related questions in Goldberg (1972). Both scales asked participants to indicate “To what extent do you experience the following symptoms *in general*?” and responses were measured using a 5-point scale (1 = “not at all” to “5 = “severely”). Physical complaints were assessed using five items, such as “headaches” and “neck or back pain” ( $\alpha = .78$ ). Mental complaints were measured by three items, including “difficulty concentrating” and “difficulty making decisions” ( $\alpha = .75$ ).

*Depletion* was measured by five items originally developed by Twenge, Muravan, Harter, and Tice (2004). This scale was further validated by Johnson, Lanaj, and Barnes (2014), and used in subsequent empirical studies (e.g., Lin & Johnson, 2015). Participants

were asked to indicate “To what extent do the following statements describe how you feel *in general*?” and responses were measured using a 5-point scale (1 = “not at all” to 5 = “very much”). Sample items include “I feel drained” and “It takes a lot of effort for me to concentrate on something” ( $\alpha = .90$ ).

Participants were also asked to provide demographic information, including gender (1 = female, 0 = male), age, race (1 = white, 0 = other), marital status (1 = single, 2 = married, 3 = same-sex domestic partner, 4 = living with a significant other or partner, 5 = divorced or separated, 6 = widowed, 0 = other), parental status (0 = 0 children living at home, 1 = one child living at home, 2 = 2 children, ... 6 = more than 5 children living at home), education (1 = some high school [grade 11 or less], 2 = graduated from high school or G.E.D., 3 = some college or technical training beyond high school [1-3 years], 4 = Bachelor’s degree, 5 = some graduate school, 6 = graduate or professional degree [Master’s, Ph.D., J.D., M.D., etc.]), tenure at the school district, and tenure in current job.

### **Measures: Weekly Survey**

*Employee Engagement* was measured by nine items from the UWES as described in the background survey. Unlike the background survey, however, which measured general levels of employee engagement, this scale focused on engagement at a weekly level, as has been done in previous research (e.g., Bakker & Bal, 2010; Breevaart, Bakker, Demerouti, & Hetland, 2012; van Woerkom et al., 2016). Responses were measured on a 7-point Likert-type scale (1 = “never” to 7 = “always”). Sample items for vigor, absorption, and dedication include “This week, when I got up in the morning I felt like going to work,” “This week, I was immersed in my work,” and “This week, my job inspired me” ( $\alpha = .93$ ).

*Perceptions of Resources* were measured in the weekly survey in a manner similar to the background survey, albeit with a fewer number of items to reduce respondent fatigue. *Perceptions of presence* of existing job resources was measured by asking participants to indicate the accuracy of 11 statements, including “This job gives me considerable opportunity for independence and freedom in how I do the work,” and “The job allows me to decide on my own how to go about doing my work” (autonomy;  $\alpha = .92$ ); “The job involves doing a number of different things,” and “The job involves performing a variety of tasks” (task variety;  $\alpha = .97$ ); “The results of my work are likely to significantly affect the lives of other people,” and “The work performed on the job has a significant impact on people outside the organization” (job significance;  $\alpha = .80$ ); “Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance,” and “I receive feedback on my performance from other people in my organization (such as my manager or coworkers)” (feedback;  $\alpha = .90$ ); and “I have the opportunity to develop close friendships in my job,” “I have the chance in my job to get to know other people,” and “People I work with take a personal interest in me” (social support;  $\alpha = .86$ ). Items were retained based upon face validity. In other words, I retained those items from the background survey that appeared to most accurately measure the constructs in question.

*Perceptions of importance* of existing job resources were measured using the same 12 items as used in the background survey for each job characteristic, including autonomy (2 items;  $\alpha = .90$ ); task variety (2 items;  $\alpha = .95$ ); job significance (2 items;  $\alpha = .83$ ); feedback (2 items;  $\alpha = .95$ ); and social support (4 items;  $\alpha = .92$ ). All items were measured on a 5-point scale (1 = “strongly disagree” to 5 = “strongly agree”).



*Workload* was measured with the same three items used in the background survey, although these items focused on workload levels experienced during the previous week. To change the temporal focus of workload items in the weekly survey, the phrase “This past week,” was added to the beginning of each item ( $\alpha = .93$ ).

*Physical Complaints* and *Mental Complaints* were measured using the same items from the background survey, although to change the temporal focus of the items, participants were asked “To what extent did you experience the following symptoms *this past week?*” As in the background survey, physical complaints were measured using five items ( $\alpha = .85$ ) and mental complaints were measured using three items ( $\alpha = .80$ ).

*Depletion* was measured using five items from Lin and Johnson (2015). Participants were asked to identify “To what extent do the following statements describe how you felt this past week?” Sample items include “I felt drained” and “It took a lot of effort for me to concentrate on something.” Responses were measured using a 5-point scale (1 = “not at all” to 5 = “very much”) ( $\alpha = .93$ ).

### **Post-Study Survey**

In the post-study survey, I used the same measures, items, and response scales as those used in the background survey for the following constructs: employee engagement, perceptions of resources (including perceptions of presence and perceptions of importance), workload, job performance, turnover intentions, physical complaints, mental complaints, and depletion.

*Discussion of Study with Others* was measured as a manipulation check to assess the extent to which participants discussed details of the study with other district employees, potentially resulting in a heightened awareness of the other study conditions.

This was measured by a single item, which asked participants to indicate “how often [they] discussed details of this study with other ABC Public School employees.”

Responses were measured on a 6-point scale (0 = “never” to 5 = “very frequently”).

Those who indicated they had discussed details of the study with others were asked a follow-up question: “Please indicate how often you discussed the details of this study with other employees of ABC Public Schools” (0 = “Not applicable/never,” 5 = “Very frequently”).

## **Chapter 4: Results**

### **Overview**

I tested hypotheses using several analytical approaches. First, I performed confirmatory factor analyses (CFA) on the items comprising scales for employee engagement, perceptions of presence, and perceptions of importance. These CFA analyses were performed on data from the background, post-study, and weekly surveys. Second, I reported descriptive statistics and zero-order correlations of study variables in all three surveys, as well as pre- and post-intervention means and standard deviations of study variables by condition. Third, I tested hypotheses at the between-person level using pre-post data from the background and post-study surveys. These analyses included a test of the overall effectiveness of the intervention for each condition using analysis of covariance (ANCOVA; Hypothesis 1). In addition, I tested the mediating effects of employee engagement on key outcomes (Hypotheses 3a and 3b), and whether the relationship between treatment condition and engagement was mediated by employee perceptions of presence (Hypotheses 5a-e) and perceptions of importance (Hypotheses 6a-e) of key job resources. I also tested the moderating effect of workload on the relationship between treatment condition and employee engagement (Hypothesis 9). Fourth, I tested hypotheses at the within-person level using multi-group latent growth modeling to assess and compare slope trajectories of within-person change using data collected from the five end-of-week (weekly) surveys. These analyses included finding the best-fitting univariate model for each variable, then combining variables of interest into multivariate models to test within-person hypotheses. These tests included a comparison of changes in within-person slope trajectories of employee engagement based

on treatment condition (Hypothesis 2), how within-person changes in engagement during the intervention period mediated the effect of treatment condition on key outcomes (Hypotheses 4a-c), and how the effects of treatment condition on within-person changes in engagement were mediated by perceptions of presence (Hypothesis 7a-e) and perceptions of importance (Hypothesis 8a-e) of job resources. In addition, I tested how the relationship between treatment condition and within-person changes in engagement was moderated by workload (Hypothesis 10). Finally, I conducted supplemental analyses to rule out alternative explanations and clarify findings.

### **Confirmatory Factor Analysis of Engagement and Perceptions of Resources Items**

#### *Background Survey*

Using background survey data from 142 study participants, I performed confirmatory factor analyses (CFA) for the nine items that make up the short version of the Utrecht Work Engagement Scale used to measure employee engagement, and also for those items used to measure perceptions of resources. All CFA analyses were performed using *Mplus* (Version 8.3; Muthén & Muthén, 2019). By default, Mplus uses maximum likelihood estimation for single-level analyses. While there were minimal missing data (a single participant failed to complete the entire background survey), Mplus treated these as “missing at random,” rather than imputing values for those missing responses.

I treated engagement as a higher-order (or second-order) factor model, in which items loaded separately onto sub-factors of vigor, dedication, and absorption, which then loaded onto engagement as a higher-order factor ( $X^2 = 54.52$ ,  $df = 22$ ,  $p < .001$ , Root Mean Square Error of Approximation [RMSEA] = .1, CFI = .95, TLI = .91, Standardized Root Mean Square Residual [SRMR] = .06). This model was then compared to two

alternative models. The first alternative was a three-factor model that loaded the items onto vigor, dedication, and absorption as three separate latent factors ( $X^2 = 54.52$ ,  $df = 22$ ,  $p < .001$ , RMSEA = .1, CFI = .95, TLI = .91, SRMR = .06). The second alternative was a one-factor model that loaded all nine items directly onto engagement as a single factor ( $X^2 = 72.59$ ,  $df = 25$ ,  $p < .001$ , RMSEA = .12, CFI = .92, TLI = .89, SRMR = .07). The higher-order factor model fit equally well as the three-factor model, and fit significantly better than the one-factor model ( $\Delta X^2 = 18.07(3)$ ,  $p < .001$ ). These results support previous findings suggesting the nine-item Utrecht Work Engagement Scale can be used to measure engagement with either a higher-order or a three-factor model, with similar results (e.g., Schaufeli, Bakker, & Salanova, 2006; Schaufeli & Bakker, 2010). Given these findings, I adopt the higher-order factor model of engagement in subsequent analyses throughout this dissertation for the sake of parsimony, which is common practice when a higher-order factor model and a multi-factor model share similar CFA results (Bollen, 1989). Confirmatory factor analysis results indicated the latent factors of vigor, dedication, and absorption all demonstrated significant loadings onto the higher-order-factor of engagement ( $\lambda = .998, .961, .764$ ;  $p < .001$  for all three latent factors). In addition, all item loadings on their respective factors were significant. The standardized item loadings can be found in Table 1.

As discussed previously, perceptions of resources were assessed for autonomy, task variety, job significance, feedback, and social support in two ways: perceptions of presence and perceptions of importance. For perceptions of presence, the item “My supervisor is concerned about the welfare of the people that work for him/her” was unrelated to the other social support items, and was removed from subsequent analyses.

Based on my theoretical hypotheses, I treated perceptions of presence as a five-factor model that loaded items onto autonomy, task variety, job significance, feedback, and social support as five separate latent factors ( $X^2 = 358.18$ ,  $df = 142$ ,  $p < .001$ , RMSEA = .1, CFI = .88, TLI = .86, SRMR = .08). This five-factor model was then compared to two alternative models. The first alternative was a higher-order factor model, with items loading separately onto sub-factors measuring perceptions of presence of autonomy, task variety, job significance, feedback, and social support, which then loaded onto the higher-order factor of perceptions of presence ( $X^2 = 362.98$ ,  $df = 147$ ,  $p < .001$ , RMSEA = .1, CFI = .88, TLI = .86, SRMR = .08). The second alternative was a one-factor model in which all of the items loaded directly onto a single factor ( $X^2 = 1540.82$ ,  $df = 152$ ,  $p < .001$ , RMSEA = .26, CFI = .2, TLI = .12, SRMR = .18). As with engagement, the five-factor model fit equally well as the higher-order factor model ( $\Delta X^2 = 4.8(5)$ ,  $p = ns$ ) and fit significantly better than the one-factor model ( $\Delta X^2 = 1182.64(10)$ ,  $p < .001$ ). These findings suggest the five-factor model and the higher-order factor model could be used interchangeably in subsequent analyses without significantly affecting results. Thus, I used the five-factor model for reasons discussed below. The standardized item loadings for the five-factor model can be found in Table 2.

Similarly, I treated perceptions of importance as a five-factor model that loaded the items onto autonomy, task variety, job significance, feedback, and social support as five separate latent factors ( $X^2 = 67.9$ ,  $df = 44$ ,  $p < .001$ , RMSEA = .06, CFI = .98, TLI = .97, SRMR = .03). I compared the five-factor model to two alternatives, including a higher-order factor model, with items loaded separately onto sub-factors measuring perceptions of importance of autonomy, task variety, job significance, feedback, and

social support, which then loaded onto the higher-order factor of perceptions of importance ( $\chi^2 = 91.18$ ,  $df = 51$ ,  $p < .001$ , RMSEA = .08, CFI = .97, TLI = .96, SRMR = .08), and a one-factor model that loaded all of the items directly onto a single factor ( $\chi^2 = 1038.03$ ,  $df = 54$ ,  $p < .001$ , RMSEA = .36, CFI = .18, TLI = .01, SRMR = .27). The five-factor model fit significantly better than both the higher-order factor model ( $\Delta\chi^2 = 23.28(7)$ ,  $p < .01$ ) and the one-factor model ( $\Delta\chi^2 = 970.13(10)$ ,  $p < .001$ ), suggesting the five-factor model was most appropriate. The standardized item loadings for this model can be found in Table 3. All items loaded significantly onto their respective factors.

Since confirmatory factor analysis of perceptions of presence data suggest either the higher-order factor model or the five-factor model can be used interchangeably, I chose the five-factor model to remain consistent between perceptions of presence and perceptions of importance. While it may be desirable to use the higher-order factor model for the sake of parsimony, such practice should only be followed when it makes theoretical and analytical sense to do so (Byrne, 2013). As some of my hypotheses look at the effects of perceptions of resources as five separate constructs, I retained the five-factor model for both perceptions of presence and perceptions of importance.

Based on these findings, it is interesting to note that CFA results of perceptions of presence and perceptions of importance operated differently. While perceptions of presence demonstrated similar fit between the five-factor model and the higher-order factor model, there were significant differences between the two models when looking at perceptions of importance. One possible explanation for these differences may have to do with dissimilar variance levels between the two constructs, as there was greater variance between the individual job resources for perceptions of presence than there was between

the perceptions of importance resources. An alternative explanation may have to do with the small sample size in this CFA, as results from the weekly survey, which has a much larger sample size than the background and post-study surveys, indicate significant differences between the higher-order and five-factor models for perceptions of presence data (see below).

#### *Post-Study Survey*

In the post-study survey, engagement was treated the same as in the background survey, using maximum likelihood estimation for single-level analysis and comparing the higher-order factor model with a three-factor model and a one-factor model of engagement. Results from the post-study survey followed those same patterns of results found in the background survey. The higher-order factor model ( $X^2 = 82.2$ ,  $df = 22$ ,  $p < .001$ , RMSEA = .14, CFI = .93, TLI = .89, SRMR = .06) demonstrated equal fit as that of the three-factor model ( $X^2 = 82.2$ ,  $df = 22$ ,  $p < .001$ , RMSEA = .14, CFI = .93, TLI = .89, SRMR = .06). Compared to the one-factor model ( $X^2 = 130.99$ ,  $df = 25$ ,  $p < .001$ , RMSEA = .17, CFI = .88, TLI = .83, SRMR = .07), the higher-order factor model demonstrated significantly better fit ( $\Delta X^2 = 48.79(3)$ ,  $p < .001$ ). Thus, the higher-order factor model of engagement was deemed appropriate for use in subsequent analyses. As with the background survey, confirmatory factor analysis results of the post-study survey indicated the latent factors of vigor, dedication, and absorption all demonstrated significant loadings onto the higher-order-factor of engagement ( $\lambda = .919, 1.092, .828$ ;  $p < .001$  for all three latent factors). All items loaded significantly onto their respective factors. The standardized item loadings can be found in Table 4.



Perceptions of presence was treated as a five-factor model, in which the items were loaded onto five separate latent factors: autonomy, task variety, job significance, feedback, and social support ( $\chi^2 = 321.73$ ,  $df = 142$ ,  $p < .001$ , RMSEA = .09, CFI = .93, TLI = .92, SRMR = .06). This five-factor model was then compared to two alternative models. The first alternative was a higher-order factor model, with individual items loading onto sub-factors of autonomy, task variety, job significance, feedback, and social support, which then loaded onto the higher-order factor of perceptions of presence ( $\chi^2 = 328.7$ ,  $df = 147$ ,  $p < .001$ , RMSEA = .09, CFI = .93, TLI = .92, SRMR = .07). The second alternative was a one-factor model, in which all items loaded onto a single latent factor of perceptions of presence ( $\chi^2 = 1778.74$ ,  $df = 152$ ,  $p < .001$ , RMSEA = .28, CFI = .36, TLI = .28, SRMR = .22). A comparison revealed no significant difference in fit between the five-factor model and the higher-order factor model ( $\Delta\chi^2 = 6.97(5)$ ,  $p = ns$ ), whereas the five-factor model fit significantly better than the one-factor model ( $\Delta\chi^2 = 1457.01(10)$ ,  $p < .001$ ). Consistent with my findings in the background survey data, these results suggest the five-factor model and the higher-order factor model could be used interchangeably. While a single-factor model is preferable to a multi-factor model when the two demonstrate similar fit (Bollen, 1989), I chose the five-factor model as it made theoretical sense to do so, and also to remain consistent with the model used for the perceptions of presence data from the background survey. The standardized item loadings for the five-factor model can be found in Table 5. All items loaded significantly onto their respective factors.

Perceptions of importance revealed results consistent with those found in my analysis of the background survey data. Perceptions of importance was also treated as a

five-factor model with items loaded onto the five job resources as separate latent factors ( $\chi^2 = 76.71$ ,  $df = 44$ ,  $p < .001$ , RMSEA = .07, CFI = .97, TLI = .96, SRMR = .05). This five-factor model was compared to two alternatives: a higher-order factor model, with individual items loaded onto sub-factors of autonomy, task variety, job significance, feedback, and social support, which then loaded onto the higher-order factor of perceptions of importance ( $\chi^2 = 100.85$ ,  $df = 51$ ,  $p < .001$ , RMSEA = .08, CFI = .96, TLI = .95, SRMR = .09), and a one-factor model whereby all items were loaded onto a single latent factor called perceptions of importance ( $\chi^2 = 944.56$ ,  $df = 54$ ,  $p < .001$ , RMSEA = .34, CFI = .29, TLI = .14, SRMR = .25). As was found in the background survey, perceptions of importance data from the post-study survey revealed the five-factor model fit significantly better than both the higher-order factor model ( $\Delta\chi^2 = 24.14(7)$ ,  $p < .01$ ) and the one-factor model ( $\Delta\chi^2 = 867.85(10)$ ,  $p < .001$ ). Thus, the five-factor model provided the best fit and was more appropriate for use in subsequent analyses. All items loaded significantly onto their respective factors. The standardized item loadings can be found in Table 6.

### *Weekly Survey*

While the background and post-study surveys were each completed once, study participants completed the weekly survey five times, at the end of consecutive weeks. Thus, data from the weekly surveys were nested within individual participants. To validate the multi-level (two-level) data structure, I followed multi-level confirmatory factor analysis (MLCFA) procedures outlined by Muthén (1994), and further clarified and tested by Dyer, Hanges, and Hall (2005). First, I performed a conventional confirmatory factor analysis using unnested data from the weekly surveys. Second, I

determined the appropriateness of multi-level analyses by estimating between-group level variation using Muthén's ICC. Third, I performed MLCFA at both the within- and between-person levels simultaneously. By default, Mplus uses robust maximum likelihood estimation for multi-level analyses.

I treated the unnested engagement data from the weekly surveys as a higher-order factor model, with items loaded separately onto sub-factors of vigor, dedication, and absorption, which then loaded onto a higher-order factor of engagement ( $X^2 = 134.03$ ,  $df = 24$ ,  $p < .001$ , RMSEA = .08, CFI = .97, TLI = .96, SRMR = .03). Similar to the background survey and post-study survey data, I compared this higher-order factor model to two alternative models. The first alternative was a three-factor model, with items loaded onto vigor, dedication, and absorption as three separate latent factors ( $X^2 = 133.06$ ,  $df = 23$ ,  $p < .001$ , RMSEA = .09, CFI = .97, TLI = .96, SRMR = .03). The second alternative was a one-factor model, with all of the items loaded directly onto engagement as a single latent factor ( $X^2 = 154.92$ ,  $df = 26$ ,  $p < .001$ , RMSEA = .09, CFI = .97, TLI = .96, SRMR = .03). The higher-order factor model fit equally well as the three-factor model ( $\Delta X^2 = 0.97(1)$ ,  $p = ns$ ) and fit significantly better than the one-factor model ( $\Delta X^2 = 20.89(2)$ ,  $p < .001$ ), suggesting the more parsimonious higher-order factor model was appropriate. Muthén's ICCs for the nine engagement items ranged from .43 to .55, with an average of .48, suggesting that 48% of the data variance was attributed to between-person differences. While some of these ICCs were toward the low end of what is considered acceptable, they nonetheless suggested multi-level confirmatory factor analysis was still appropriate (Dyer et al., 2005; Fliess, 2011; Bliese & Halverson, 1998). I conducted a MLCFA at both the within- and between-person levels simultaneously,

treating the engagement data as a higher-order factor model. This model yielded acceptable fit at the within- and between-participant levels ( $\chi^2 = 158.42$ ,  $df = 49$ ,  $p < .001$ , RMSEA = .06, CFI = .95, TLI = .93, SRMR<sub>between</sub> = .04, SRMR<sub>within</sub> = .05). All item loadings on their respective factors were significant. The standardized item loadings at the within- and between-person level can be found in Table 7.

Because the weekly survey was designed to determine how participants' perceptions of individual job resources change over time, I treated perceptions of presence as a five-factor model with the unnested items loaded onto five separate latent factors, which consisted of autonomy, task variety, job significance, feedback, and social support ( $\chi^2 = 67.01$ ,  $df = 34$ ,  $p < .001$ , RMSEA = .04, CFI = .99, TLI = .99, SRMR = .02). The five-factor model was compared to two alternatives: the higher-order factor model, whereby items loaded onto the five latent factors, which were then loaded onto a single higher-order factor ( $\chi^2 = 100.13$ ,  $df = 39$ ,  $p < .001$ , RMSEA = .05, CFI = .99, TLI = .98, SRMR = .04), and a one-factor model, in which all items loaded onto a single latent factor of perceptions of presence ( $\chi^2 = 2958.99$ ,  $df = 44$ ,  $p < .001$ , RMSEA = .32, CFI = .37, TLI = .22, SRMR = .14). The five-factor model demonstrated significantly better fit than both the higher-order factor model ( $\Delta\chi^2 = 33.12(5)$ ,  $p < .001$ ) and the one-factor model ( $\Delta\chi^2 = 2891.98(10)$ ,  $p < .001$ ), and was selected for subsequent analyses. Muthén's ICCs ranged from .48 to .69, with an average of .59, which suggested further multi-level analysis was appropriate. I then conducted a MLCFA at both the within- and between-person levels simultaneously, treating the perceptions of presence data as a five-factor model. Results revealed negative residual variance between two items at the between-person level. Also referred to as a "Heywood case," this negative residual

variance may have been due to model misspecification, small sample size, or sampling error (Geiser, 2012). Given the residual variance and the standard error were both small and non-significant, it is likely this negative variance was due to small sample size or sampling error, rather than model misspecification (Dillon, Kumar, & Mulani, 1987; Gerbing & Anderson, 1987). Thus, to avoid this Heywood case I constrained the residual variances from two between-person items by fixing them to zero, which is common practice in Mplus (Byrne, 2013). Those items were “The job allows me to decide on my own how to go about doing my work,” and “The job involves doing a number of different things.” The five-factor model yielded acceptable fit at the within- and between-participant levels ( $\chi^2 = 82.89$ ,  $df = 70$ ,  $p < .001$ , RMSEA = .02, CFI = .99, TLI = .99, SRMR<sub>between</sub> = .03, SRMR<sub>within</sub> = .03). All items loaded significantly onto their respective factors. The standardized item loadings at the within- and between-person level can be found in Table 8.

Perceptions of importance was also treated as a five-factor model to better fit the analyses performed with the weekly survey data. In this model, the unnested items loaded onto five separate latent factors: autonomy, task variety, job significance, feedback, and social support ( $\chi^2 = 196.99$ ,  $df = 44$ ,  $p < .001$ , RMSEA = .07, CFI = .97, TLI = .96, SRMR = .03). As with the weekly data for perceptions of presence, I compared the five-factor model of perceptions of importance to two alternative models. The first alternative was a higher-order factor model, with items loaded onto five latent factors that were then loaded onto a single higher-order factor ( $\chi^2 = 329.75$ ,  $df = 49$ ,  $p < .001$ , RMSEA = .09, CFI = .95, TLI = .94, SRMR = .08). The second alternative was a single-factor model, with all items loaded onto a single latent factor of perceptions of importance ( $\chi^2 =$

3512.75,  $df = 54$ ,  $p < .001$ , RMSEA = .31, CFI = .42, TLI = .29, SRMR = .18). The five-factor model fit significantly better than both the higher-order factor model ( $\Delta\chi^2 = 132.76(5)$ ,  $p < .001$ ) and the one-factor model ( $\Delta\chi^2 = 3315.76(10)$ ,  $p < .001$ ). Muthén's ICCs ranged from .46 to .72, with an average of .58, suggesting further multi-level analysis was appropriate. To avoid negative residual variances, I fixed to zero the residual variances from four between-person items: "Having autonomy, or the freedom to make decisions about how I complete my work, is important to me," "Having a job that significantly affects the lives of others is important to me," "Doing a number of different things is important to me," and "Receiving information from other people in the organization (such as my manager or coworkers) about the effectiveness of my job performance is important to me." Multi-level confirmatory factor analysis performed at both the within- and between-person levels simultaneously, using a five-factor model, yielded acceptable fit at the within- and between-participant levels ( $\chi^2 = 190.04$ ,  $df = 92$ ,  $p < .001$ , RMSEA = .04, CFI = .96, TLI = .95, SRMR<sub>between</sub> = .05, SRMR<sub>within</sub> = .02). All items loaded significantly onto their respective factors. The standardized item loadings at the within- and between-person level can be found in Table 9.

### **Description of Study Variables**

The means, standard deviations, and zero-order correlations of variables used in the background survey can be found in Table 10. As expected, engagement correlated significantly with key outcomes such as job performance, turnover intentions, physical and mental health complaints, and depletion. In addition, engagement significantly correlated with all five perceptions of presence measures. Interestingly, however, engagement only demonstrated significant correlation with a single perceptions of

importance measure (task variety) and the correlation coefficients for the other four measures were low (-.01 to .15). The means, standard deviations, and zero-order correlations of variables used in the post-study survey are located in Table 11. As with the background survey, analysis of the post-study survey revealed that engagement significantly correlated with key outcomes of interest. Correlations with perceptions of resources measures were mixed: engagement significantly correlated with four of the perceptions of presence measures (task variety, job significance, feedback, and social support), and three of the perceptions of importance measures (autonomy, task variety, and job significance). The means, standard deviations, and zero-order correlations of weekly survey variables can be found in Table 12. Engagement demonstrated significant correlation with key outcome variables, including physical and mental complaints, depletion, and weekly job performance. In addition, engagement significantly correlated with all five perceptions of presence measures, and with four of the perceptions of importance measures (social support was the only measure that was not significant). Table 13 shows a comparison of means and standard deviations of study variables from the background and post-study surveys, broken down by each of the three study conditions. Similarly, Figures 5 and 6 illustrate graphs of these differences in pre-study and post-study means for each variable, by condition.

### **Between-Person Analyses**

To assess the overall effectiveness of the intervention used in this study, I first tested hypotheses that explored changes at the between-person level. These hypotheses were analyzed using SPSS (version 25). Mediation and moderation analyses were

conducted with the PROCESS macro (version 3.4) for SPSS, following procedures outlined by Hayes (2017).

Hypothesis 1 stated that at the between-person level, participants assigned to the active-treatment condition would experience greater changes in employee engagement than those in the active-control or no-treatment conditions. To test this hypothesis, I performed a one-way ANCOVA (analysis of covariance) with repeated measures and assessed the overall effectiveness of the intervention on employee engagement, comparing the effects of treatment condition assignment to changes in pre-test and post-test means of engagement scores. In other words, I compared mean changes in engagement scores from Time 1 (pre-test/background survey) to Time 2 (post-test/post-study survey) between the three conditions. I also included participant age and education as covariates. Age was included as a covariate due to empirical evidence suggesting a significant relationship between age and engagement, with older employees generally reporting higher levels of engagement (e.g., Avery, McKay, & Wilson, 2007; James, McKechnie, & Swanberg, 2011). Education was also included as a covariate to account for statistically significant differences in education between participants assigned to the active control and treatment conditions, and those in the no-treatment condition. Results from a Shapiro-Wilk test of normality suggested scores were normally distributed between the three conditions, and the Levene statistic indicated homogeneity of variance. The effect of treatment condition on changes in engagement levels was not significant at the  $p < .05$  level for the three conditions [ $F(2, 179) = 2.65, p = .07$ ] suggesting that, overall, there were not significant differences between the three groups. Next, I conducted a planned comparison analyses with the Bonferroni correction (which is used



when multiple tests are being conducted simultaneously) to compare mean differences in engagement scores between the three conditions to determine whether they were significantly different from one another. Results from this planned comparison analysis, presented in Table 14, showed there was not a significant difference in mean changes of engagement between the active-treatment group and the no-treatment group ( $p = .23$ ), the active-control group and the no-treatment group ( $p = .08$ ), or the active-treatment group and the active-control group ( $p = 1.00$ ). Thus, Hypothesis 1 was not supported.

Despite these non-significant results, Figure 5 shows the differences in mean engagement scores, both pre- and post-intervention, and illustrates how engagement scores increased during the intervention period for both the active-treatment and active-control conditions. On the other hand, engagement scores for the no-treatment condition actually decreased during the intervention period. This figure suggests both positive reflection conditions contributed to an increase in employee engagement, and although not significantly different from each other or the no-treatment condition, results were trending in the right direction. Additionally, Figure 6 shows differences in pre- and post-intervention, by condition, for the other variables included in this study.

Hypothesis 3 stated that at the between-person level, employee engagement would mediate the relationship between treatment condition and outcomes of turnover intentions and job performance. I tested this hypothesis with a simple mediation path-analysis model. Treatment condition was treated as a multicategorical variable, with the no-treatment condition serving as the referent group (group 0). Indicator variables were created to represent the active-control condition (labeled as group 1) and the active-treatment condition (group 2). I ran two separate analyses—one for each outcome—with

the treatment conditions run simultaneously as multicategorical independent variables, and post-study engagement scores (Time 2) as the mediating variable. I also controlled for participant age, education, and engagement scores from the background survey (Time 1). Once these analyses were completed, I repeated the process using the active-control condition as the referent group. While the first set of analyses allowed me to compare the active-treatment and active-control conditions to the no-treatment condition, the second set of analyses compared the active-treatment and active-control conditions with one another.

Table 15 shows the effects of the intervention on turnover intentions, as mediated by employee engagement (while using the no-treatment condition as the referent group). A Monte Carlo resampling simulation of the relative indirect effects of those assigned to the active-control condition, based on 10,000 random samples, was entirely below zero (estimate =  $-.105$ , 95% CI [ $-.238$ ,  $-.006$ ]). However, the relative indirect effects of those assigned to the active-treatment condition did not exclude zero (estimate =  $-.094$ , 95% CI [ $-.229$ ,  $.005$ ]). These results suggest that, compared to the no-treatment condition, participants assigned to the active-control condition reported significantly lower levels of turnover intentions, and those outcomes were mediated by higher levels of employee engagement. While participants assigned to the active-treatment condition also reported significantly higher levels of engagement than those assigned to the no-treatment condition, the inclusion of zero in the relative indirect path suggests that, in comparing the active-treatment condition to the no-treatment condition, there is not a significant difference in their effects on turnover intentions with employee engagement as a mediator.

Similarly, Table 16 shows the effects of intervention treatment condition on turnover intentions, as mediated by employee engagement, with the active-control condition assigned as the referent group. A Monte Carlo resampling simulation of the relative indirect effects of those assigned to the active-treatment condition, based on 10,000 random samples, included zero (estimate = .011, 95% CI [-.076, .103]), suggesting no significant difference between the active-treatment condition and the active-control condition. Altogether, these results reveal no significant difference between participants assigned to the active-treatment condition and those assigned to the active-control and no-treatment conditions when evaluating whether engagement mediates the relationship between treatment condition and turnover intentions. Thus, Hypothesis 3a was not supported. Table 19 shows a summary of the indirect effect estimations for all three treatment conditions.

Table 17 outlines the effects of intervention treatment condition on employee job performance, mediated by employee engagement, with the no-treatment condition assigned as the referent group. Confidence intervals of relative indirect effects, based on 10,000 Monte Carlo samples, included zero for both the active-control condition (estimate = .020, 95% CI [-.012, .060]) and the active-treatment condition (estimate = .018, 95% CI [-.012, .059]), suggesting neither condition was significantly different from the no-treatment condition in their effects on employee performance through employee engagement as a mediator. Similarly, Table 18 illustrates the effects of treatment condition on job performance, mediated by employee engagement, while comparing the active-treatment group to the active-control group. Confidence intervals of relative indirect effects, based on 10,000 Monte Carlo samples, included zero for the active-

treatment condition (estimate =  $-.002$ , 95% CI [ $-.025$ ,  $.019$ ]). Together, these results suggest no significant difference between the active-treatment condition and the active-control and no-treatment conditions in assessing the effects of treatment condition on job performance, as mediated by employee engagement. Thus, Hypothesis 3b was also not supported. A summary of these indirect effects is shown in Table 19.

Hypotheses 5 and 6 predicted that at the between-person level, the relationship between treatment condition assignment and employee engagement would be mediated by perceptions of presence (H5) and perceptions of importance (H6) for five resources: autonomy, task variety, job significance, feedback, and social support. I tested these hypotheses using parallel multiple mediation models, in which I assessed the effects of treatment condition (as a multicategorical variable represented by indicator variables for the active-control and active-treatment conditions) on post-study engagement scores (Time 2), while being mediated simultaneously by Time 2 scores of perceptions of job resources. Thus, to test Hypothesis 5, I analyzed the effects of treatment condition on employee engagement through five parallel mediating pathways, which consisted of perceptions of presence scores (Time 2) for autonomy, task variety, job significance, feedback, and social support. Hypothesis 6 was tested using perceptions of importance scores for the five job resources as mediating pathways. In addition, age, education, and engagement scores from the background survey (Time 1) were included as covariates. Time 1 scores for each of the five job resources (both perceptions of presence and perceptions of importance) were also included as covariates. I tested each hypothesis first using the no-treatment condition as the referent group, and then with the active-control condition designated the referent group.

As shown in Table 20, Monte Carlo confidence intervals for the relative indirect effects of those assigned to the active-control condition, compared to the no-treatment condition and based on 10,000 simulations, included zero on perceptions of presence for all five job resources (autonomy: estimate = .009, 95% CI [-.016, .045]; task variety: estimate = -.001, 95% CI [-.025, .023]; job significance: estimate = -.043, 95% CI [-.114, .030]; feedback: estimate = .039, 95% CI [-.018, .109]; social support: estimate = -.015, 95% CI [-.066, .018]). Results for the active-treatment condition, as compared to the no-treatment condition, were similar to those from the active-control group. Confidence intervals of the relative indirect effects of assignment to the active-treatment condition on employee engagement, mediated through perceptions of presence for the five job resources and based on 10,000 simulations, included zero for all five resources (autonomy: estimate = .016, 95% CI [-.019, .057]; task variety: estimate = .002, 95% CI [-.019, .029]; job significance: estimate = -.039, 95% CI [-.120, .034]; feedback: estimate = .032, 95% CI [-.016, .099]; social support: estimate = -.012, 95% CI [-.062, .027]).

As shown in Table 21, Monte Carlo confidence intervals for the relative indirect effects of the active-treatment condition, compared to the active-control condition and based on 10,000 simulations, included zero for all five job resources (autonomy: estimate = .007, 95% CI [-.013, .037]; task variety: estimate = .003, 95% CI [-.017, .028]; job significance: estimate = .004, 95% CI [-.063, .061]; feedback: estimate = -.006, 95% CI [-.037, .018]; social support: estimate = .003, 95% CI [-.027, .040]). Given the relative indirect paths of the active-treatment condition included zero, both when the active-control and no-treatment conditions were the referent groups, the null hypothesis could not be rejected, meaning there was not sufficient evidence to suggest this condition was

significantly different from either condition. Thus, Hypotheses 5a, 5b, 5c, 5d, and 5e were not supported. A summary of these indirect effect estimates for perceptions of presence as mediating pathways is shown in Table 24.

Table 22 displays results from an analysis of Hypothesis 6 with the no-treatment condition assigned as the referent group. As with perceptions of presence, Monte Carlo confidence intervals of the relative indirect effects of perceptions of importance, based on 10,000 simulations, showed that a comparison of the active-control condition and the no-treatment condition included zero for all five job resources (autonomy: estimate = .007, 95% CI [-.017, .043]; task variety: estimate = -.005, 95% CI [-.041, .021]; job significance: estimate = -.009, 95% CI [-.063, .041]; feedback: estimate = .007, 95% CI [-.039, .048]; social support: estimate = -.009, 95% CI [-.049, .018]). Similarly, confidence intervals from 10,000 simulations comparing the relative indirect effects of perceptions of importance from the active-treatment condition to the no-treatment condition also included zero for all five job resources (autonomy: estimate = .012, 95% CI [-.029, .056]; task variety: estimate = -.004, 95% CI [-.050, .018]; job significance: estimate = -.018, 95% CI [-.082, .032]; feedback: estimate = -.029, 95% CI [-.074, .008]; social support: estimate = -.003, 95% CI [-.035, .024]).

Table 23 shows the efficacy of active-treatment condition assignment on employee engagement, as mediated by perceptions of importance of the five job resources and with the active-control condition assigned as the referent group. Monte Carlo confidence intervals of the relative indirect effects of perceptions of importance, based on 10,000 simulations, included zero for all five job resources (autonomy: estimate = .005, 95% CI [-.017, .028]; task variety: estimate = .001, 95% CI [-.029, .018]; job

significance: estimate =  $-.009$ , 95% CI  $[-.060, .031]$ ; feedback: estimate =  $-0.36$ , 95% CI  $[-.078, .002]$ ; social support: estimate =  $.005$ , 95% CI  $[-.017, .047]$ ). As the relative indirect pathways for the active-treatment condition included zero for all five job resources when compared to the active-control and no-treatment conditions, and the null hypothesis therefore could not be rejected, Hypotheses 6a, 6b, 6c, 6d, and 6e were not supported. Table 25 shows a summary of the indirect effect estimations for perceptions of importance as mediating pathways between treatment condition and employee engagement.

Hypothesis 9 predicted that at the between-person level, the relationship between treatment condition and employee engagement would be moderated by workload. In testing this hypothesis, treatment condition was once again treated as a multicategorical variable, with the no-treatment condition set as the referent group and indicator variables used for both the active-control and active-treatment conditions. Post-study (Time 2) measures of employee engagement were used as the dependent variable. Age, education, and baseline levels of employee engagement (Time 1) were also included in the model as covariates and were group-mean centered, which is how covariates are treated by PROCESS by default in moderation analyses. As shown in Table 26, results suggest that compared to the no-treatment condition, neither the active-control condition ( $B = .004$ ,  $p = .97$ ) nor the active-treatment condition ( $B = -.069$ ,  $p = .50$ ) indicated significant moderation effects of workload on the condition-engagement relationship. In addition, a comparison of the two interaction terms indicated no significant difference ( $\Delta X^2 = .002$ ,  $F(2, 174) = .356$ ,  $p = .70$ ), suggesting the active-treatment condition was not significantly different from the active-control condition. Therefore, analysis revealed no evidence for

the moderating effect of workload on the relationship between intervention treatment condition and employee engagement scores, and Hypothesis 9 was not supported. Post-hoc analyses additionally revealed the relationship between treatment condition and engagement was also not moderated by age or job tenure, nor by any combination of workload or other moderators.

In summary, at the between-person level, none of the hypothesis tests proved to be significant. Although the results from Hypothesis 1 indicated that both the active-treatment and active-control conditions resulted in higher (positive) levels of employee engagement than the no-treatment condition, those groups were not *significantly* different from the no-treatment condition, nor were they significantly different from each other. Further, engagement did not significantly mediate the relationship between intervention condition assignment and outcomes of turnover intentions and job performance (Hypothesis 3a and 3b), and perceptions of presence and perceptions of importance did not significantly mediate the relationship between intervention condition assignment and employee engagement (Hypotheses 5-6). Finally, workload did not significantly moderate the effects of intervention condition assignment on employee engagement (Hypothesis 9). These results, along with study limitations, are further reviewed in the Discussion section of this dissertation.

### **Within-Person Analyses**

In addition to measuring the overall effectiveness of the intervention used in this study, I also took a more granular look at employee engagement and other key variables by assessing how measures of these constructs changed within each participant during the study period. To do so, I performed multiple-group latent growth modeling, which is used



to examine differential growth trajectories of participants assigned to separate conditions in a randomized intervention (Muthén & Curran, 1997; Bollen & Curran, 2006; Cho, Preacher, & Bottge, 2005). These analyses were conducted using data from the weekly surveys that were administered during the five-week intervention period of the study. Because participants assigned to the no-treatment condition did not complete these weekly surveys, their data were not included in these analyses. Consequently, the within-person portion of this study will only compare differential growth trajectories of participants assigned to the active-control and active-treatment conditions.

In latent growth modeling, repeated observations nested within individuals are used to study within-person change over time, as well as between-person variability of within-person change (Singer & Willett, 2003; Preacher, Wichman, MacCallum, & Briggs, 2008). While multilevel models and latent growth models both utilize repeated measures of a given outcome or outcomes, multilevel models typically investigate whether the means of repeated measures differ between individuals or groups, whereas latent growth modeling looks at the actual trajectory of change of a given variable over time and addresses between-condition differences in these developmental trajectories (Preacher et al., 2008). In addition, latent growth models possess tremendous flexibility in plotting non-linear trajectories, including quadratic and cubic patterns, as well as less-common curve patterns (Bollen & Curran, 2006).

Fundamentally, latent growth models are interested in two key attributes of a given variable when modeling differential growth trajectories: the intercept and slope (Chan & Schmitt, 2000). The intercept corresponds with the initial status of a variable, or, in the case of this study, the intercept indicates the value of each variable prior to the

beginning of the intervention. The slope indicates the rate of change of a given variable, or the rate at which each variable increased or decreased during the study period. Using latent growth modeling, I was able to simultaneously estimate both the latent initial status and latent slope of each variable, which allowed me to control for the initial status while testing hypotheses about changes in slope (Zhou et al., 2020).

In my study, I collected weekly surveys across five consecutive weeks. Therefore, each observation consisted of one week. The first weekly survey was assessed *at the end* of the first week of the active phase of the study, meaning this survey would not serve as an accurate baseline for key variables since participants had already completed up to four days of daily reflections as part of the intervention. To address this issue, I included data from the background survey in all latent growth models as a proxy for initial status. Thus, each latent growth model was assessed using six waves of data—observations collected from the background survey (Time 0), and the five weekly surveys collected during the intervention period (Time 1-Time 5). Consequently, results from subsequent latent-growth-model analyses indicate the rate at which each variable changed over time from initial statuses collected at the pre-intervention (background) survey. Missing data for repeated measures were treated as missing at random (MAR), and full-information maximum likelihood estimation was used to create unbiased parameter estimates for missing responses. All within-person hypothesis tests were performed using *Mplus* (Version 8.3; Muthén & Muthén, 2019).

I conducted latent growth model analyses following procedures outlined in Chan (1998) and Chan & Schmitt (2000), and further clarified in additional empirical studies (see Kammeyer-Mueller, Wanberg, Rubenstein, & Song, 2013; Zhou et al., 2020). Due to

the complex nature of nested and longitudinal data, full models are often unlikely to converge (Zhou et al., 2020; Kammeyer-Mueller et al., 2013). Therefore, it was necessary to first investigate each variable independently to determine the best fitting univariate model before testing the full structural model for each hypothesis. To do so, I adopted the following procedures: First, I tested for the best-fitting univariate model for each variable through a comparison of different slope patterns or growth trajectories. Fit was determined through a comparison of values of Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Residual (SRMR). For each variable, I tested three different slope patterns, including linear, quadratic, and cubic. The best fitting trajectory was determined using Satorra-Bentler scaled chi-squared tests to compare the different models. Second, I removed slope constraints and allowed the growth trajectory to estimate freely, and then compared this freely estimated slope to the three constrained models to determine which one fit the data best. Third, I tested the best-fitting model (linear, quadratic, cubic, or free) while adding autoregressive terms to determine whether fit for this model was improved either with or without autoregressive terms. Fourth, I constrained the Level 1 (within-person) residual variances to be equal over time, and compared models both with and without these constrained residuals. Finally, after determining the best-fitting model for each variable, I was able to combine multiple univariate models to test within-person hypotheses using full-structural multivariate models.

I first followed these procedures using data from the weekly surveys to find the best-fitting univariate model for employee engagement. Multiple-group latent growth modeling was performed simultaneously on participants assigned to both the active

control and active treatment conditions, using baseline data from the background survey and five repeated weekly surveys. Including multiple groups in the same latent growth model allows researchers to look at results for each condition independently, while also simultaneously comparing growth trajectories for each group (Muthén & Curran, 1997).<sup>1</sup> First, I compared different slope patterns to determine which one best fit the growth trajectories of the employee engagement data. The quadratic trajectory fit the data significantly better than the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 52.698$ ,  $\Delta df = 8$ ,  $p < .001$ ). In addition, the cubic trajectory failed to converge. Second, I relaxed slope constraints and compared the quadratic trajectory to a freely estimated trajectory, however, the free model also failed to converge. Third, I added autoregressive terms to the quadratic model. There was no significant difference between the models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 15.636$ ,  $\Delta df = 10$ ,  $p > .05$ ), so for the sake of parsimony, I chose the model without autoregression. Fourth, I tested the model with and without constrained residuals; the chi-squared difference showed the model with constrained residuals fit significantly better than the model without (Satorra-Bentler scaled  $\Delta\chi^2 = 22.786$ ,  $\Delta df = 11$ ,  $p < .05$ ). Thus, the final univariate model for employee engagement consisted of a quadratic trajectory with constrained residuals and no autoregressive terms.

---

<sup>1</sup> I also performed latent growth curve modeling on each of the two conditions independently for each variable (e.g., tested univariate models of employee engagement for participants assigned to the active-control and active-treatment groups separately). As was expected, fit indices varied for each individual model compared to the multiple-group models, but parameter estimates did not change. Thus, I conducted latent growth curve analyses using multiple-group models.

This same process was followed to determine the best-fitting univariate model for each variable used in the within-person portion of my analyses. A step-by-step outline of these procedures for each variable can be found in Appendix C. Similarly, Table 27 lists the final univariate models that were used in subsequent analyses for each variable. Fit indices for these final univariate models, broken down by condition, are found in Table 28. In addition, Table 29 shows the multiple-group latent-growth-model parameter estimates for each univariate model by condition. Finally, graphs illustrating the mean slopes of both conditions for employee engagement and other variables used in within-person analyses are found in Figure 7.

### *Hypothesis Tests*

Hypothesis 2 stated that at the within-person level, participants assigned to the active-treatment condition would experience significantly higher levels of employee engagement during the intervention period than those assigned to the active-control or no-treatment condition, suggesting active-treatment participants would see steeper, upward-facing slopes than those assigned to other conditions. As mentioned previously, the no-treatment condition was not included in within-person analyses due to the small number of participants, so this analysis was a comparison of the active-treatment and active-control conditions. As shown in Table 29, the initial status (intercept) mean and variance for both the active-treatment and active-control conditions were significant. The growth rate mean (slope) was also significant for both conditions ( $\gamma_{\text{CONTROL}} = -.220, p < .001$ ;  $\gamma_{\text{TREATMENT}} = -.264, p < .001$ ). In addition, the quadratic growth mean was significant and positive for both conditions ( $\gamma_{\text{CONTROL}} = .035, p < .01$ ;  $\gamma_{\text{TREATMENT}} = .047, p < .001$ ), suggesting the rate of change for each slope increased over time during the

intervention period. As the primary purpose of this hypothesis was to investigate the engagement slopes for each condition, two issues of concern must be highlighted: First, while the growth rate mean was significant for each condition, the variance of that growth rate for each condition was not. The growth rate variance indicates the extent to which individual slopes differ between-person, and is an important component in latent growth modeling. Second, while the parameter estimate for the slope of the treatment condition ( $\gamma = -.264$ ) was larger than the slope of the active-control condition, ( $\gamma = -.220$ ), both of these estimates were negative or downward, suggesting that as the intervention continued throughout the five-week period, engagement scores in both conditions actually *decreased*. Thus, Hypothesis 2 was not supported. For illustrative purposes, graphs of these downward-facing slopes of employee engagement in both conditions can be found in Figure 7.

The remaining within-person hypotheses were all tested using latent-growth-modeling techniques that consisted of combining the best-fitting univariate model for each variable into larger multivariate models to test mediation and moderation effects. These models tested how within-person changes in employee engagement during the intervention period mediated the effect of treatment condition on outcomes of physical complaints, mental complaints, and depletion (Hypothesis 4), as well as how the effects of treatment condition on within-person changes in employee engagement were mediated by both perceptions of resource presence and perceptions of resource importance (Hypothesis 7 and Hypothesis 8). In addition, a similar model was used to test how the relationship between treatment condition and within-person changes in employee

engagement was moderated by workload (Hypothesis 10). Results from analysis of Hypotheses 4, 7, 8, and 10 revealed that none of the hypothesis tests were significant.

There are several potential explanations for this lack of findings in testing within-person mediation and moderation hypotheses. While I discuss these limitations and explanations more in-depth in the Discussion section, I will also briefly mention them here. First, limited sample size may have played a role in these results not achieving statistical significance. Second, and related to the previous point, the lack of participants allowed me to include only two treatment conditions in the active-phase of the intervention, which means there was not a no-treatment condition to which I could compare the findings of the active-treatment and active-control groups. Further, it may be the two conditions that were included in the intervention were just too similar to provide significantly differential effects, and the lack of no-treatment condition made it impossible to accurately assess the effects of each remaining condition independently. Third, the lack of baseline weekly data required me to use responses from the background survey as proxy, which may have been problematic due to the different contextual anchors used by each survey. For example, while the background survey asked participants to respond to items based on “how [they] *generally* feel,” the weekly survey items asked participants to respond based on their experiences in the *previous week*. These differences in contextual prompts may have led to psychometric unreliability (e.g., Wedell, Parducci, & Lane, 1990). In addition, these different contextual anchors may explain why employee engagement scores for both the active-control and active-treatment conditions experienced downward slope trajectories—if participants indicated

they had higher “general” engagement levels in the background survey, then those scores would be lower in the more temporally specific weekly surveys.

### **Supplemental Analyses**

Rather than extrapolate findings from Hypotheses 4, 7, 8, and 10 with tables, figures, and substantive explanation of results, I have provided an overview above, and then move on to supplemental analyses that test alternative explanations in an effort to clarify some of the findings from this study. First, I tested for differences in the daily reflection responses and used a qualitative approach to compare entries from those in the active-control group to those in the active-treatment group. Second, I re-tested Hypothesis 1 after removing from the active-control condition those participants who wrote about job resources in their daily reflection entries, which allowed for a cleaner comparative analysis of those who wrote about job resources (treatment condition) and those who wrote about unrelated topics (a more pure control condition). Third, I investigated the effects of each job resource individually to determine whether reflecting and writing about some resources were associated with higher weekly levels of employee engagement than others. Fourth, I combined participants from the active-treatment and active-control conditions into a broader “reflection” group, and compared their between-person changes in engagement scores to those of participants assigned to the no-treatment condition.

#### *Supplemental Analysis 1: Qualitative Review of Daily Good-Thing Entries*

Results from analyses of differences in pre-post means at the between-person level revealed similar growth patterns in employee engagement for participants assigned to both the active-control and active-treatment conditions. While initial reactions may



lead one to conclude there are no significant differences to employee engagement regardless of whether participants are asked to write about specific job resources or a more general focus on positive events, an alternative explanation could be that these lack of significant differences stem from participants in both conditions actually writing about similar things during the intervention period. While participants in the active-treatment condition were assigned to write about specific job resources they had witnessed at work each day, participants assigned to the active-control group were under no such constraints, and were simply told to write about “something good that happened” each day. With such open-ended instructions, it is plausible participants assigned to the active-control condition not only wrote about work events from time to time, but may have even written specifically about the very job resources upon which those in the active-treatment condition were asked to reflect. If those in the active-control condition also wrote about job resources, then this could offer some explanation as to why participants in both conditions experienced similar changes in employee engagement during the intervention period. Thus, I performed a qualitative analysis of the daily reflection entries to explore differences and/or similarities in topics recorded by participants in each condition.

During the intervention period, those 142 participants assigned to the active-control and active-treatment conditions wrote a total of 2,473 daily reflection entries. I reviewed and coded each entry based on three criteria: first, whether the entry focused on work or the participant’s job (1 = yes, 0 = no); second, whether the entry discussed one of the five primary job resources studied in this dissertation (1 = yes, 0 = no); and third, which job resource was specifically referenced (1 = autonomy; 2 = task variety; 3 = job significance; 4 = feedback; 5 = social support; 0 = did not write about any job resource).

If an entry referenced more than one job resource, I selected the one resource I felt was most prominent using my best judgement. Typically, for the sake of validity these daily reflection entries would be coded by multiple raters whose scores would be compared and assessed for consistency and inter-rater reliability. As these supplemental analyses were of an exploratory nature, I coded each reflection entry myself without the assistance of additional raters.

The 66 participants assigned to the active-treatment condition completed a total of 1,132 daily entries during the study period (mean = 17.15 entries per person). Although all of those entries were supposed to be about work, 1,053 (93.02%) entries were actually about work, and 1,010 (89.22%) were about the specific job resources that were assigned. Those entries not about work typically focused on weather, events at home, or other unrelated topics (e.g., "Nothing happened today"). Of those 1,010 entries that were written about work and focused on the assigned resources, 205 (20.30%) were about autonomy, 199 (19.70%) were about task variety, 203 (20.10%) were about job significance, 192 (19.01%) were about feedback, and 211 (20.89%) were about social support. Given that participants assigned to the active-treatment condition were asked to write about each of the five job resources equally, or four times per resource, there should have been an even distribution of entries with each resource written about approximately 20% of the time. The data drawn from my sample fit that approximation, suggesting that for the most part, participants assigned to the active-treatment condition wrote about each of the job resources equally.

The active-control condition consisted of 76 participants who completed 1,341 total daily entries (mean = 17.64 entries per person). Of those entries, 644 (48.02%) were

about work or work events, and 483 (36.02%) were focused on the same five job resources assigned to participants in the active-treatment condition. The remaining non-work entries were typically about the weather, family, health-related issues, and other general topics. While entries from the active-treatment condition were spread fairly evenly across the five job-resource topics, participants in the active-control condition were not under the same mandate to write about specific resources. As such, the majority of their resource-related entries were about social support (45.13%), job significance (26.29%), and feedback (21.95%), with task variety (6.21%) and autonomy (0.41%) mentioned only briefly. These findings suggest that while participants assigned to the active-control condition wrote about a wide variety of topics, more than one-third of their reflection entries focused on the same issues as were discussed by participants in the active-treatment condition. In other words, these results lend some support to the thought that participants in both conditions experienced similar changes in employee engagement because they wrote about similar things.

#### *Supplemental Analysis 2: Re-test of Hypothesis 1 with Updated Active-Control Condition*

Given the findings of Supplemental Analysis 1, it became important to identify how the results of the between-person hypothesis tests changed following an analysis that compared participants in the active-treatment condition to only those in the active-control condition who *did not* write about job resources, thereby giving a cleaner comparison of those who wrote about job resources to those who did not. Thus, I re-tested Hypothesis 1 using the full group of participants assigned to the active-treatment condition ( $n = 66$ ) and a subset of participants assigned to the active-control group consisting of those who wrote about job resources the least ( $n = 36$ ).

To separate those assigned to the active-control condition who wrote about job resources from those who did not, I used the data from the previous supplemental analysis, which identified the number of times each participant wrote about one of the five job resources discussed in this study. There is little empirical evidence in the job-resource or engagement literature to suggest one resource is more beneficial than another at building employee engagement, although this remains a topic that should be studied by future research. Given this gap in the existing research, however, I theorize participants experienced similar benefits from reflecting upon and writing about different job resources. In other words, I assume the *overall number of times* a participant assigned to the active-control condition chose to write about job resources is more important than the specific job resources about which he or she wrote (e.g., social support vs. task variety). Therefore, participants were identified based on the number of times they wrote about job resources overall, rather than accounting for the number of entries dedicated to each unique resource.

To perform this analysis, I first created a variable that listed the number of times each participant in the active-control condition wrote about any of the five job resources out of 20 possible entries (range = 1 to 14). Second, I performed a median split to the data, thereby separating participants into two groups—those who wrote about job resources more frequently, and those who focused on topics other than job resources. Although each participant wrote about job resources at least once during the intervention period, the median number of entries about job resources was six. Thus, I excluded all participants assigned to the active-control condition who wrote about job resources six or more times ( $n = 40$ ), and kept those who referenced job resources in five entries or fewer

( $n = 36$ ). Of those retained in the active-control condition, participants wrote about job resources an average of 3.81 times, compared to participants in the active-treatment group who wrote about job resources an average of 15.3 times. Third, I re-ran the analysis for Hypothesis 1 using the active-treatment group, the no-treatment group, and the updated active-control group to assess the overall effectiveness of the intervention on employee engagement, comparing changes in pre-test and post-test means of engagement scores for each condition.

Similar to the original results for Hypothesis 1, the effect of treatment condition on changes in engagement levels was not significant at the  $p < .05$  level for the three conditions [ $F(2, 139) = 1.61, p = .21$ ], suggesting there were still no significant differences between the three treatment conditions. Results from a planned comparison analysis using Bonferroni correction examined the three treatment conditions against each other. Comparison of mean changes of engagement between the active-treatment group and the no-treatment group remained largely unchanged ( $p = .27$ ), while there were still no significant differences between the active-control group and the no-treatment group ( $p = .51$ ) or the active-control group and the active-treatment group ( $p = 1.00$ ).

Figure 8 shows the differences in mean engagement scores before and after the intervention period for all three conditions. While the active-treatment and no-treatment conditions remain unchanged, there is a slight difference to the active-control condition. The post-intervention engagement scores are still higher than they were prior to the intervention, however, the margin of growth is four times smaller than it was before participants who wrote about job resources were removed from the control group. Despite these differences, these changes are too small to say with any certainty whether

the intervention led to significant increases in engagement in the active-treatment condition, or whether any of the three conditions were significantly different from one another.

### *Supplemental Analysis 3: Test of Individual Job Resources*

I also tested the effects of the five job resources individually, and whether writing about different job resources produced significant differences in employee engagement (e.g., whether writing about task variety produced better results than writing about job significance). This was done using weekly survey data from participants assigned to the active-treatment condition. Although nested within individual participants, these data were treated as between-person and the nested structure of the data was ignored. This produced a larger overall sample size ( $n = 296$ ), which gave me greater statistical power with which to analyze the effects of individual job resources. While participants differed in the weeks in which they wrote about each job resource, these assignments were randomized for each person assigned to the active-treatment condition, which should help to buffer against any differences in week assignment. In addition, I also controlled for week number (week 1-5) in my analyses.

I performed multiple regression analyses to assess the effects of individual job resources on employee engagement (while controlling for week). To do so, I created dummy variables for each of the five job resources. I began with Task Variety as the referent group and included the other four resources in the analysis, and then re-ran these analyses using Autonomy as the referent group. In addition to engagement, I also looked at physical complaints, mental complaints, depletion, and weekly job performance as outcomes. None of these analyses provided significant results, suggesting the effects of

job resources on engagement and other outcomes do not differ significantly from one resource to another.

#### *Supplemental Analysis 4: Creating a Broader “Reflection” Condition*

A repeated finding throughout this dissertation is the active-treatment and active-control conditions both performed similarly for the majority of analyses. These consistent results between conditions intimate that the value in positive reflection exercises may stem from the act of reflecting itself, rather than the focus or context of reflection. In fact, the active-control condition was included in my dissertation to test this very assertion, and was meant to rule out “reflection in general” as an alternative explanation for any significant findings, and to further point to the value of contextualized reflection upon specific job resources. As results were largely *not* significant, however, I ran an additional supplemental analysis to test whether positive reflection exercises, regardless of focus, promoted differential effects in employee engagement compared to those who were not asked to reflect during the intervention period.

In this analysis, I created a single broader “reflection” group, comprised of participants assigned to both the active-treatment and active-control conditions ( $n = 142$ ), and compared them to participants assigned to the no-treatment condition ( $n = 43$ ). I re-ran the analysis for Hypothesis 1, using analysis of covariance (ANCOVA) to compare differences in engagement scores between the two groups while controlling for age and education. Combined, the overall positive-reflection group experienced significantly higher levels of engagement than those in the no-treatment condition [ $F(1, 178) = 4.92, p < .05$ ]. These results suggest reflecting on positive daily events, regardless of context, led

to significantly higher levels of employee engagement than not reflecting on positive events.

Following the success of this analysis, I then re-tested all between-person hypotheses using this broader “reflection” group compared to the no-treatment condition.<sup>2</sup> While engagement still did not significantly mediate the relationship between treatment condition and job performance, results found engagement did significantly mediate between treatment condition and turnover intentions (estimate =  $-.099$ , 95% CI [ $-.224$ ,  $-.009$ ]), based on 10,000 Monte Carlo samples. These results suggest turnover intentions, mediated by engagement, were significantly lower for participants assigned to the reflection condition than those in the no-treatment condition.

Similar tests examined the mediating effect of engagement on physical complaints, mental complaints, and depletion. These tests were not part of the original between-person hypotheses, so I conducted these analyses first using the original three treatment conditions, and then again using the larger reflection condition. Analyses for all three outcomes were not significant while using the original three treatment conditions. With the larger reflection condition, however, both mental complaints (estimate =  $-.042$ , 95% CI [ $-.103$ ,  $-.001$ ]) and depletion (estimate =  $-.078$ , 95% CI [ $-.164$ ,  $-.007$ ]) were significantly lower for participants assigned to the reflection condition (based on 10,000 Monte Carlo samples). There was no significant difference between the two conditions for physical complaints.

---

<sup>2</sup> I did not re-run within-person hypotheses, because participants assigned to the no-treatment condition did not participate in the intervention, and thus did not provide weekly survey data.



Finally, I re-tested the moderating effect of workload on the relationship between treatment condition and employee engagement while using the larger reflection condition, but results were still not significant.

## Chapter 5: Discussion

This dissertation examined the role of cognition in increasing employee engagement using a cognitive reflection intervention in a randomized field experiment. Specifically, the purpose of this dissertation was to test the efficacy of the intervention on employee engagement and related outcomes, and to explore cognitive mechanisms, such as perceptions of resource presence and importance, to better understand how and why such an intervention would operate. Results from all of the hypothesis tests in this study failed to achieve statistical significance, both at the between-person and within-person levels. These findings are disappointing, however, there is some evidence to suggest results from this study are not entirely conclusive. In particular, this dissertation encountered three primary challenges that may have adversely affected results: a small sample size, similarity between reflection conditions (the active-treatment and active-control groups), and a potential ceiling effect. While the results of this study indicate cognition *does not* play a role in increasing employee engagement, I believe a glimmer of hope exists, particularly due to findings from supplemental analyses, that may suggest otherwise. In this final section, I will provide more in-depth discussion of the three primary limitations encountered in this dissertation, followed by reflections on theoretical and practical implications of my findings, as well as additional study limitations and areas for future research.

### Primary Limitations

#### *Sample Size*

Perhaps the most pervasive limitation of this study was the lack of sufficient sample size, which can make it difficult to detect significant effects and increases the

likelihood of making a Type II error (Shadish et al., 2002). The three conditions used in the between-person analyses of my study included 66 (active treatment), 76 (active control), and 43 (no treatment) participants, whereas an a priori statistical-power analysis indicated a need for at least 105 participants per condition.<sup>3</sup> Sufficient sample size is particularly important in positive psychology interventions, such as the cognitive reflection exercises used in this study, due to the small effect sizes typically found in such interventions (Sin & Lyubomirsky, 2009). In addition, while sample size is of concern with all statistical analyses, it becomes even more critical when performing latent growth modeling and structural equation modeling, due to the underlying assumption of multivariate normality (Byrne, 2013), which becomes less certain with smaller samples. The growth-rate variance of latent growth models is particularly sensitive to sample size, and small samples can contribute to non-significant growth rate variances (Preacher, 2010; Shadish et al., 2002; Crocker & Algina, 1986), such as were found in my within-person analyses.

Evidence that sample size likely affected the results of my study can be found in Supplemental Analysis #4. When originally separated into two different reflection groups (the active-treatment and active-control conditions), the influence of treatment condition assignment on employee engagement was not significant for either group. Similarly, mediation analyses revealed treatment condition did not significantly influence any outcomes while mediated by engagement, including turnover intentions, job performance, physical or mental health complaints, and depletion. However, once participants from the

---

<sup>3</sup> Statistical power analysis was conducted using G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007).

two conditions were combined into a single (larger) group, results from many of these analyses became statistically significant, including significantly higher levels of employee engagement (compared to participants assigned to the no-treatment condition) as well as other workplace and well-being outcomes. These findings appear to lend credence to the possibility that sample size was a key limitation and was insufficient to detect any effect.

#### *Reflection Condition Similarity*

Throughout this study, the two reflection conditions (active control and active treatment) performed similarly across both between-person and within-person analyses. For example, nearly half of the reflection entries written by participants assigned to the active-control condition were about work, and participants from both conditions experienced similar work-related and well-being outcomes. While this similarity was beneficial in allowing me to combine participants into a single reflection group for supplemental analyses, it also created study limitations due to the lack of significant differences between the two conditions. In particular, these similarities were problematic in the within-person analyses, where a no-treatment condition was not available. Thus, the within-person analyses were essentially neutralized because I was trying to find significant differences between two groups that were largely similar to one another.

#### *Ceiling Effect*

The third primary limitation of this study was the existence of a possible ceiling effect for employee engagement. Administrators at ABC Public Schools have actively sought to increase employee engagement, motivation, and well-being over the years through a number of initiatives, including bringing motivational speakers to all-staff

meetings, health and well-being programs, mindfulness and improv trainings, and more, and have even received the Malcolm Baldrige National Quality Award in recognition of quality management and performance. In fact, the very study whereby I conducted this intervention and collected dissertation data is evidence of the lengths to which administrators have gone to increase the engagement of employees at ABC Public Schools. Consequently, district employees who volunteered to participate in this study already had generally high levels of engagement before the intervention even began, which may have created a ceiling effect limiting the extent to which engagement levels could be further increased. Background survey data indicated that even before the study period began, mean participant engagement scores from my sample were 5.28 (out of 7). In contrast, a review of nine engagement-intervention studies cited in the “Theory and Hypothesis Development” section of this dissertation (e.g., Biggs et al., 2014; Cifre et al., 2011; Alessandri et al., 2018) found an overall mean engagement score of 3.88 (out of 7).

### **Theoretical Implications**

Despite these limitations and overall lack of findings, there are still theoretical implications that can be drawn from this study.

#### *What do These Results Tell us About Engagement?*

While results from primary hypothesis testing does not definitively answer questions regarding the influence of positive reflections on employee engagement, data from supplemental analyses with a larger sample size helps shed a little more light on this area. These results suggest daily positive reflection can lead to increased engagement. What is not clear is whether these increases in engagement stem from positive reflections in general, or reflecting specifically about work. As more than 90% of the reflection

entries from the active-treatment condition and nearly half of those from the active-control condition were about work, it is impossible to tell from the current study which mechanisms are driving these changes in engagement.

#### *What do These Results Tell us About Positive Reflections?*

In this study, the two treatment conditions were similar in that they asked participants to reflect upon positive experiences; while the active-control condition asked for a more general assessment of good things from throughout the day, the active-treatment condition required participants to reflect upon and write about very context-specific prompts. This active-treatment condition was unique—previous studies have created variations of traditional positive reflection interventions by asking participants to write about *funny* things, or things that were pleasant or meaningful from earlier in the day (Gander et al., 2013; Giannopoulos & Vella-Brodrick, 2011), but existing research has not asked participants to restrict their reflections to specific contextual environments (such as the workplace). Similarly, existing research has not compared the efficacy of such variations to traditional positive reflection exercises. In this, my dissertation makes an important contribution to field of positive organizational scholarship by shedding additional light on broader applications of these interventions.

Two key findings about positive reflection exercises have emerged from this study. First, these results suggest there is little difference whether participants are asked to reflect upon and write about dynamic personal experiences, like general good-things that happen across various areas of one's life, and reflecting about more specific contexts such as the workplace. Perhaps more pointedly, these results provide no evidence to suggest context-specific reflections are more likely to lead to context-specific outcomes.

Not only did participants in both conditions perform similarly in work-related measures such as job performance and turnover intentions, but they also performed similarly in more general well-being-related outcomes. Second, these results suggest the most important component in positive reflection exercises lies not in the *subject* of reflection, whether tied to specific contexts or open to more dynamic events, but in the process of reflecting itself. I will address this second point further in the *Practical Implications* section.

#### *What do These Results Tell us About Outcomes?*

Existing studies have linked employee engagement to both work-related outcomes, such as increased job performance and decreased turnover intentions, and well-being outcomes like decreased health complaints. In this study, I investigated whether engagement mediates the relationship between treatment condition assignment and outcomes of work-related and well-being measures. Unfortunately, none of the initial hypothesis tests revealed significant results, despite existing studies showing links between engagement and these outcomes. Supplemental analyses, however, did find significant mediating relationships with some of these outcomes (turnover intentions, mental complaints, and depletion) when using a larger sample size that combined both reflection conditions. These supplemental results tell us two things about engagement-related outcomes: First, they partially confirm findings from previous studies suggesting a connection between engagement and some work-related and well-being outcomes. Second, these results suggest work and well-being outcomes can be influenced by daily positive reflections, while mediated by engagement. These findings contribute to the positive organizational scholarship literature by proposing that positive reflection

exercises can go beyond traditional well-being measures and can even influence important outcomes in the workplace.

*What do These Results Tell us About Cognition?*

If cognition plays a role in the relationship between job resources and engagement, it does not appear to be operating through perceptions of resource presence or importance. That being said, perceptions of presence does appear to be slightly more active than perceptions of importance in the current study, and within-person changes to perceptions of presence experienced more variance than perceptions of importance. These results appear to suggest, although not definitively, that reflecting about job resources at work may lead to slight increases in employees' perceptions of the presence or existence of those resources, however, these changes are not enough to significantly influence engagement levels. These findings further suggest the importance of certain job resources appear to be much more stable for individual employees than an assessment of whether or not those resource exists in the workplace.

What these results do not tell us is whether or not the influence of cognition on employee engagement is activated by certain boundary conditions. One such boundary condition could be *changes* to job resources, such as the introduction of new resources or the loss of existing resources, rather than an emphasis on existing resources, which has been the focus of this dissertation. While perceptions of resource importance may be more stable than other cognitive mechanisms, perhaps the importance of these resources will change only as employees face the imminent or recent loss of those resources. Similarly, this could explain why, according to the existing engagement literature, new or additional resources lead to increased employee engagement. New resources are novel



and may be more cognitively salient to employees, which could highlight why interventions that introduce new job resources are effective in increasing engagement.

In contrast to potential boundary conditions, an alternative explanation may be that cognition simply does not influence engagement at all, either in the ways in which I have hypothesized, or through other conditional mechanisms. This explanation makes sense based on the findings of this study, which suggest perceptions of resource presence either do not change or experience only minimal change, and employees' perceptions of resource importance are even less likely to change. If such is the case, then future studies should focus on increasing engagement strictly through the addition of new resources. The likely explanation, however, may lie somewhere between these two positions. While it may be that cognition does play some role in influencing employees' engagement levels, these effects are likely too small to trigger significant change alone, and must be combined with actual changes in job resources (as the existing literature suggests) to enact change in engagement.

## **Practical Implications**

### *Provide Additional Resources to Build Engagement*

Based on the limited findings of this study, practitioners looking to increase engagement in the workplace should follow the recommendations of existing research and provide additional resources that will help employees to better perform their job functions. These resources include (but are not limited to) providing employees more autonomy, a stronger social structure through which they can support one other, more frequent and specific job feedback, etc. Currently, there is not enough evidence from this study to suggest reflection alone is sufficient to boost employee engagement.

Practitioners may find additive benefits by combining new/additional resources with some kind of reflection component, but this suggestion is purely speculative. While previous studies have typically used formal interventions to introduce new job resources to employees, the findings of this study, and particularly the lack of sufficient cognitive changes in either perceptions of presence or perceptions of importance, suggest a formal introduction of new resources may not be necessary to initiate change. Simply adding new or additional resources wherever possible should be sufficient to positively alter employee engagement.

### *The Need for Genuine Reflection*

Another practical component highlighted by my study is the need for participants who choose to participate in cognitive reflection exercises to really reflect, while engaging in the exercise. As an overt part of the intervention, pointing out the need to reflect may seem like stating the obvious. After conducting a qualitative review of the reflection entries participants wrote as part of the supplemental analyses, however, it became apparent that some participants only wrote about events that were readily available in their minds. For example, participants wrote “I can’t think of anything to write for today,” or “Nothing good happened...Today was rough.” While these types of responses were out of the ordinary, they nevertheless occurred on occasion and demonstrated that some participants put in minimal cognitive effort to draw upon even small positive events. Other participants, on the other hand, struggled to come up with something “good” to write about at the end of the day, but upon deeper reflection found positive experiences about which they could write. For example, one participant assigned to reflect about job significance as part of the active-treatment condition wrote, “It's

tough to be certain that I made a difference today. I tried to re-establish a relationship with a parent whose child I'm evaluating and who had frustrating experiences at the school earlier this year. She seemed receptive, but I think full trust is a longer road.” Rather than simply writing that he/she did not have any positive experiences, some level of effort to reflect is evident in this entry. My findings emphasize the importance of reflecting, and that the struggle to draw upon positive experiences, even when not immediately available to one’s memory, is a central element of what makes cognitive reflection exercises work.

From an application standpoint, there are different ways practitioners can help encourage participants to reflect and give thoughtful responses in their daily entries. One suggestion is to include examples with the daily prompts, or even to showcase an exceptional response by a single participant from the day before. I make this suggestion with some hesitation, however, and caution practitioners who choose this approach to be careful to avoid priming or unduly influencing participants toward providing certain types of responses in the future. An alternative solution would be for practitioners to actively monitor daily reflection responses, especially toward the beginning of a new study, and reach out to those who seem to be lacking effort. Gently encouraging participants to reflect a little more to find something positive from the previous day will not only guide them toward more appropriate responses, but will also help them recognize their responses are being monitored, which may increase compliance and direction-following.

### *Recognize Existing Ceiling Effects*

Practitioners who seek to use engagement-building interventions are cautioned to first check for existing ceiling effects. My findings suggest those who already have high initial levels of employee engagement may be limited in how much they can grow in the future. For these employees, and especially for organizations with generally above-average engagement levels in their workforce, such interventions will likely have minimal success. Interventions can be expensive, logistically challenging, and difficult to implement, therefore practitioners seeking to use engagement-building interventions are encouraged to first collect baseline measures of engagement and ensure mean engagement levels are not so high as to limit opportunities for future growth.

### **Limitations and Future Directions**

In addition to the three primary limitations outlined above, this study had several additional limitations. They are outlined below, along with directions for future research.

#### *No Baseline Measures for Weekly Survey Data*

Prior to the beginning of the study, I collected baseline measures of key variables using the background survey, although I was not able to collect baseline measures of weekly survey data prior to the beginning of the intervention period. Consequently, I used data from the background survey as a proxy for the baseline weekly survey measures. This may have been problematic, as both the background and weekly surveys used different contextual anchors. While the background survey asked participants to describe how they behave “in general,” items from the weekly survey asked participants to respond based on behaviors and experiences “in the past week.” Although many of the same variables were measured in both surveys (e.g., employee engagement, health

complaints, job performance), these shifts in contextual anchors may have created unreliability in participants' responses, especially at the within-person level, in comparing Time 0 (background survey) results to those from the other weekly surveys (e.g., Krosnick & Fabrigar, 1997; Wedell, Parducci, & Lane, 1990). In other words, participant responses to the question "how did you perform *in the past week?*" may have differed from responses to the question "how do you perform *in general?*" This was an issue in my study, because for some variables (engagement and job performance, in particular), participants reported higher "general" levels than "weekly" levels. As a result, engagement and performance scores appear to have decreased considerably at the end of the first week of the intervention period, when weekly data were compared to "general" baseline data, despite theory suggesting those scores would increase after completing four days of cognitive reflection exercises. Thus, using different contextual anchors introduced unreliability in participants' within-person responses.

#### *Lack of No-Treatment Condition for Weekly Survey Data*

The small sample size meant I was not able to include a no-treatment condition during the intervention period. Without weekly survey data from this condition, all within-person analyses and hypothesis tests consisted of a comparison of the active-treatment and the active-control conditions. Two challenges stemmed from this limitation: First, without a no-treatment condition, it was impossible to determine the overall effects of each of the other two conditions compared to a no-treatment group. A key way to assess the efficacy of different cognitive reflection exercises (such as were assigned to the active-treatment and active-control conditions) is to compare the results of those assigned to each condition to a group who was *not* asked to reflect upon and write

about positive events. Without a no-treatment condition, such comparisons were impossible. Second, the lack of no-treatment condition left me to compare results from the active-treatment condition to the active-control condition alone. As discussed previously, these two groups performed very similarly, with similar outcomes and similar changes, both at the between-person and within-person level. Thus, the comparison of two similar groups, without a no-treatment group, makes it look as though neither condition is particularly effective if they are not significantly different from each other.

### *Self-Reported Data*

Finally, the data in this study were all self-reported, both for the background and post-study surveys, and also the weekly surveys. For variables assessing changes in cognition, such as perceptions of presence and perceptions of importance, it would have been difficult to collect data using third-party sources and were ultimately best left as self-reported. Some outcomes, however, would have benefited and even been strengthened by the collection of other-reported data, such as job performance, health complaints, and even employee engagement. As such, this lack of other-reported data is a limitation in my study.

### *Areas for Future Research*

While results from this dissertation may initially appear grim concerning the role of underlying cognitive processes in building employee engagement, this is an area that could benefit from additional studies.

Future research should further study the effects of cognition and cognitive reflection on employee engagement, although with a decidedly more robust sample size, as any effects produced in my study were too subtle to be captured by smaller samples.

Existing research has established a connection between job resources and engagement, but there needs to be a better understanding of the mediating role played by cognition. While sample size certainly appears to be an issue in my study, an alternative explanation could be that reflection alone does not produce effects strong enough to move the needle on engagement or cognitive perceptions of job resources. To test these opposing ideas, researchers could consider an approach that combines reflection exercises with approaches from the current engagement literature, which encourages practitioners to provide employees with more resources to increase engagement. For example, future research could create a study with four conditions: no-treatment, reflection only, new resources only, and reflection + new resources. From what I have learned in the current study, I would suggest it doesn't matter *what* participants are asked to reflect about in the reflection condition, so long as it is something positive from earlier in the day. I would also suggest asking participants to complete the reflection exercises before leaving work each day, likely increasing the number of entries about work, which may then be tied to increased work-related outcomes. Assuming this study had a sufficient sample size, it would allow future researchers to compare the effects of a reflection intervention to one based on giving employees new resources, and both could also be compared to a no-treatment condition. Finally, the fourth condition would examine additive effects of providing employees new resources combined with positive reflection.

Future research should further explore differential effects of reflecting on discrete job resources, both those studied in this dissertation (e.g., autonomy, job significance, social support), and more indirect resources such as opportunities for personal growth and development. Future research could also study interventions that use different models

for categorizing resources, such as Richter and Hacker's (1998) proposal for distinguishing resources into two categories: external (e.g., organizational and social resources) and internal (cognitive features and action patterns) (see also Demerouti et al., 2001). While my findings suggest similar outcomes when comparing cognitive reflection exercises focused on contextualized job resources to general good-thing reflections, those in the active-treatment condition only reflected about each resource for four days before being assigned to reflect on another resource. My qualitative analysis of reflection entries written by participants assigned to the active-control condition revealed that among those who chose to write about job resources, most wrote about social support and job significance, while few wrote about autonomy or task variety. While this may indicate some resources are more salient to employees than others, are there resources that, after prolonged reflection, lead to more definitive outcomes? Also, do differences emerge when participants are asked to reflect about specific job resources for longer durations (e.g., two weeks, instead of four days)? What about common versus uncommon (occurring less frequently) resources? Resources that are more salient compared to those that are less salient, which may require more in-depth cognitive effort? More robust research about specific job resources would help uncover some of the underlying processes that make positive reflection interventions most effective. For example, researchers could conduct a multi-week reflection study, similar to this dissertation, where participants would be assigned to one of four groups: no-reflection control, reflect on a single salient resource (e.g., social support or job significance), reflect on a single non-salient resource (e.g., autonomy or task variety), and a condition that asks participants to reflect on a different resource each week, like the active-treatment



condition in this dissertation. This would allow researchers to explore key conditions about the relationship between job resources, cognition, and employee engagement, and help fine-tune future engagement-building interventions.

In addition, future research of cognitive reflection exercises, such as those used in this dissertation, would benefit from a broader study of work-related outcomes. While most positive reflection interventions have focused primarily on participants' self-reported scores of happiness and depression (e.g., Seligman et al., 2005; 2006; Sin & Lyubomirsky, 2009), others have begun to look at additional outcomes, such as depletion, and physical and mental health complaints (e.g., Bono et al., 2013). To further understanding of the more wide-ranging effects of positive reflection interventions, especially those conducted in the workplace, a more robust exploration of workplace-related outcomes should be conducted, even beyond job performance and turnover intentions. Health, happiness, and cognitive depletion certainly play an indirect role toward the efficacy of an organization's workforce. However, an understanding of how cognitive reflection exercises impact both positive and negative work-related outcomes, such as a firm's financial performance, employee turnover, supervisor-reported employee performance, leadership behaviors, organizational citizenship behaviors, absenteeism, and counterproductive work behaviors (e.g., workplace theft), would further deepen understanding of the role these exercises play in organizational life.

## **Conclusion**

There is substantial evidence affirming the relationship between job resources and employee engagement, however, much about this connection remains unknown. The purpose of this dissertation was to explore the role of cognition in the relationship

between job resources and engagement. While existing literature appears to subscribe to an underlying assumption that the addition of new resources will directly lead to increased engagement at work, I propose this process works through increased cognition, or a cognitive awareness that these resources exist and are important to individual employees. To test this theory, I conducted a field experiment using a cognitive reflection intervention in which participants were asked to reflect about job resources at work each day for five weeks, to determine whether regular cognitive reflection about existing job resources, without adding additional resources to the workplace, would increase employee engagement. Study results did not confirm my hypotheses, however, supplemental analyses suggest there may be more to cognition and engagement than initial results reveal. My hope is future research with larger sample sizes will seek to replicate this study and explore additional boundary conditions, furthering understanding of the role of cognition in the relationship between job resources and employee engagement. Despite the overall lack of findings, this study provides an important step in better understanding the relationship between job resources and employee engagement, and introduces a novel intervention practitioners can use to potentially increase engagement in the workplace.

Table 1

*Background Survey:**Standardized Item Loadings in the Higher-Order Factor Model for Engagement*

Item	Vigor	Dedication	Absorption
At my work, I feel bursting with energy.	0.66		
At my job, I feel strong and vigorous.	0.63		
When I get up in the morning, I feel like going to work.	0.77		
I am enthusiastic about my job.		0.81	
My job inspires me.		0.84	
I am proud of the work that I do.		0.61	
I feel happy when I am working intensely.			0.80
I am immersed in my work.			0.69
I get carried away when I am working.			0.58

*Note.*  $N = 142$  participants. $p < .001$  for all item loadings.

Table 2

*Background Survey:**Standardized Item Loadings in the Five-Factor Model for Perceptions of Presence*

Item	Auton.	Task Var.	Job Sig.	Feed-back	Social Sup.
The job allows me to make decisions about what methods I use to complete my work.	0.84				
The job gives me considerable opportunity for independence and freedom in how I do the work.	0.92				
The job allows me to decide on my own how to go about doing my work.	0.82				
The job involves a great deal of task variety.		0.58			
The job involves doing a number of different things.		0.84			
The job requires the performance of a wide range of tasks.		0.96			
The job involves performing a variety of tasks.		0.93			
The results of my work are likely to significantly affect the lives of other people.			0.62		
The job itself is very significant and important in the broader scheme of things.			0.59		
The job has a large impact on people outside the organization.			0.93		
The work performed on the job has a significant impact on people outside the org.			0.96		
I receive a great deal of information from my manager and coworkers about my job performance.				0.91	
Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.				0.93	
I receive feedback on my performance from other people in my organization (such as my manager or coworkers).				0.85	
I have the opportunity to develop close friendships in my job.					0.72
I have the chance in my job to get to know other people.					0.67
I have the opportunity to meet with others in my work.					0.73
People I work with take a personal interest in me.					0.70
People I work with are friendly.					0.64

*Note.*  $N = 142$  participants. Auton. = Autonomy; Task Var. = Task Variety; Job Sig. = Job Significance; Social Sup. = Social Support  
 $p < .001$  for all item loadings.

Table 3

*Background Survey:**Standardized Item Loadings in the Five-Factor Model for Perceptions of Importance*

Item	Auton.	Task Variety	Job Sig.	Feed- back	Social Support
Having autonomy, or the freedom to make decisions about how I complete my work, is important to me.	0.89				
Deciding on my own how I go about doing my work is important to me.	0.93				
Having variety in the tasks I do at work is important to me.		0.90			
Doing a number of different things at my job is important to me.		0.97			
Having a job that significantly affects the lives of others is important to me.			0.80		
Doing work that significantly impacts people outside of the organization is important to me.			0.88		
Receiving feedback from others about my job performance is important to me.				0.91	
Receiving information from other people in the organization (such as my manager or coworkers) about the effectiveness of my job performance is important to me.				0.98	
Having the opportunity to develop close friendships at my job is important to me.					0.78
Having the chance to get to know other people at my job is important to me.					0.90
Working with people who take a personal interest in me is important to me.					0.85
Giving/receiving social support from others at work is important to me.					0.92

*Note.*  $N = 142$  participants. $p < .001$  for all item loadings.

Auton. = Autonomy; Job Sig. = Job Significance

Table 4

*Post-Study Survey:**Standardized Item Loadings in the Higher-Order Factor Model for Engagement*

Item	Vigor	Dedication	Absorption
At my work, I feel bursting with energy.	0.89		
At my job, I feel strong and vigorous.	0.90		
When I get up in the morning, I feel like going to work.	0.66		
I am enthusiastic about my job.		0.82	
My job inspires me.		0.70	
I am proud of the work that I do.		0.66	
I feel happy when I am working intensely.			0.70
I am immersed in my work.			0.88
I get carried away when I am working.			0.78

*Note.*  $N = 142$  participants. $p < .001$  for all item loadings.

Table 5

*Post-Study Survey:**Standardized Item Loadings in the Five-Factor Model for Perceptions of Presence*

Item	Auton.	Task Var.	Job Sig.	Feed-back	Social Sup.
The job allows me to make decisions about what methods I use to complete my work.	0.82				
The job gives me considerable opportunity for independence and freedom in how I do the work.	0.94				
The job allows me to decide on my own how to go about doing my work.	0.94				
The job involves a great deal of task variety.		0.90			
The job involves doing a number of different things.		0.89			
The job requires the performance of a wide range of tasks.		0.96			
The job involves performing a variety of tasks.		0.98			
The results of my work are likely to significantly affect the lives of other people.			0.76		
The job itself is very significant and important in the broader scheme of things.			0.73		
The job has a large impact on people outside the organization.			0.98		
The work performed on the job has a significant impact on people outside the organization.			0.96		
I receive a great deal of information from my manager and coworkers about my job performance.				0.86	
Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.				0.90	
I receive feedback on my performance from other people in my organization (such as my manager or coworkers).				0.92	
I have the opportunity to develop close friendships in my job.					0.81
I have the chance in my job to get to know other people.					0.86
I have the opportunity to meet with others in my work.					0.74
People I work with take a personal interest in me.					0.74
People I work with are friendly.					0.73

*Note.*  $N = 142$  participants. Auton. = Autonomy; Task Var. = Task Variety; Job Sig. = Job Significance; Social Sup. = Social Support  
 $p < .001$  for all item loadings.

Table 6

*Post-Study Survey:**Standardized Item Loadings in the Five-Factor Model for Perceptions of Importance*

Item	Auton.	Task Variety	Job Sig.	Feed-back	Social Support
Having autonomy, or the freedom to make decisions about how I complete my work, is important to me.	0.95				
Deciding on my own how I go about doing my work is important to me.	0.96				
Having variety in the tasks I do at work is important to me.		0.94			
Doing a number of different things at my job is important to me.		0.92			
Having a job that significantly affects the lives of others is important to me.			0.99		
Doing work that significantly impacts people outside of the organization is important to me.			0.76		
Receiving feedback from others about my job performance is important to me.				0.88	
Receiving information from other people in the organization (such as my manager or coworkers) about the effectiveness of my job performance is important to me.				0.99	
Having the opportunity to develop close friendships at my job is important to me.					0.84
Having the chance to get to know other people at my job is important to me.					0.83
Working with people who take a personal interest in me is important to me.					0.92
Giving/receiving social support from others at work is important to me.					0.74

*Note.*  $N = 142$  participants. $p < .001$  for all item loadings.

Auton. = Autonomy; Job Sig. = Job Significance



Table 7

*Weekly Survey:**Standardized Item Loadings from the Multi-Level Confirmatory Factor Analysis of the Higher-Order Factor Model for Engagement*

Item	Within	Between
<i>Vigor</i>		
This week at work, I felt bursting with energy.	0.85	0.96
This week at my job, I felt strong and vigorous.	0.87	0.98
This week, when I got up in the morning I felt like going to work.	0.59	0.77
<i>Dedication</i>		
This week, I was enthusiastic about my job.	0.74	0.97
This week, my job inspired me.	0.76	0.83
This week, I was proud of the work that I did.	0.64	0.84
<i>Absorption</i>		
This week, I felt happy when I was working intensely.	0.69	0.96
This week, I was immersed in my work.	0.70	0.84
This week, I got carried away when I was working.	0.64	0.76

*Note.*  $N = 654$  weekly observations nested within 142 participants.

$p < .001$  for all item loadings.

Within-level item loadings represent the within-person factor structure, which comes from a covariance matrix comprised of item scores centered at each participant's mean. Between-level item loadings represent the between-person factor structure derived from a covariance matrix of participants' mean item scores (Muthén, 1994; Dyer et al., 2005).

Table 8

*Weekly Survey:**Standardized Item Loadings from the Multi-Level Confirmatory Factor Analysis of the Five-Factor Model for Perceptions of Presence*

Item	Within	Between
<i>Autonomy</i>		
The job gives me considerable opportunity for independence and freedom in how I do the work.	0.76	0.97
The job allows me to decide on my own how to go about doing my work.	0.78	1.00
<i>Task Variety</i>		
The job involves doing a number of different things.	0.92	1.00
The job involves performing a variety of tasks.	0.96	0.99
<i>Job Significance</i>		
The results of my work are likely to significantly affect the lives of other people.	0.54	0.98
The work performed on the job has a significant impact on people outside the organization.	0.61	0.89
<i>Feedback</i>		
Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.	0.72	0.99
I receive feedback on my performance from other people in my organization (such as my manager or coworkers).	0.80	0.99
<i>Social Support</i>		
I have the opportunity to develop close friendships in my job.	0.69	0.89
I have the chance in my job to get to know other people.	0.69	0.90
People I work with take a personal interest in me.	0.56	0.92

*Note.*  $N = 654$  weekly observations nested within 142 participants.

$p < .001$  for all item loadings.

Within-level item loadings represent the within-person factor structure, which comes from a covariance matrix comprised of item scores centered at each participant's mean. Between-level item loadings represent the between-person factor structure derived from a covariance matrix of participants' mean item scores (Muthén, 1994; Dyer et al., 2005).

Table 9

*Weekly Survey:**Standardized Item Loadings from Multi-Level Confirmatory Factor Analysis of the Five-Factor Model for Perceptions of Importance*

Item	Within	Between
<i>Autonomy</i>		
Having autonomy, or the freedom to make decisions about how I complete my work, is important to me.	0.80	1.00
Deciding on my own how I go about doing my work is important to me.	0.86	0.97
<i>Task Variety</i>		
Having variety in the tasks I do at work is important to me.	0.92	0.99
Doing a number of different things at my job is important to me.	0.91	1.00
<i>Job Significance</i>		
Having a job that significantly affects the lives of others is important to me.	0.72	1.00
Doing work that significantly impacts people outside of the organization is important to me.	0.72	0.83
<i>Feedback</i>		
Receiving feedback from others about my job performance is important to me.	0.90	0.99
Receiving information from other people in the organization (such as my manager or coworkers) about the effectiveness of my job performance is important to me.	0.84	1.00
<i>Social Support</i>		
Having the opportunity to develop close friendships at my job is important to me.	0.71	0.92
Having the chance to get to know other people at my job is important to me.	0.66	0.92
Working with people who take a personal interest in me is important to me.	0.74	0.94
Giving/receiving social support from others at work is important to me.	0.62	0.94

*Note.*  $N = 654$  weekly observations nested within 142 participants.

$p < .001$  for all item loadings.

Within-level item loadings represent the within-person factor structure, which comes from a covariance matrix comprised of item scores centered at each participant's mean. Between-level item loadings represent the between-person factor structure derived from a covariance matrix of participants' mean item scores (Muthén, 1994; Dyer et al., 2005).

Table 10

*Background Survey:**Means, Standard Deviations, Cronbach's Alpha, and Zero-Order Correlations*

	<i>α</i>	M	SD	1	2	3	4	5	6	7	8	9
1 Condition		0.46	0.50	1.00								
2 Total Daily Reflections		17.96	2.25	-.06	1.00							
3 Engagement	.88	5.28	0.68	.08	.13	1.00						
4 POP_Autonomy	.89	4.08	0.79	-.05	-.07	.18*	1.00					
5 POP_Task Variety	.89	4.42	0.56	-.01	.08	.18*	.08	1.00				
6 POP_Job Significance	.87	4.26	0.64	-.09	.08	.27**	.10	.18*	1.00			
7 POP_Feedback	.92	3.39	0.87	-.03	-.04	.27**	.27**	.11	.18*	1.00		
8 POP_Social Support	.82	4.16	0.56	-.04	.08	.17*	.18*	.21*	.24**	.31***	1.00	
9 POI_Autonomy	.90	4.38	0.64	-.09	.04	.09	.42***	.18*	.31***	.03	.16	1.00
10 POI_Task Variety	.93	4.28	0.64	-.01	-.00	.29**	.29***	.27**	-.01	.12	.10	.26**
11 POI_Job Significance	.82	4.28	0.61	-.18	-.05	.15	.01	.13	.61***	.10	.33***	.23**
12 POI_Feedback	.95	3.98	0.68	-.03	-.04	.01	-.06	.12	.08	.09	.11	-.13
13 POI_Social Support	.92	4.16	0.68	-.05	.05	-.01	.12	.11	.19*	.06	.44***	.19*
14 Workload	.89	3.39	0.99	-.05	.01	-.11	-.26**	.28**	.16	-.13	-.17*	.15
15 Job Performance	.78	4.36	0.51	-.04	.07	.23**	.01	.11	.24**	.05	.06	.11
16 Turnover Intentions	.76	1.94	0.92	-.08	-.04	-.42**	-.45**	.06	-.01	-.34***	-.18*	.07
17 Physical Complaints	.78	2.32	0.76	-.08	-.06	-.23**	-.11	.10	.05	-.01	-.10	.06
18 Mental Complaints	.75	2.16	0.84	-.13	-.04	-.27**	-.13	.04	.05	.01	-.01	.12
19 Depletion	.90	1.99	0.82	-.03	-.08	-.27**	-.16	.05	.01	.01	-.03	.12
20 Gender		1.14	0.41	-.01	.03	-.00	-.04	-.11	.07	-.05	-.01	.15
21 Age		41.01	10.55	.04	-.08	.20*	.01	.01	-.14	-.16	-.06	-.11
22 Race		0.96	0.19	.10	.01	-.03	-.01	.09	.11	-.15	-.01	-.01
23 Marital Status		2.18	1.08	.07	-.01	.07	.06	-.13	.06	.07	.01	.02
24 Parental Status		1.99	1.44	-.04	.01	.05	-.08	-.01	.11	-.08	-.09	-.16
25 Education		5.11	1.22	-.09	-.00	-.01	.07	-.02	.13	-.07	.06	.25**
26 Tenure_District		11.32	7.18	.05	-.05	.15	.06	.02	-.06	-.23**	-.02	.02
27 Tenure_Current Job		7.97	5.53	-.03	.06	.04	.13	.09	.12	-.18*	.05	.15

Table 10 (Continued)

	10	11	12	13	14	15	16	17	18	19	20	21
1 Condition												
2 Total Daily Reflections												
3 Engagement												
4 POP_Autonomy												
5 POP_Task Variety												
6 POP_Job Significance												
7 POP_Feedback												
8 POP_Social Support												
9 POI_Autonomy												
10 POI_Task Variety	1.00											
11 POI_Job Significance	.11	1.00										
12 POI_Feedback	.13	.19*	1.00									
13 POI_Social Support	.10	.35***	.39***	1.00								
14 Workload	.01	.16	.07	-.05	1.00							
15 Job Performance	.02	.24**	.04	.03	-.01	1.00						
16 Turnover Intentions	-.06	.06	.08	-.03	.29***	-.03	1.00					
17 Physical Complaints	-.02	.11	.09	.02	.39***	-.03	.23**	1.00				
18 Mental Complaints	-.13	.01	-.02	.04	.39***	-.06	.26**	.49***	1.00			
19 Depletion	-.04	.03	-.05	.02	.45***	-.17*	.26**	.59***	.76***	1.00		
20 Gender	.01	-.01	-.04	-.04	-.06	-.02	.05	-.22**	-.02	-.08	1.00	
21 Age	.19*	-.05	-.05	-.06	-.07	.05	-.06	-.22**	-.29***	.29**	-.07	1.00
22 Race	.09	.12	.08	.06	.06	.09	.05	.00	-.02	-.08	.16	.16
23 Marital Status	.01	.05	-.05	-.02	-.04	.06	-.08	-.03	-.06	-.01	.01	.13
24 Parental Status	.09	.10	-.04	-.10	.02	.03	-.01	-.09	-.21*	-.12	-.01	.56***
25 Education	-.08	.14	-.22*	.03	.17*	.13	-.03	.12	.19*	.25**	-.08	.02
26 Tenure_District	.13	.01	-.11	-.10	-.16	.19*	-.17*	-.20*	-.29***	-.26***	.03	.54***
27 Tenure_Current Job	.09	.05	-.08	-.07	-.01	.17*	-.01	-.11	-.10	-.10	.04	.24**

Table 10 (Continued)

	22	23	24	25	26	27
1 Condition						
2 Total Daily Reflections						
3 Engagement						
4 POP_Autonomy						
5 POP_Task Variety						
6 POP_Job Significance						
7 POP_Feedback						
8 POP_Social Support						
9 POI_Autonomy						
10 POI_Task Variety						
11 POI_Job Significance						
12 POI_Feedback						
13 POI_Social Support						
14 Workload						
15 Job Performance						
16 Turnover Intentions						
17 Physical Complaints						
18 Mental Complaints						
19 Depletion						
20 Gender						
21 Age						
22 Race	1.00					
23 Marital Status	.10	1.00				
24 Parental Status	.21*	.16	1.00			
25 Education	.02	-.03	-.06	1.00		
26 Tenure_District	.06	.03	.33***	.23**	1.00	
27 Tenure_Current Job	.13	-.04	.19*	.18*	.61***	1.00

*Note.*  $N = 140$ - $142$  participants.

Condition: 1 = Active treatment, 0 = Active control. Total Daily Reflections = Total number of daily reflection exercises completed during the active phase of the study. POP = Perceptions of presence. POI = Perceptions of importance. Gender: 1 = female, 2 = male. Race: 1 = White, 0 = other. Marital Status: 1 = single, 2 = married, 3 = same-sex domestic partner, 4 = living with a significant other or partner, 5 = divorced or separated, 6 = widowed, 0 = other. Parental Status = Number of children participant has. Education: 1 = some high school (grade 11 or less), 2 = graduated from high school or G.E.D., 3 = some college or technical training beyond high school (1-3 years), 4 = Bachelor's degree, 5 = some graduate school, 6 = graduate or professional degree (Master's, Ph.D., J.D., M.D., etc.)). Tenure\_District = Length of time in which participant has worked for the school district: 1 = 0-3 months, 2 = 4-6 months, 3 = 7-11 months, 4 = 1 year, 5 = 2 years ... Tenure\_Current Job = Length of time in which participant has worked in current role: 1 = 0-3 months, 2 = 4-6 months, 3 = 7-11 months, 4 = 1 year, 5 = 2 years ...

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two-tailed test.

Table 11  
*Post-Study Survey:*  
*Means, Standard Deviations, Cronbach's Alpha, and Zero-Order Correlations*

	$\alpha$	M	SD	1	2	3	4	5	6	7	8	9
1 Condition		0.46	0.50	1.00								
2 Total Daily Reflections		18.01	2.14	-.04	1.00							
3 Engagement	.92	5.34	0.75	.05	.09	1.00						
4 POP_Autonomy	.93	4.25	0.73	.01	-.09	.16	1.00					
5 POP_Task Variety	.97	4.44	0.61	-.00	-.14	.27**	.32***	1.00				
6 POP_Job Significance	.93	4.23	0.66	-.06	.04	.34***	.30***	.29**	1.00			
7 POP_Feedback	.92	3.60	0.81	-.06	-.00	.29**	.15	.35***	.28**	1.00		
8 POP_Social Support	.88	4.11	0.54	-.05	.07	.18*	.29**	.34***	.26**	.44***	1.00	
9 POI_Autonomy	.95	4.49	0.54	.03	.01	.17*	.29***	.06	.12	.09	.11	1.00
10 POI_Task Variety	.92	4.36	0.59	-.04	.02	.24**	.13	.29***	.09	.26**	.25**	.44***
11 POI_Job Significance	.86	4.31	0.57	-.13	-.05	.26**	.03	.10	.48***	.28**	.28**	.31***
12 POI_Feedback	.93	4.05	0.63	-.17	.08	.12	-.02	.14	.09	.31***	.28**	.16
13 POI_Social Support	.90	4.11	0.61	-.03	.06	.09	.02	.25**	.27**	.24**	.56***	.23**
14 Workload	.94	3.31	1.08	-.12	-.04	-.14	-.20*	.09	.04	-.07	-.14	.06
15 Job Performance	.80	4.44	0.48	-.00	.04	.16	-.04	.05	.09	.02	.07	.11
16 Turnover Intentions	.76	1.95	1.00	-.02	-.10	-.51**	-.25**	-.28**	-.22**	-.44***	-.23**	-.03
17 Physical Complaints	.82	2.17	0.74	-.07	-.07	-.19*	-.15	.01	.07	-.03	-.08	.04
18 Mental Complaints	.70	1.98	0.75	-.12	-.03	-.33**	-.10	.08	-.008	-.10	-.15	.05
19 Depletion	.89	1.86	0.75	.04	-.08	-.10**	-.15	.02	-.07	-.08	-.11	.02

Table 11 (Continued)

	10	11	12	13	14	15	16	17	18	19
1 Condition										
2 Total Daily Reflections										
3 Engagement										
4 POP_Autonomy										
5 POP_Task Variety										
6 POP_Job Significance										
7 POP_Feedback										
8 POP_Social Support										
9 POI_Autonomy										
10 POI_Task Variety	1.00									
11 POI_Job Significance	.40***	1.00								
12 POI_Feedback	.28**	.17*	1.00							
13 POI_Social Support	.22**	.34***	.47***	1.00						
14 Workload	.01	.06	.09	.01	1.00					
15 Job Performance	-.01	-.01	.05	.08	.09	1.00				
16 Turnover Intentions	-.14	-.06	-.04	-.11	.20*	.03	1.00			
17 Physical Complaints	.03	.16	.02	.01	.41***	-.04	.23**	1.00		
18 Mental Complaints	-.04	-.08	-.02	-.13	.43***	-.08	.21*	.58***	1.00	
19 Depletion	.00	.01	-.07	-.04	.48***	-.03	.27**	.62***	.78***	1.00

Note.  $N = 142$  participants.

Condition: 1 = Active treatment, 0 = Active control. Total Daily Reflections = Total number of daily reflection exercises completed during the active phase of the study. POP = Perceptions of presence. POI = Perceptions of importance.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two-tailed test.



Table 12

*Weekly Survey:**Means, Standard Deviations, Cronbach's Alpha, and Zero-Order Correlations*

	$\alpha$	M	SD	SD	1	2	3	4	5	6	7	8
1 Condition		0.45	0.50		1.00							
2 Total Daily Reflections		18.13	2.10		-.01	1.00						
3 Engagement	.93	4.95	0.87		.04	.09*	1.00					
4 POP_Autonomy	.92	4.14	0.74		-.00	-.02	.20***	1.00				
5 POP_Task Variety	.97	4.49	0.64		.05	-.03	.15***	.38***	1.00			
6 POP_Job Significance	.80	4.16	0.66		.00	.04	.25***	.34***	.39***	1.00		
7 POP_Feedback	.89	3.68	0.76		-.04	.01	.20***	.31***	.25***	.30***	1.00	
8 POP_Social Support	.86	4.06	0.59		-.07	.12**	.13**	.26***	.26***	.35***	.39***	1.00
9 POI_Autonomy	.90	4.39	0.59		.04	.03	.15***	.40***	.28***	.14***	.11**	.09*
10 POI_Task Variety	.95	4.36	0.62		.00	.09*	.21***	.32***	.42***	.11**	.17***	.12**
11 POI_Job Significance	.82	4.26	0.59		-.04	.05	.21***	.15***	.18***	.51***	.26***	.33***
12 POI_Feedback	.94	4.08	0.66		.03	.08	.18***	.01	.18***	.12**	.23***	.23***
13 POI_Social Support	.92	4.10	0.64		.01	.12**	.08	.08*	.20***	.24***	.18***	.60***
14 Workload	.93	3.15	1.04		-.02	-.02	-.11**	-.24**	.14***	.03	-.09*	-.09*
15 Physical Complaints	.85	2.12	0.87		-.09	-.03	-.38**	-.22**	.02	.01	-.09*	-.10**
16 Mental Complaints	.80	1.97	0.89		-.04	-.05	-.42**	-.14**	.05	-.02	-.05	-.09*
17 Depletion	.93	2.08	0.97		-.04	-.04	-.53**	-.17**	.02	-.04	-.05	-.05
18 Job Performance_Week		3.96	0.70		.05	.01	.49***	.07	.13**	.13**	.02	.03

Table 12 (continued)

	9	10	11	12	13	14	15	16	17	18
1 Condition										
2 Total Daily Reflections										
3 Engagement										
4 POP_Autonomy										
5 POP_Task Variety										
6 POP_Job Significance										
7 POP_Feedback										
8 POP_Social Support										
9 POI_Autonomy	1.00									
10 POI_Task Variety	.53***	1.00								
11 POI_Job Significance	.29***	.32***	1.00							
12 POI_Feedback	.20***	.30***	.25***	1.00						
13 POI_Social Support	.22***	.23***	.34***	.47***	1.00					
14 Workload	.03	-.01	-.02	.08*	.03	1.00				
15 Physical Complaints	-.02	-.07	.05	-.01	.05	.40***	1.00			
16 Mental Complaints	-.04	-.08*	.01	.04	.02	.43***	.67***	1.00		
17 Depletion	-.08*	-.09*	-.03	-.03	.05	.41***	.74***	.82***	1.00	
18 Job Performance_Week	.17***	.16***	.08*	.06	.05	-.01	-.26***	-.34***	-.39***	1.00

*Note.*  $N = 142$  participants.

Condition: 1 = Active treatment, 0 = Active control. Total Daily Reflections = Total number of daily reflection exercises completed during the active phase of the study. POP = Perceptions of presence. POI = Perceptions of importance.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two-tailed test.

Table 13  
*Pre- and Post-Intervention Means and Standard Deviations of Study Variables by Condition*

Variable	Condition	Pre-Intervention			Post-Intervention		
		N	M	SD	N	M	SD
Engagement	Active Treatment	66	5.34	0.74	66	5.38	0.77
	Active Control	76	5.23	0.61	76	5.31	2.08
	No Treatment	43	5.36	0.75	43	5.23	0.80
POP_Autonomy	Active Treatment	66	4.04	0.77	66	4.26	0.69
	Active Control	75	4.12	0.82	76	4.25	0.73
	No Treatment	43	4.05	0.74	43	4.05	0.92
POP_Task Variety	Active Treatment	66	4.42	0.54	66	4.44	0.64
	Active Control	75	4.42	0.57	76	4.44	0.60
	No Treatment	43	4.41	0.67	43	4.44	0.50
POP_Job Significance	Active Treatment	66	4.19	0.61	66	4.18	0.57
	Active Control	75	4.31	0.66	76	4.27	0.72
	No Treatment	43	4.31	0.72	43	4.39	0.72
POP_Feedback	Active Treatment	66	3.36	0.86	66	3.55	0.84
	Active Control	75	3.41	0.89	76	3.65	0.79
	No Treatment	43	3.45	0.92	43	3.24	1.02
POP_Social Support	Active Treatment	66	4.13	0.57	66	4.08	0.54
	Active Control	75	4.18	0.55	76	4.14	0.54
	No Treatment	43	3.95	0.81	43	4.09	0.67
POI_Autonomy	Active Treatment	66	4.32	0.67	66	4.51	0.55
	Active Control	75	4.43	0.62	76	4.48	0.53
	No Treatment	43	4.40	0.58	43	4.33	0.72
POI_Task Variety	Active Treatment	66	4.28	0.71	66	4.33	0.65
	Active Control	75	4.29	0.58	76	4.38	0.53
	No Treatment	43	4.15	0.70	43	4.26	0.73
POI_Job Significance	Active Treatment	66	4.17	0.58	66	4.23	0.54
	Active Control	75	4.39	0.61	76	4.38	0.59
	No Treatment	42	4.44	0.60	43	4.43	0.60
POI_Feedback	Active Treatment	66	3.95	0.64	66	3.93	0.54
	Active Control	75	3.99	0.72	76	4.14	0.69
	No Treatment	42	3.93	0.92	43	4.02	0.77
POI_Social Support	Active Treatment	66	4.13	0.65	66	4.09	0.55
	Active Control	75	4.19	0.70	76	4.12	0.67
	No Treatment	42	4.04	0.65	43	4.08	0.65
Job Performance	Active Treatment	66	4.34	0.54	66	4.44	0.48
	Active Control	75	4.37	0.48	76	4.44	0.49
	No Treatment	42	4.44	0.58	43	4.41	0.57
Turnover Intentions	Active Treatment	66	1.86	0.86	66	1.93	1.01
	Active Control	75	2.01	0.97	76	1.97	1.00
	No Treatment	42	2.25	1.08	43	2.03	1.01

Table 13 (Continued)

Variable	Condition	Pre-Intervention			Post-Intervention		
		N	M	SD	N	M	SD
Physical Complaints	Active Treatment	66	2.25	0.73	66	2.11	0.73
	Active Control	74	2.38	0.78	76	2.22	0.75
	No Treatment	42	2.27	0.72	43	2.33	0.79
Mental Complaints	Active Treatment	66	2.05	0.79	66	1.89	0.76
	Active Control	74	2.26	0.88	76	2.06	0.73
	No Treatment	42	2.26	0.75	43	2.03	0.63
Depletion	Active Treatment	66	1.96	0.80	66	1.89	0.84
	Active Control	74	2.01	0.84	76	1.84	0.67
	No Treatment	42	1.97	0.85	43	1.97	0.84

*Note.* POP = Perceptions of presence. POI = Perceptions of importance.

Table 14

*Engagement Differences by Treatment Condition: Analysis of Covariance Planned Comparison Results*

Condition	Condition	Mean Difference	Standard Error	<i>p</i>	95% CI	
					Lower Bound	Upper Bound
Active control	Active treatment	.05	.09	1.00	-.18	.28
	No treatment	.25	.11	.08	-.02	.52
Active treatment	Active control	-.05	.09	1.00	-.28	.18
	No treatment	.19	.11	.23	-.07	.47
No treatment	Active control	-.25	.11	.08	-.52	.02
	Active treatment	-.19	.11	.23	-.47	.07

*Note.* Adjustments made for multiple comparisons using Bonferroni correction. CI = Bootstrapped confidence intervals.

Table 15

*Regression Coefficients and Standard Errors for the Engagement-Turnover Intentions Mediation Model (No-Treatment Condition as Referent Group)*

	Engagement (T2)		Turnover Intentions	
	<i>B</i>	SE	<i>B</i>	SE
Intercept	.828*	.389	6.218***	.642
Controls				
Age	.013*	.004	.003	.007
Education	-.017	.033	-.060	.055
Engagement (T1)	.732***	.059	-.286*	.131
Predictors				
Active Control	.223*	.105	-.073	.173
Active Treatment	.199†	.107	-.068	.176
Mediators				
Engagement (T2)			-.470***	.123

*Note.*  $N = 183$ . Unstandardized coefficients are reported. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the No-Treatment condition assigned as the referent group. The Active Control row shows a comparison of the Active Control condition to the No-Treatment condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the No-Treatment condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 16

*Regression Coefficients and Standard Errors for the Engagement-Turnover Intentions Mediation Model (Active-Control Condition as Referent Group)*

	Engagement (T2)		Turnover Intentions	
	<i>B</i>	SE	<i>B</i>	SE
Intercept	1.051	.375	6.144***	.625
Controls				
Age	.013*	.004	.003	.007
Education	-.017	.033	-.060	.055
Engagement (T1)	.732***	.059	-.286*	.131
Predictors				
No Treatment	-.223*	.105	.073	.173
Active Treatment	-.024	.091	.005	.149
Mediators				
Engagement (T2)			-.470***	.123

*Note.*  $N = 183$ . Unstandardized coefficients are reported. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the Active Treatment condition assigned as the referent group. The No-Treatment row shows a comparison of the No-Treatment condition to the Active Control condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the Active Control condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 17

*Regression Coefficients and Standard Errors for the Engagement-Performance Mediation Model (No-Treatment Condition as Referent Group)*

	Engagement (T2)		Job Performance	
	<i>B</i>	SE	<i>B</i>	SE
Intercept	.828*	.389	3.819***	.368
Controls				
Age	.013*	.004	-.001	.004
Education	-.017	.033	.037	.313
Engagement (T1)	.732***	.059	.002	.075
Predictors				
Active Control	.223*	.105	-.013	.099
Active Treatment	.199†	.107	-.006	.101
Mediators				
Engagement (T2)			.090	.070

*Note.*  $N = 183$ . Unstandardized coefficients are reported. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the No-Treatment condition assigned as the referent group. The Active Control row shows a comparison of the Active Control condition to the No-Treatment condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the No-Treatment condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$



Table 18

*Regression Coefficients and Standard Errors for the Engagement-Turnover Intentions Mediation Model (Active-Control Condition as Referent Group)*

	Engagement (T2)		Job Performance	
	<i>B</i>	SE	<i>B</i>	SE
Intercept	1.051	.375	3.807***	.358
Controls				
Age	.013*	.004	.003	.007
Education	-.017	.033	-.060	.055
Engagement (T1)	.732***	.059	-.286*	.131
Predictors				
No Treatment	-.223*	.105	.013	.099
Active Treatment	-.024	.091	.006	.085
Mediators				
Engagement (T2)			.090	.070

*Note.*  $N = 183$ . Unstandardized coefficients are reported. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the Active Treatment condition assigned as the referent group. The No-Treatment row shows a comparison of the No-Treatment condition to the Active Control condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the Active Control condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 19

*Summary of Indirect Effects Estimated from the Engagement-Turnover Intentions/Job Performance Mediation Models*

Indirect Effect Pathway	Point Estimate	95% CI	
		Lower Bound	Upper Bound
Referent Group: No-Treatment Condition			
Active-Control → Employee Engagement → Turnover Intentions	-.105	-.238	-.006
Active-Treatment → Employee Engagement → Turnover Intentions	-.094	-.229	.005
Active-Control → Employee Engagement → Job Performance	.020	-.012	.060
Active-Treatment → Employee Engagement → Job Performance	.018	-.012	.059
Referent Group: Active-Control Condition			
No-Treatment → Employee Engagement → Turnover Intentions	.105	.007	.235
Active-Treatment → Employee Engagement → Turnover Intentions	.011	-.076	.103
No-Treatment → Employee Engagement → Job Performance	-.020	-.059	.013
Active-Treatment → Employee Engagement → Job Performance	-.002	-.025	.019

*Note.*  $N = 183$ . Unstandardized coefficients are reported. CI = Monte Carlo confidence intervals.

Table 20

*Regression Coefficients for Parallel Multiple Mediation Model: Perceptions of Presence (Referent Group: No-Treatment Condition)*

	POP_ Autonomy (T2)		POP_Task Variety (T2)		POP_Job Sig. (T2)		POP_Feedback (T2)		POP_Social Support (T2)		Engagement (T2)	
	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Intercept	.905†	.540	1.101*	.451	.453	.485	-.541	.578	1.054†	.387	-.325	.470
Controls												
Age	.005	.004	.006	.004	.004	.004	.006	.005	.002	.003	.010**	.004
Education	.082*	.037	-.031	.031	.035	.033	.042	.039	.050†	.026	-.049	.031
Engagement (T1)	-.070	.073	-.091	.061	-.036	.066	.049	.078	-.091†	.052	.708***	.062
POP_Autonomy (T1)	.657***	.060	.107*	.049	.155**	.053	.060	.064	.067	.043	-.078	.065
POP_Task Variety (T1)	-.005	.077	.462***	.064	.075	.068	.042	.081	.080	.055	.113	.073
POP_Job Sig. (T1)	.031	.075	.142*	.062	.557***	.067	-.069	.079	.004	.054	-.122	.075
POP_Feedback (T1)	-.017	.056	.096*	.047	.071	.050	.594***	.059	.105**	.040	-.061	.059
POP_Social Sup. (T1)	.039	.079	.077	.065	.042	.069	.222†	.083	.544***	.056	-.229**	.081
Predictors												
Active Control	.138	.115	-.016	.096	-.139	.103	.372**	.123	-.086	.082	.243*	.100
Active Treatment	.240*	.117	.028	.098	-.127	.105	.311*	.126	-.070	.084	.225*	.102
Mediators												
POP_Autonomy (T2)											.068	.068
POP_Task Variety (T2)											.067	.078
POP_Job Sig. (T2)											.311***	.074
POP_Feedback (T2)											.104	.063
POP_Social Sup. (T2)											.178†	.093

*Note.*  $N = 183$ . Unstandardized coefficients are reported. POP = Perceptions of Presence. Job Sig. = Job Significance. T2 = Time 2 data from the post-study survey. T1 = Time 1 data from the background survey. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the No-Treatment condition assigned as the referent group. The Active Control row shows a comparison of the Active Control condition to the No-Treatment condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the No-Treatment condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 21

*Regression Coefficients for Parallel Multiple Mediation Model: Perceptions of Presence (Referent Group: Active-Control Condition)*

	POP_ Autonomy (T2)		POP_Task Variety (T2)		POP_Job Sig. (T2)		POP_Feedback (T2)		POP_Social Support (T2)		Engagement (T2)	
	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Intercept	1.043†	.536	1.084*	.447	.314	.481	-.169	.573	.968*†	.384	-.082	.462
Controls												
Age	.005	.004	.006	.004	.004	.004	.006	.005	.002	.003	.010**	.004
Education	.082*	.037	-.031	.031	.035	.033	.042	.039	.050†	.026	-.049	.031
Engagement (T1)	-.070	.073	-.091	.061	-.036	.066	.049	.078	-.091†	.052	.708***	.062
POP_Autonomy (T1)	.657***	.060	.107*	.049	.155**	.053	.060	.064	.067	.043	-.078	.065
POP_Task Variety (T1)	-.005	.077	.462***	.064	.075	.068	.042	.081	.080	.055	.113	.073
POP_Job Sig. (T1)	.031	.075	.142*	.062	.557***	.067	-.069	.079	.004	.054	-.122	.075
POP_Feedback (T1)	-.017	.056	.096*	.047	.071	.050	.594***	.059	.105**	.040	-.061	.059
POP_Social Sup. (T1)	.039	.079	.077	.065	.042	.069	.222†	.083	.544***	.056	-.229**	.081
Predictors												
No-Treatment	-.138	.115	.016	.096	.139	.103	-.372**	.123	.086	.082	-.243*	.100
Active Treatment	.102	.099	.044	.083	.012	.089	-.061	.106	.016	.071	-.019	.083
Mediators												
POP_Autonomy (T2)											.068	.068
POP_Task Variety (T2)											.067	.078
POP_Job Sig. (T2)											.311***	.074
POP_Feedback (T2)											.104	.063
POP_Social Sup. (T2)											.178†	.093

*Note.*  $N = 183$ . Unstandardized coefficients are reported. POP = Perceptions of Presence. Job Sig. = Job Significance. T2 = Time 2 data from the post-study survey. T1 = Time 1 data from the background survey. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the Active Control condition assigned as the referent group. The No-Treatment row shows a comparison of the No-Treatment condition to the Active Control condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the Active Control condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 22

*Regression Coefficients for Parallel Multiple Mediation Model: Perceptions of Importance (Referent Group: No-Treatment Cond.)*

	POI_Autonomy (T2)		POI_Task Variety (T2)		POI_Job Sig. (T2)		POI_Feedback (T2)		POI_Social Support (T2)		Engagement (T2)	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Intercept	1.767**	.473	1.337*	.573	.741	.474	1.719**	.525	1.059*	.429	-.288	.545
Controls												
Age	.006	.004	.007	.004	-.001	.004	-.005	.004	-.003	.003	.015***	.004
Education	-.006	.032	.009	.037	.025	.031	.019	.034	-.017	.028	-.012	.034
Engagement (T1)	-.029	.058	.045	.067	.049	.055	-.027	.061	.001	.050	.715***	.060
POI_Autonomy (T1)	.467***	.066	.113	.076	.224**	.063	-.012	.069	.038	.057	.005	.079
POI_Task Variety (T1)	.122†	.064	.268**	.074	-.003	.061	.156*	.068	-.004	.055	-.039	.070
POI_Job Sig. (T1)	.041	.067	.009	.078	.374***	.064	-.135	.071	.091	.058	-.095	.078
POI_Feedback (T1)	-.053	.059	.123†	.068	.069	.056	.429***	.060	.036	.051	.076	.069
POI_Social Sup. (T1)	-.012	.063	.052	.073	.103†	.060	.213**	.067	.628***	.054	-.218*	.088
Predictors												
Active Control	.142	.098	.083	.113	-.037	.094	.037	.104	-.076	.085	.234*	.103
Active Treatment	.234*	.102	.067	.117	-.072	.097	-.167	.108	-.028	.088	.254*	.108
Mediators												
POI_Autonomy (T2)											.049	.084
POI_Task Variety (T2)											-.055	.077
POI_Job Sig. (T2)											.248**	.090
POI_Feedback (T2)											.179*	.079
POI_Social Support (T2)											.112	.098

*Note.*  $N = 183$ . Unstandardized coefficients are reported. POI = Perceptions of Importance. Job Sig. = Job Significance. T2 = Time 2 data from the post-study survey. T1 = Time 1 data from the background survey. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the No-Treatment condition assigned as the referent group. The Active Control row shows a comparison of the Active Control condition to the No-Treatment condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the No-Treatment condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 23

*Regression Coefficients for Parallel Multiple Mediation Model: Perceptions of Importance (Referent Group: Active-Control Cond.)*

	POI_Autonomy (T2)		POI_Task Variety (T2)		POI_Job Sig. (T2)		POI_Feedback (T2)		POI_Social Support (T2)		Engagement (T2)	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Intercept	1.909**	.489	1.419*	.566	.704	.468	1.756**	.519	.983*	.424	-.054	.541
Controls												
Age	.006	.004	.007	.004	-.001	.004	-.005	.004	-.003	.003	.015***	.004
Education	-.006	.032	.009	.037	.025	.031	.019	.034	-.017	.028	-.012	.034
Engagement (T1)	-.029	.058	.045	.067	.049	.055	-.027	.061	.001	.050	.715***	.060
POI_Autonomy (T1)	.467***	.066	.113	.076	.224**	.063	-.012	.069	.038	.057	.005	.079
POI_Task Variety (T1)	.122†	.064	.268**	.074	-.003	.061	.156*	.068	-.004	.055	-.039	.070
POI_Job Sig. (T1)	.041	.067	.009	.078	.374***	.064	-.135	.071	.091	.058	-.095	.078
POI_Feedback (T1)	-.053	.059	.123†	.068	.069	.056	.429***	.060	.036	.051	.076	.069
POI_Social Sup. (T1)	-.012	.063	.052	.073	.103†	.060	.213**	.067	.628***	.054	-.218*	.088
Predictors												
No-Treatment	-.142	.098	-.083	.113	.037	.094	-.037	.104	.076	.085	-.234*	.103
Active Treatment	.093	.102	-.016	.099	-.035	.082	-.203	.091	.048	.074	.020	.091
Mediators												
POI_Autonomy (T2)											.049	.084
POI_Task Variety (T2)											-.055	.077
POI_Job Sig. (T2)											.248**	.090
POI_Feedback (T2)											.179*	.079
POI_Social Support (T2)											.112	.098

*Note.*  $N = 183$ . Unstandardized coefficients are reported. POI = Perceptions of Importance. Job Sig. = Job Significance. T2 = Time 2 data from the post-study survey. T1 = Time 1 data from the background survey. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the Active Control condition assigned as the referent group. The No-Treatment row shows a comparison of the No-Treatment condition to the Active Control condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the Active Control condition.

†  $p < .1$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 24

*Summary of Indirect Effects Estimated from the Parallel Multiple Mediation Models for Perceptions of Presence*

Indirect Effect Pathway	Point Estimate	95% CI	
		Lower Bound	Upper Bound
Referent Group: No-Treatment Condition			
Active-Control → POP_Autonomy → Employee Engagement	.009	-.016	.045
Active-Treatment → POP_Autonomy → Employee Engagement	.016	-.019	.057
Active-Control → POP_Task Variety → Employee Engagement	-.001	-.025	.023
Active-Treatment → POP_Task Variety → Employee Engagement	.002	-.019	.029
Active-Control → POP_Job Significance → Employee Engagement	-.043	-.114	.030
Active-Treatment → POP_Job Significance → Employee Engagement	-.039	-.120	.034
Active-Control → POP_Feedback → Employee Engagement	.039	-.018	.109
Active-Treatment → POP_Feedback → Employee Engagement	.032	-.016	.099
Active-Control → POP_Social Support → Employee Engagement	-.015	-.066	.018
Active-Treatment → POP_Social Support → Employee Engagement	-.012	-.062	.027
Referent Group: Active-Control Condition			
No-Treatment → POP_Autonomy → Employee Engagement	-.009	-.047	.015
Active-Treatment → POP_Autonomy → Employee Engagement	.007	-.013	.037
No-Treatment → POP_Task Variety → Employee Engagement	.001	-.025	.023
Active-Treatment → POP_Task Variety → Employee Engagement	.003	-.017	.028
No-Treatment → POP_Job Significance → Employee Engagement	.043	-.028	.112
Active-Treatment → POP_Job Significance → Employee Engagement	.004	-.063	.061
No-Treatment → POP_Feedback → Employee Engagement	-.039	-.109	.017
Active-Treatment → POP_Feedback → Employee Engagement	-.006	-.037	.018
No-Treatment → POP_Social Support → Employee Engagement	.015	-.019	.066
Active-Treatment → POP_Social Support → Employee Engagement	.003	-.027	.040

*Note.*  $N = 183$ . Unstandardized coefficients are reported. CI = Monte Carlo confidence Intervals. POP = Perceptions of Presence.

Table 25

*Summary of Indirect Effects Estimated from the Parallel Multiple Mediation Models for Perceptions of Importance*

Indirect Effect Pathway	Point Estimate	95% CI	
		Lower Bound	Upper Bound
Referent Group: No-Treatment Condition			
Active-Control → POI_Autonomy → Employee Engagement	.007	-.017	.043
Active-Treatment → POI_Autonomy → Employee Engagement	.012	-.029	.056
Active-Control → POI_Task Variety → Employee Engagement	-.005	-.041	.021
Active-Treatment → POI_Task Variety → Employee Engagement	-.004	-.050	.018
Active-Control → POI_Job Significance → Employee Engagement	-.009	-.063	.041
Active-Treatment → POI_Job Significance → Employee Engagement	-.018	-.082	.032
Active-Control → POI_Feedback → Employee Engagement	.007	-.039	.048
Active-Treatment → POI_Feedback → Employee Engagement	-.029	-.074	.008
Active-Control → POI_Social Support → Employee Engagement	-.009	-.049	.018
Active-Treatment → POI_Social Support → Employee Engagement	-.003	-.035	.024
Referent Group: Active-Control Condition			
No-Treatment → POI_Autonomy → Employee Engagement	-.007	-.043	.017
Active-Treatment → POI_Autonomy → Employee Engagement	.005	-.017	.028
No-Treatment → POI_Task Variety → Employee Engagement	.005	-.021	.041
Active-Treatment → POI_Task Variety → Employee Engagement	.001	-.029	.018
No-Treatment → POI_Job Significance → Employee Engagement	.009	-.043	.062
Active-Treatment → POI_Job Significance → Employee Engagement	-.009	-.060	.031
No-Treatment → POI_Feedback → Employee Engagement	-.007	-.049	.039
Active-Treatment → POI_Feedback → Employee Engagement	-.036	-.078	.002
Active-Control → POI_Social Support → Employee Engagement	.009	-.017	.037
Active-Treatment → POI_Social Support → Employee Engagement	.005	-.017	.047

*Note.*  $N = 183$ . Unstandardized coefficients are reported. CI = Monte Carlo confidence Intervals. POI = Perceptions of Importance.



Table 26  
*Regression Coefficients and Standard Errors for the Moderation Model*

	Engagement (T2)		95% CI	
	<i>B</i>	SE	Lower Bound	Upper Bound
Intercept	.698	.478	-.246	1.642
Controls				
Age	.012**	.004	.004	.020
Education	-.019	.034	-.087	.049
Engagement (T1)	.737***	.059	.619	.855
Predictors				
Active Control	.202	.348	-.485	.888
Active Treatment	.426	.357	-.278	1.129
Workload	.041	.077	-.110	.193
Moderators				
Active Control x Workload	.004	.099	-.190	.199
Active Treatment x Workload	-.069	.103	-.272	.134

*Note.*  $N = 183$ . Unstandardized coefficients are reported. CI = Monte Carlo confidence intervals. Control variables were group-mean centered. The independent variable in this analysis (treatment condition) is a multicategorical variable, with the No-Treatment condition assigned as the referent group. The Active Control row shows a comparison of the Active Control condition to the No-Treatment condition. The Active Treatment row illustrates a comparison of the Active Treatment condition to the No-Treatment condition.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 27

*Final Univariate Models by Variable for Latent Growth Modeling*

Variable	Trajectory	Autoregressive Terms	Constrained Residuals
Engagement	Quadratic	No	Yes
POP_Autonomy	Linear	No	No
POP_Task Variety	Quadratic	Yes	No
POP_Job Significance	Quadratic	No	Yes
POP_Feedback	Quadratic	No	No
POP_Social Support	Quadratic	Yes	No
POI_Autonomy	Linear	No	Yes
POI_Task Variety	Linear	No	Yes
POI_Job Significance	Linear	No	Yes
POI_Feedback	Quadratic	Yes	No
POI_Social Support	Quadratic	Yes	No
Performance	Quadratic	No	Yes
Physical Complaints	Quadratic	No	No
Mental Complaints	Linear	Yes	No
Depletion	Quadratic	No	Yes

*Note.* This table shows the best-fitting univariate model for each variable, to be used in subsequent multivariate latent growth models as part of within-person hypothesis testing. For each variable, the table lists which slope trajectory fit the data best, as well as whether the best-fitting model included autoregressive terms and constrained residuals.

Table 28

*Fit Statistics for Linear Growth Models of Weekly Outcomes by Condition*

Condition	<i>N</i>	<i>df</i>	$\chi^2$	RMSEA	CFI	SRMR
Engagement						
Active Control	76	17	34.088	.115	.861	.287
Treatment	66	17	31.192	.112	.924	.164
POP_Autonomy						
Active Control	76	16	18.725	.047	.989	.100
Treatment	66	16	27.227	.103	.931	.283
POP_Task Variety						
Active Control	76	7	23.865	.178	.868	.163
Treatment	66	7	11.489	.099	.953	.166
POP_Job Significance						
Active Control	76	17	43.780	.144	.918	.137
Treatment	66	17	23.078	.074	.963	.132
POP_Feedback						
Active Control	76	12	23.803	.114	.934	.177
Treatment	66	12	6.406	.000	1.000	.050
POP_Social Support						
Active Control	76	7	21.919	.167	.924	.162
Treatment	66	7	6.278	.000	1.000	.220
POI_Autonomy						
Active Control	76	21	26.671	.060	.954	.147
Treatment	66	21	55.783	.158	.625	.436
POI_Task Variety						
Active Control	76	21	56.513	.149	.571	.474
Treatment	66	21	39.933	.117	.836	.262
POI_Job Significance						
Active Control	76	21	32.849	.086	.944	.218
Treatment	66	21	14.042	.000	1.000	.190
POI_Feedback						
Active Control	76	7	9.241	.065	.990	.064
Treatment	66	7	11.053	.094	.960	.087
POI_Social Support						
Active Control	76	7	2.591	.000	1.000	.027
Treatment	66	7	3.461	.000	1.000	.084
Performance						
Active Control	76	17	25.027	.079	.813	.300
Treatment	66	17	24.180	.080	.921	.257
Physical Complaints						
Active Control	76	12	12.270	.017	.998	.055
Treatment	66	12	13.699	.046	.991	.065

Table 28 (continued)

Condition	<i>N</i>	<i>df</i>	$\chi^2$	RMSEA	CFI	SRMR
Mental Complaints						
Active Control	76	11	10.760	.000	1.000	.054
Treatment	66	11	8.240	.000	1.000	.057
Depletion						
Active Control	76	17	8.215	.000	1.000	.053
Treatment	66	17	37.591	.135	.914	.071

*Note.* Used six total waves of repeated measures, nested within-person. Includes data from the Background Survey to establish baselines, as well as five waves of weekly survey data collected during the intervention period.

POP = Perceptions of presence. POI = Perceptions of importance.

Table 29

*Parameter Estimates for Linear Growth Models of Weekly Outcomes by Condition*

Condition	Initial Status Mean	Initial Status Variance	Growth Rate Mean	Growth Rate Variance	Quadratic Growth Mean	Quadratic Growth Variance	Covariance (Initial Status and Growth Rate)
Engagement							
Active Control	5.192***	.222**	-.220***	-.014	.035**	.001	.088*
Treatment	5.285***	.316**	-.264***	.034	.047***	.000	.000
POP_Autonomy							
Active Control	4.169***	.501***	-.008	.018*	—	—	-.039
Treatment	4.022***	.368**	.047**	.004	—	—	-.012
POP_Task Variety							
Active Control	4.507***	.039	.040	-.063	-.013	.000	.083
Treatment	4.427***	.320	.095**	-.064	-.015*	-.007**	-.072
POP_Job Significance							
Active Control	4.327***	.257***	-.128**	.036	.020**	.001	.017
Treatment	4.152***	.232**	-.003	-.003	.003	.000	.020
POP_Feedback							
Active Control	3.453***	.399**	.214***	-.024	-.034***	-.001	-.007
Treatment	3.355***	.427**	.199***	-.013	-.026*	.001	.005
POP_Social Support							
Active Control	4.168***	.272**	-.035	.024	.005	.000	-.019
Treatment	4.131***	.446*	-.105**	.096	.019*	.000	-.165
POI_Autonomy							
Active Control	4.423***	.275***	-.017	.008	—	—	-.021
Treatment	4.307***	.210***	.038*	.006*	—	—	-.019*
POI_Task Variety							
Active Control	4.351***	.138***	-.002	.007	—	—	-.007
Treatment	4.286***	.274***	.025	.025*	—	—	-.018

Table 29 (continued)

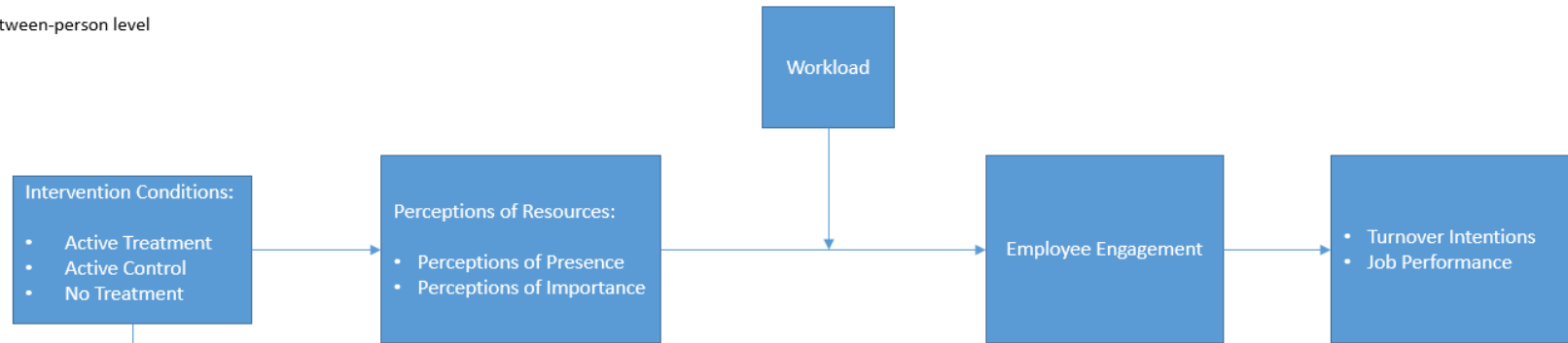
Condition	Initial Status Mean	Initial Status Variance	Growth Rate Mean	Growth Rate Variance	Quadratic Growth Mean	Quadratic Growth Variance	Covariance (Initial Status and Growth Rate)
POI_Job Significance							
Active Control	4.383***	.290***	-.032*	.005*	—	—	-.014
Treatment	4.183***	.183***	.018	.004	—	—	-.010
POI_Feedback							
Active Control	3.981***	.333	.109*	.041	-.021**	.000	-.004
Treatment	4.050***	.691*	.053	.126	-.007	.001	-.281
POI_Social Support							
Active Control	4.129***	.110	-.062	-.059	.010	.000	.123
Treatment	4.146***	.536*	-.014	.076	.002	.001	-.140
Performance							
Active Control	4.312***	.026	-.280***	.070	.042***	.002	.004
Treatment	4.319***	-.004	-.248***	.059	.038**	.001	.040
Physical Complaints							
Active Control	2.351***	.446***	-.025	.101	-.006	.004	-.008
Treatment	2.249***	.422***	-.150**	.056	.021*	.002*	-.065
Mental Complaints							
Active Control	2.181***	.537***	-.057**	.013	—	—	-.031
Treatment	2.002***	.278**	-.019	.001	—	—	.039
Depletion							
Active Control	2.002***	.393***	.161*	.121	-.032*	.004	.024
Treatment	1.970***	.418*	.022	-.004	.001	.000	.055

*Note.* Used six total waves of repeated measures, nested within-person. Includes data from the Background Survey to establish baselines, as well as five waves of weekly survey data collected during the intervention period. POP = Perceptions of Presence; POI = Perceptions of Importance.

\* < .05, \*\* < .01, \*\*\* < .001

Figure 1  
*Theoretical Model*

Between-person level



Within-person level

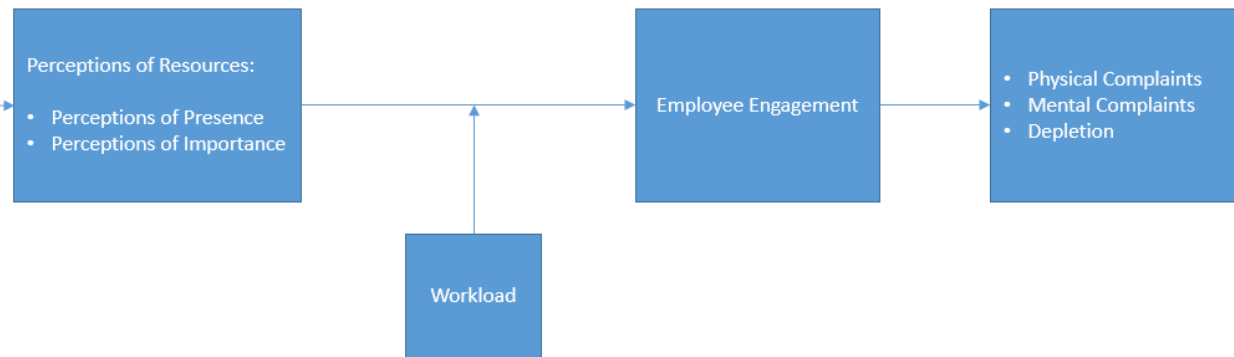


Figure 2

*Example Timeline for Participants Assigned to the Active-Treatment Condition*

		<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>Subject 1</b>	Week 1	Autonomy	Autonomy	Autonomy	Autonomy	Weekly Survey
	Week 2	Task Variety	Task Variety	Task Variety	Task Variety	Weekly Survey
	Week 3	Job Sig.	Job Sig.	Job Sig.	Job Sig.	Weekly Survey
	Week 4	Feedback	Feedback	Feedback	Feedback	Weekly Survey
	Week 5	Social Support	Social Support	Social Support	Social Support	Weekly Survey
<b>Subject 2</b>	Week 1	Feedback	Feedback	Feedback	Feedback	Weekly Survey
	Week 2	Job Sig.	Job Sig.	Job Sig.	Job Sig.	Weekly Survey
	Week 3	Autonomy	Autonomy	Autonomy	Autonomy	Weekly Survey
	Week 4	Social Support	Social Support	Social Support	Social Support	Weekly Survey
	Week 5	Task Variety	Task Variety	Task Variety	Task Variety	Weekly Survey

Figure 3

*Timeline for Participants Assigned to the Active-Control Condition*

		<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>Subject 1</b>	Week 1	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 2	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 3	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 4	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 5	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
<b>Subject 2</b>	Week 1	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 2	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 3	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 4	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey
	Week 5	Good Thing	Good Thing	Good Thing	Good Thing	Weekly Survey

Figure 4

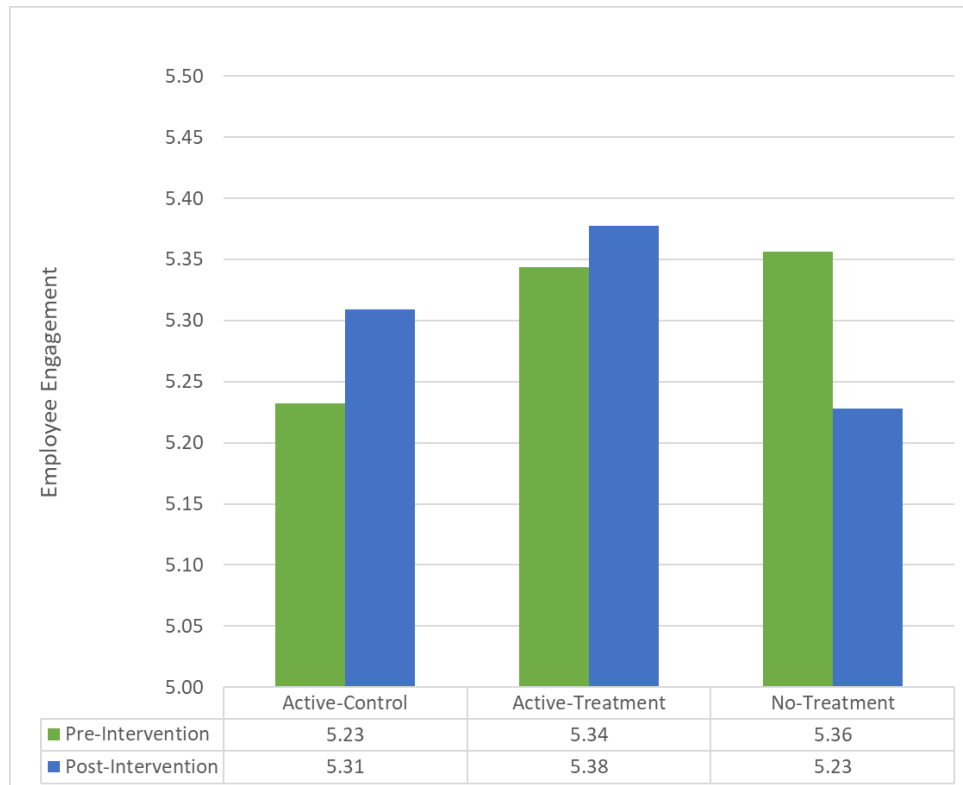
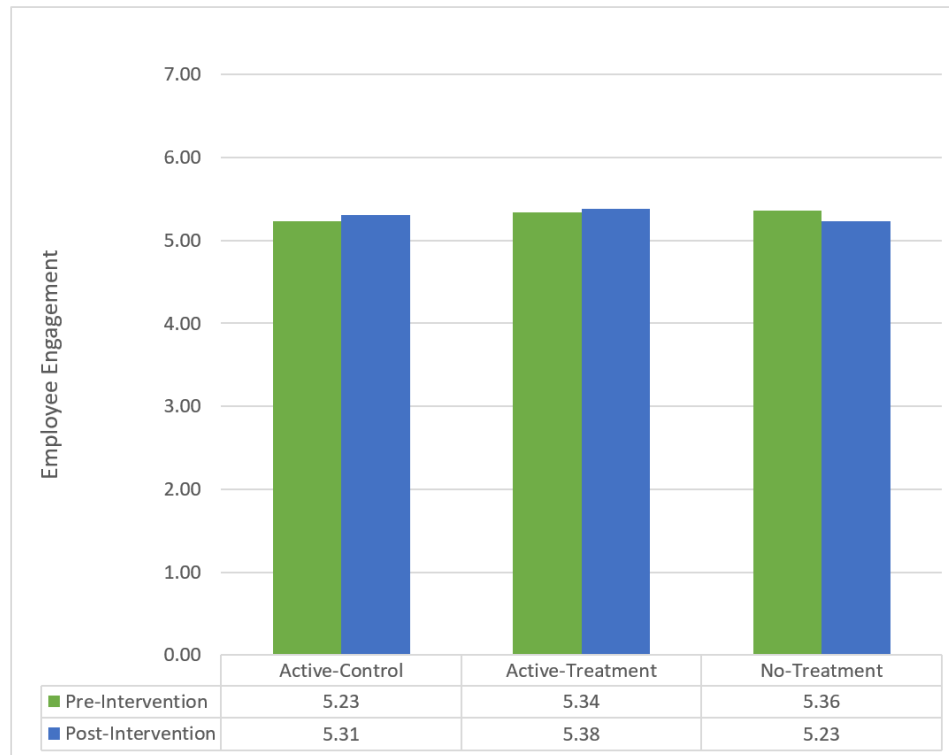
*Timeline for Participants Assigned to the No-Treatment Condition*

		<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>Subject 1</b>	Week 1					Weekly Survey
	Week 2					Weekly Survey
	Week 3					Weekly Survey
	Week 4					Weekly Survey
	Week 5					Weekly Survey
<b>Subject 2</b>	Week 1					Weekly Survey
	Week 2					Weekly Survey
	Week 3					Weekly Survey
	Week 4					Weekly Survey
	Week 5					Weekly Survey



Figure 5

*A Comparison of Pre- and Post-Study Means of Employee Engagement by Condition*



*Note.*  $N = 185$ .

Top graph shows full response scale (1-7). Bottom graph is a close-up of differences.

Figure 6

*A Comparison of Pre- and Post-Study Means of Study Variables, Excluding Engagement*

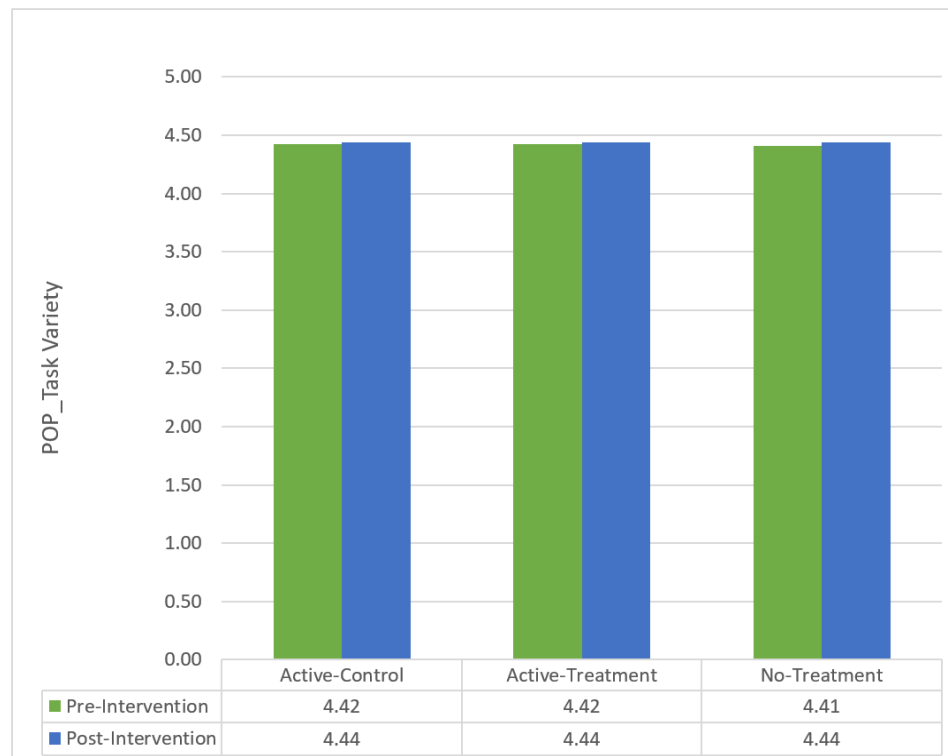
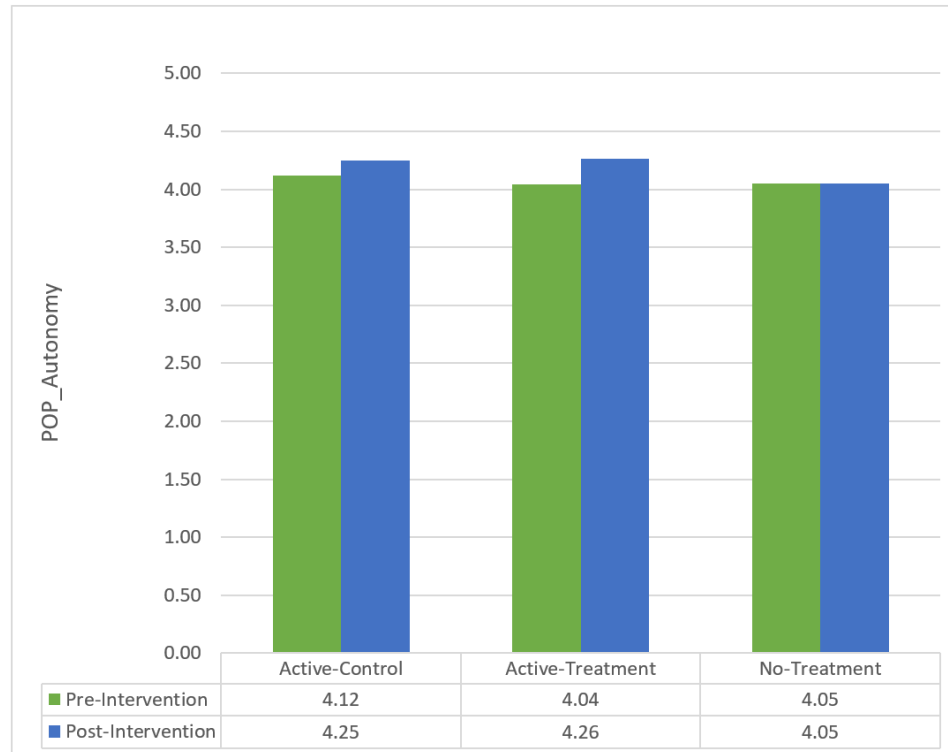


Figure 6 (Continued)

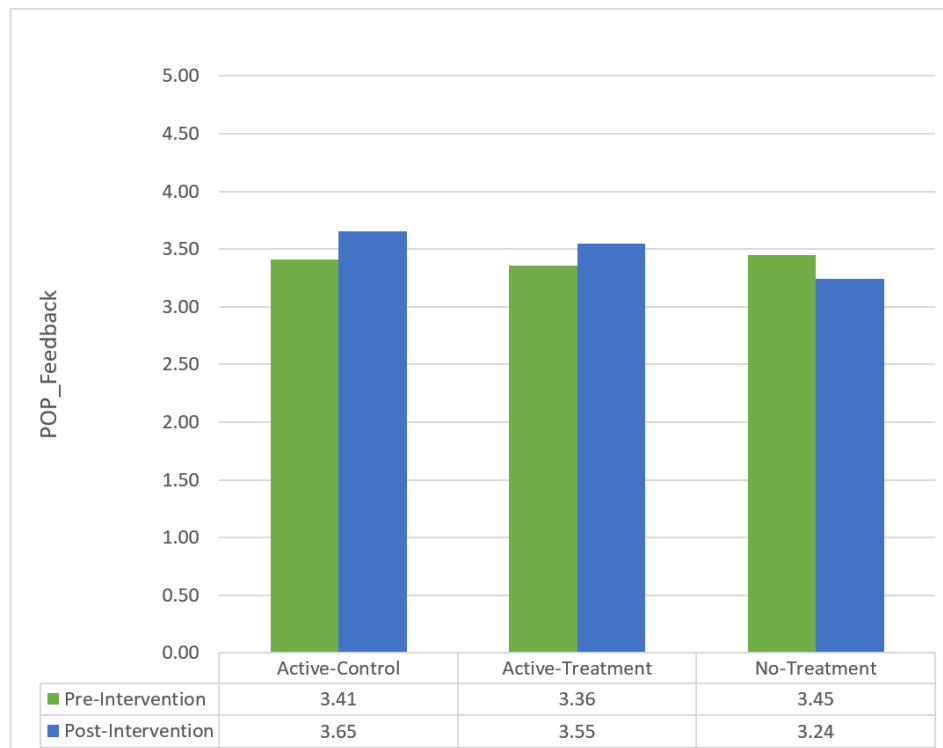
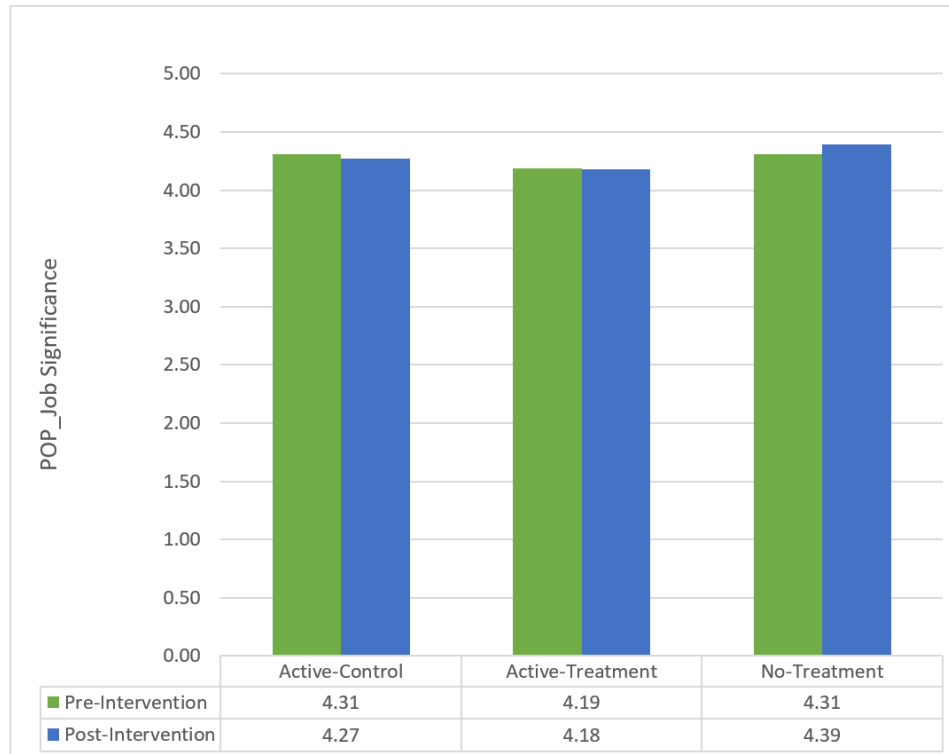


Figure 6 (Continued)

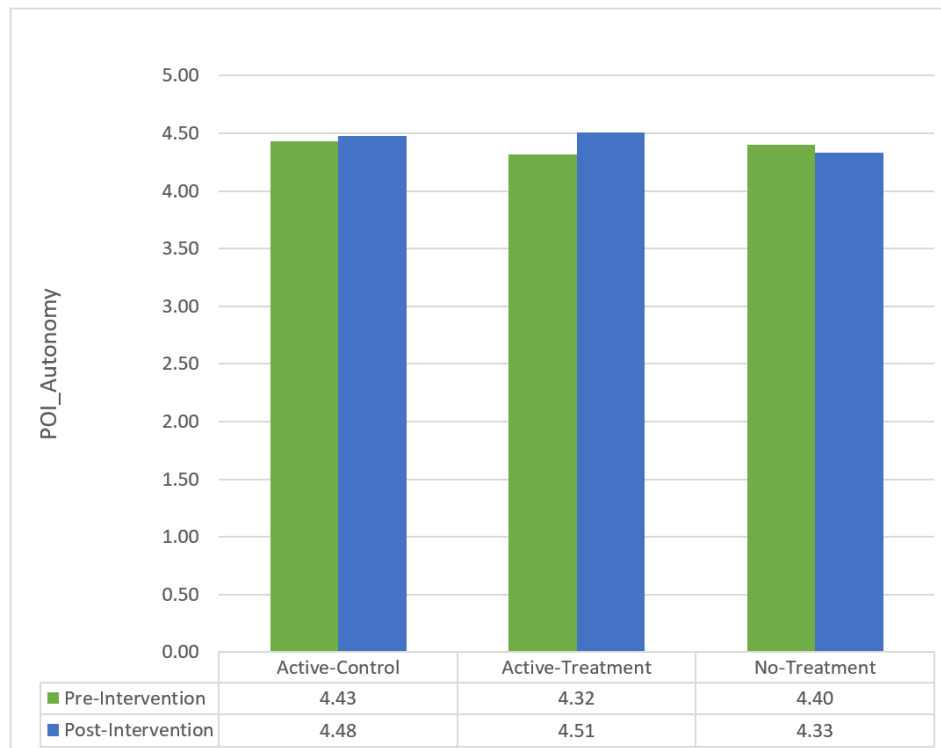
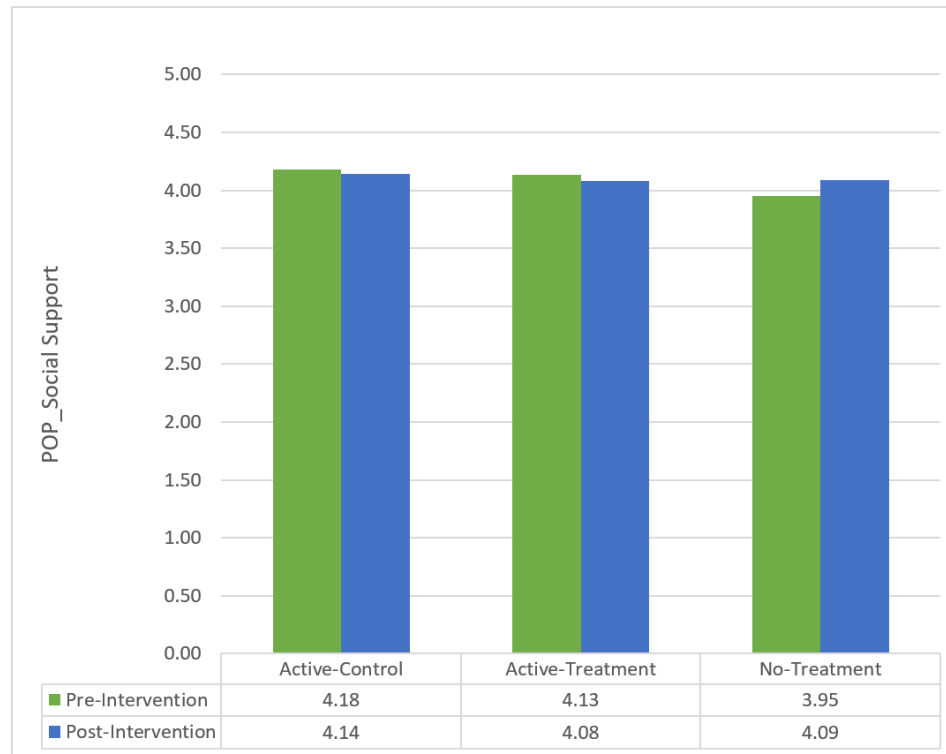


Figure 6 (Continued)

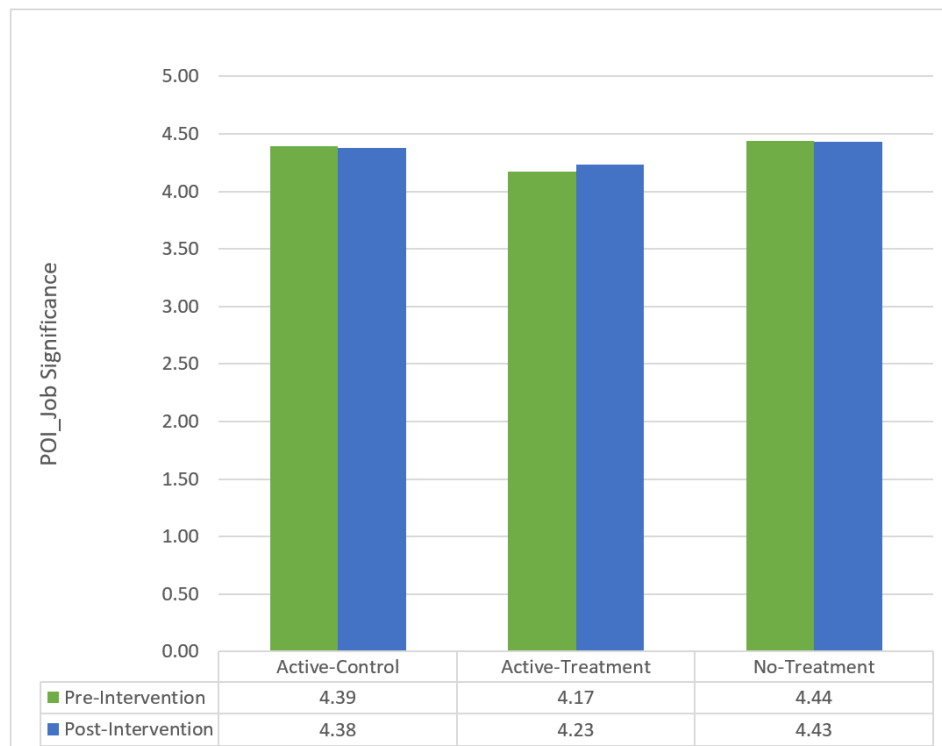
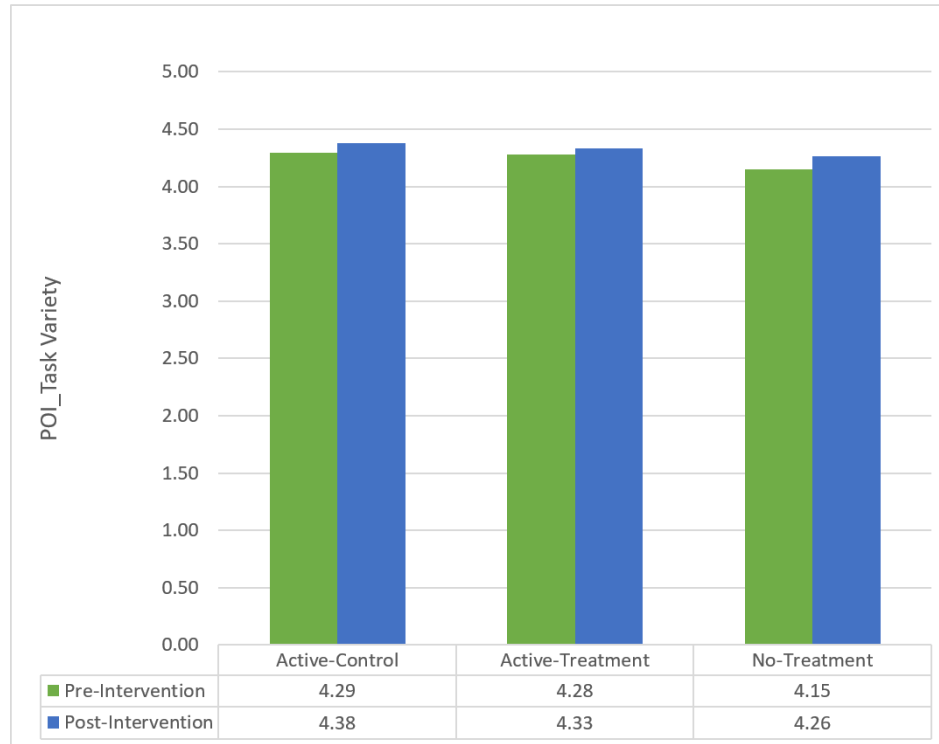


Figure 6 (Continued)

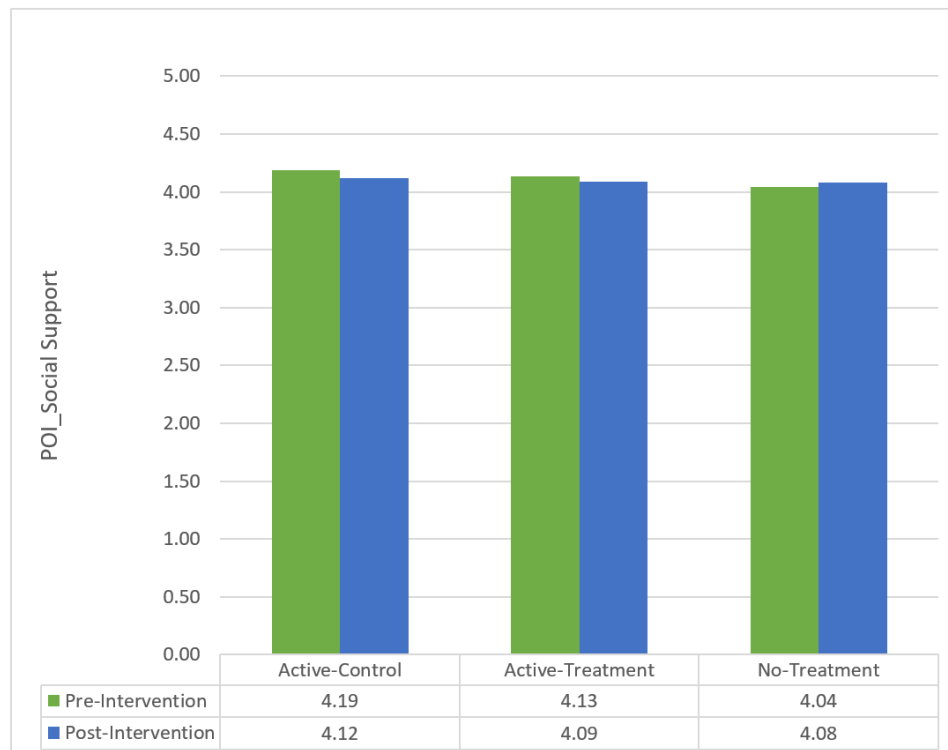
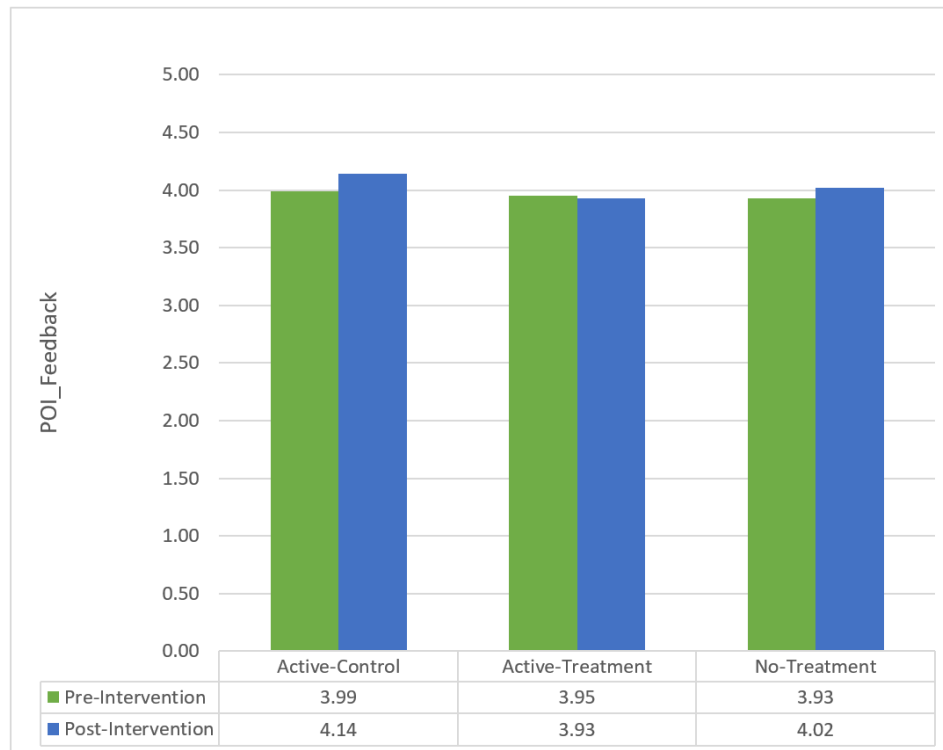


Figure 6 (Continued)

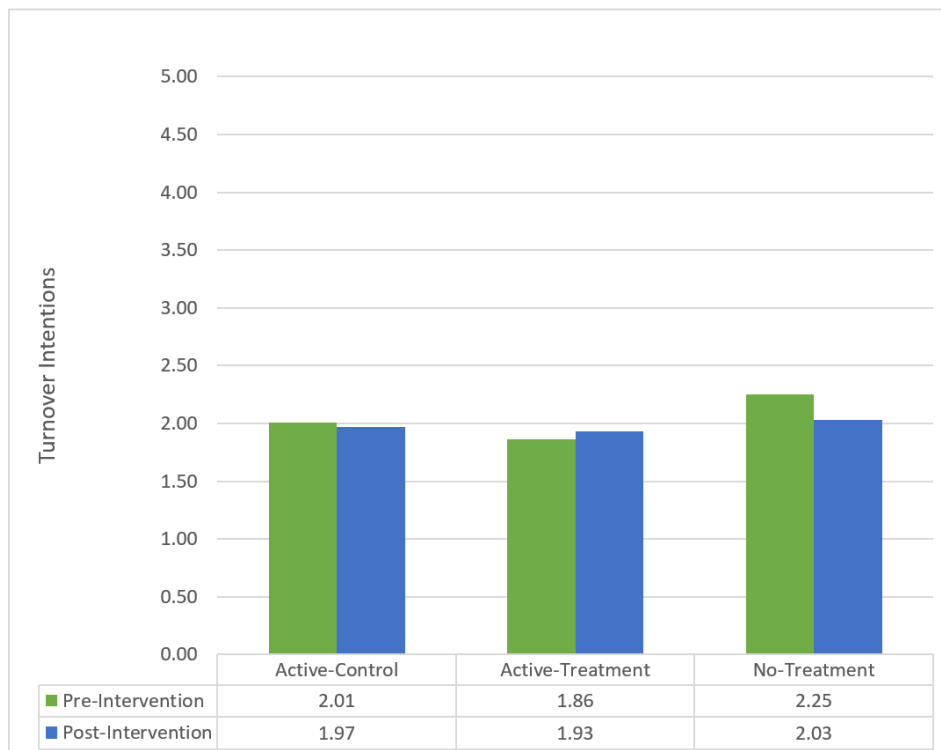
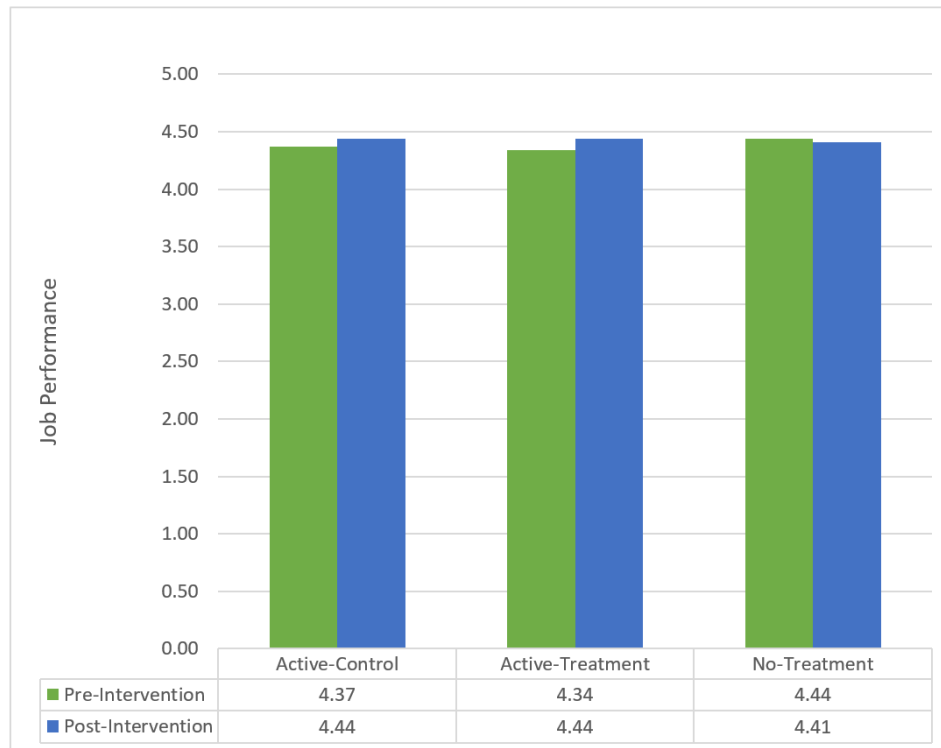


Figure 6 (Continued)

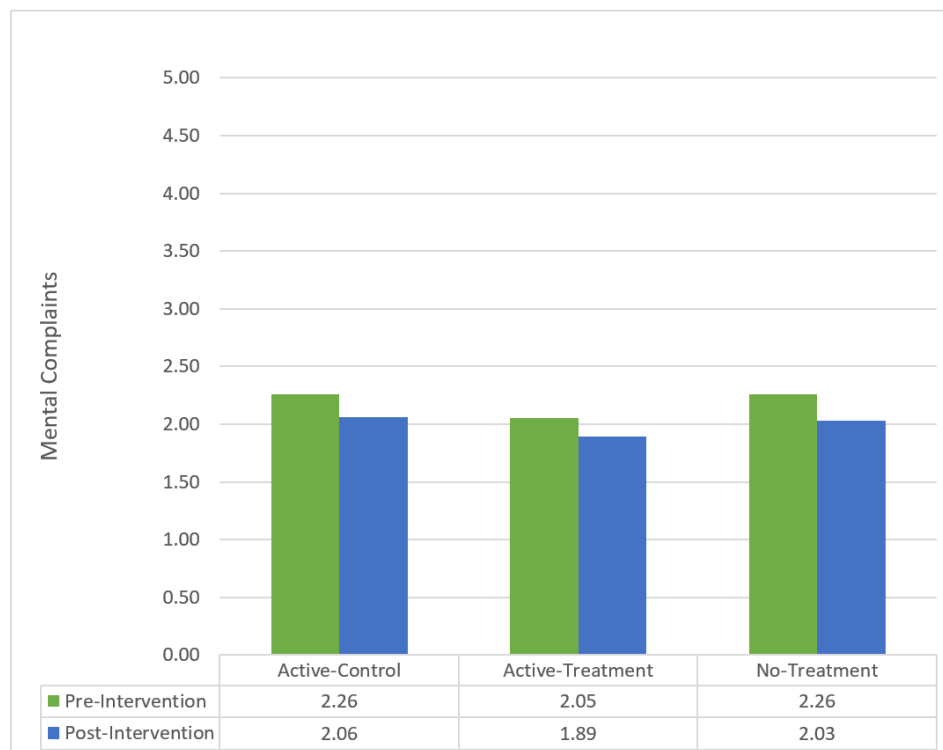
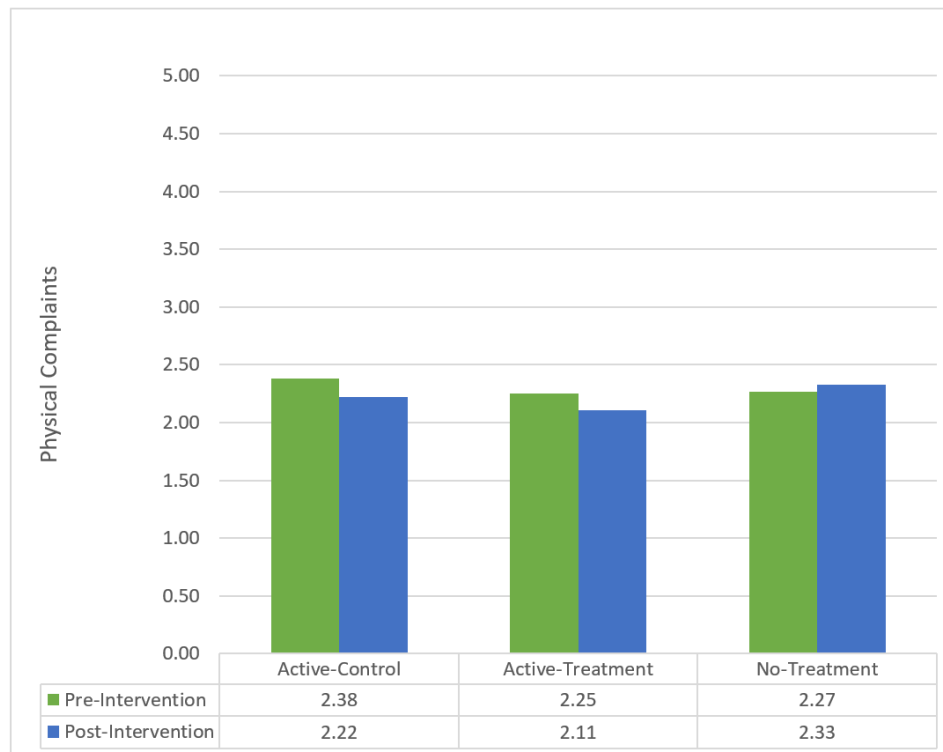




Figure 6 (Continued)

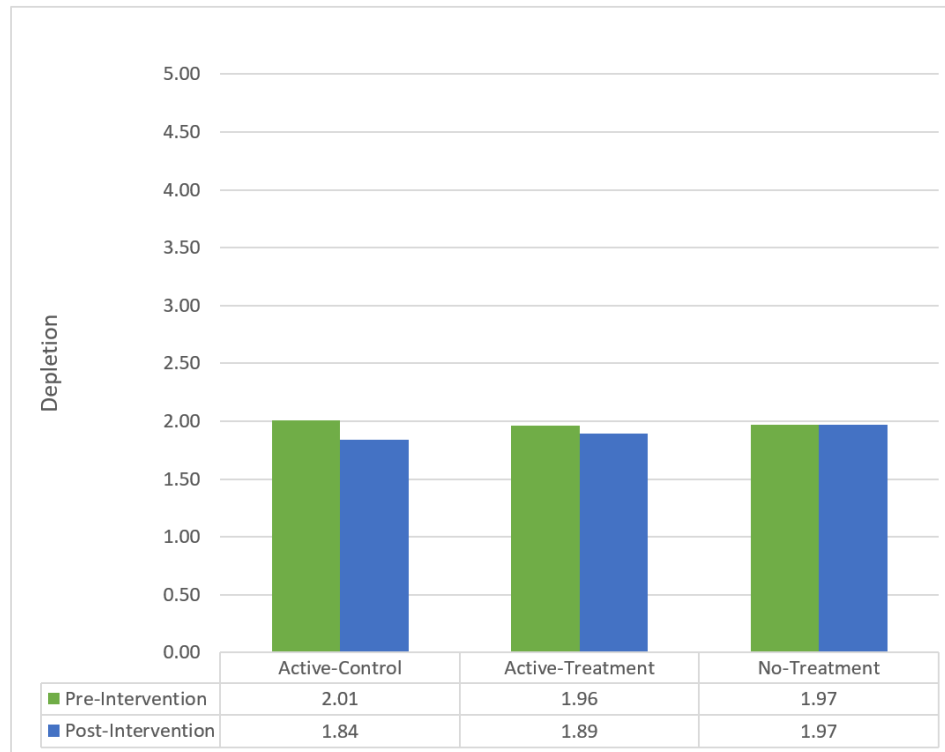


Figure 7  
*Comparison of Within-Person Slopes/Trajectories of Univariate Variables by Condition*

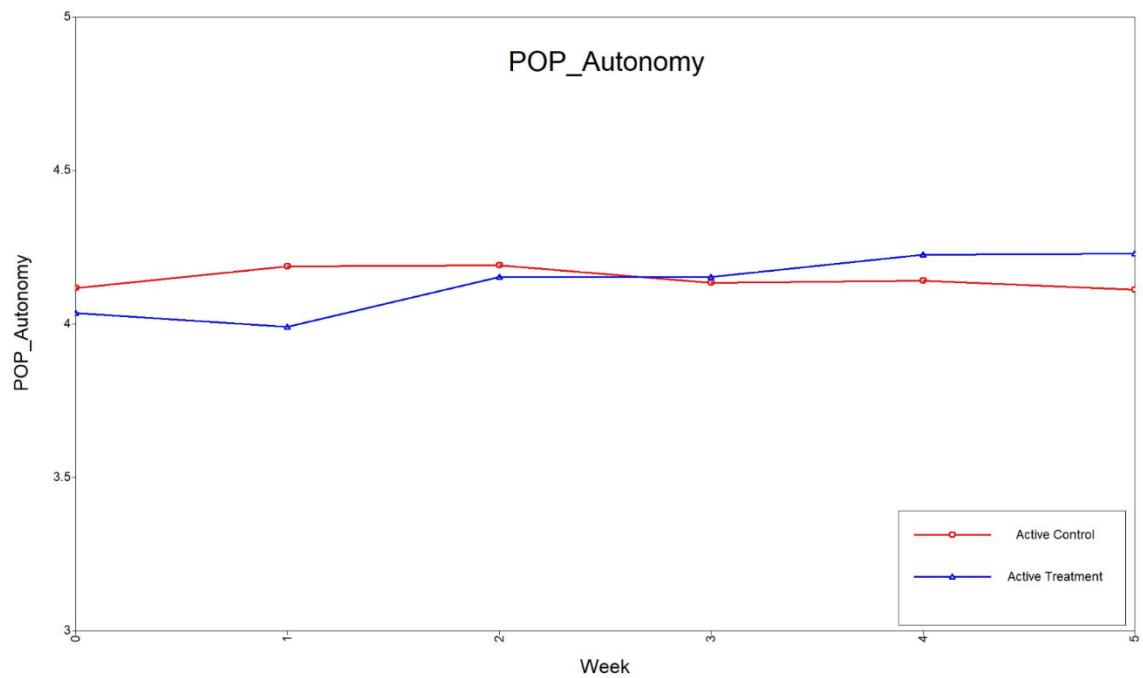
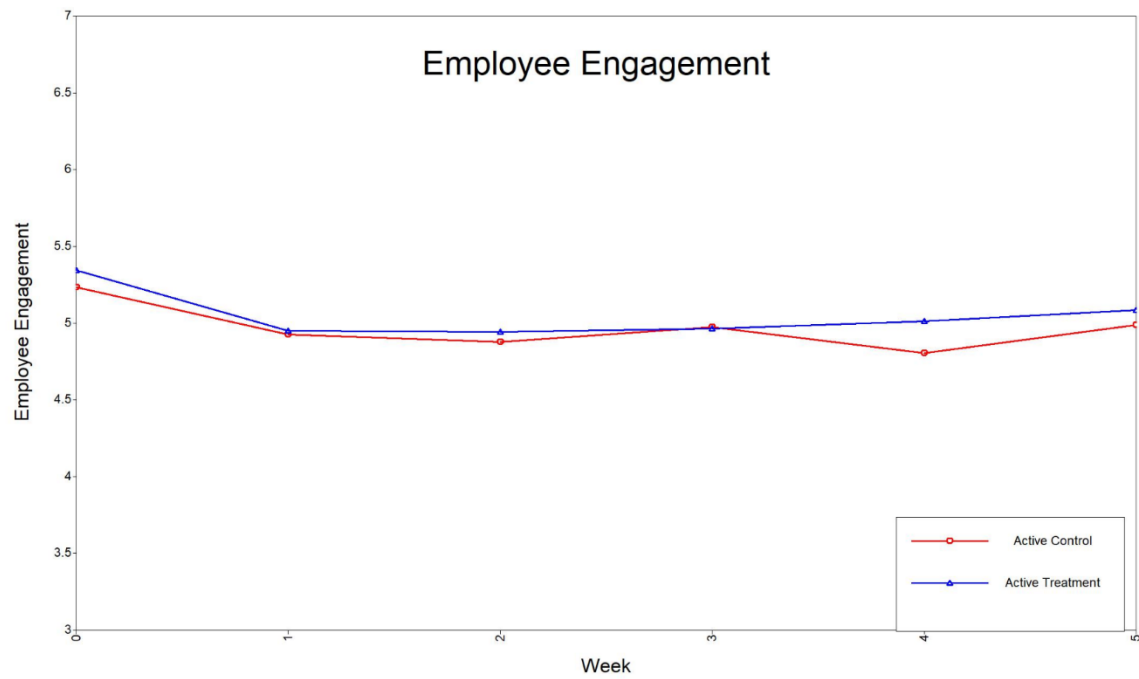


Figure 7 (Continued)

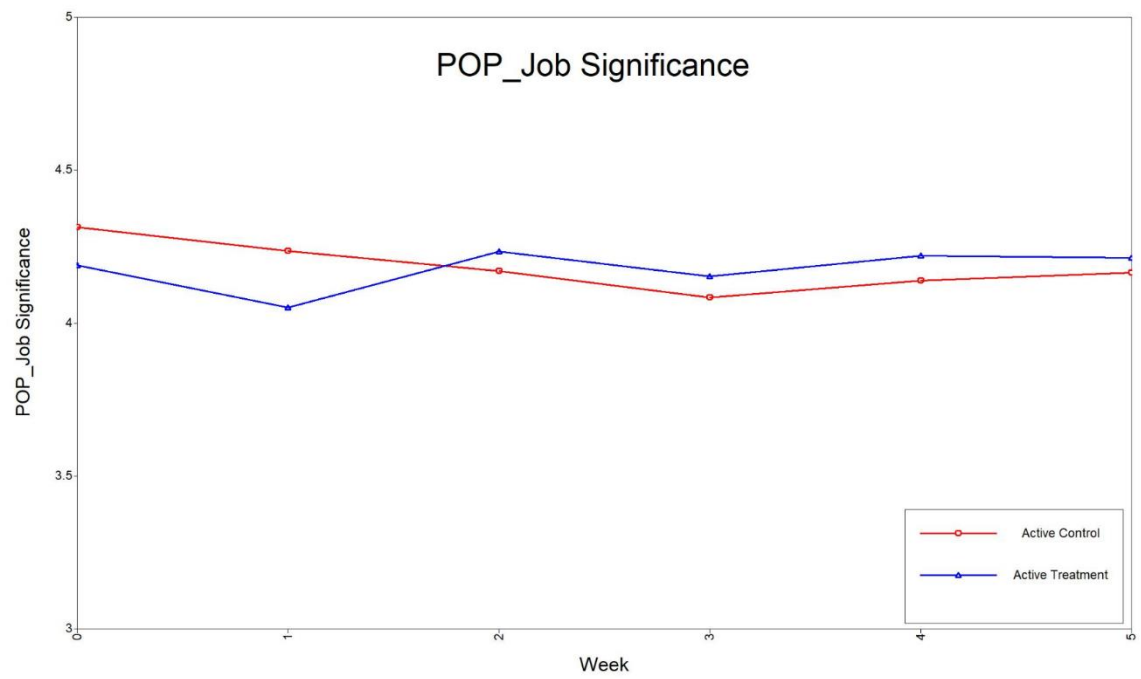
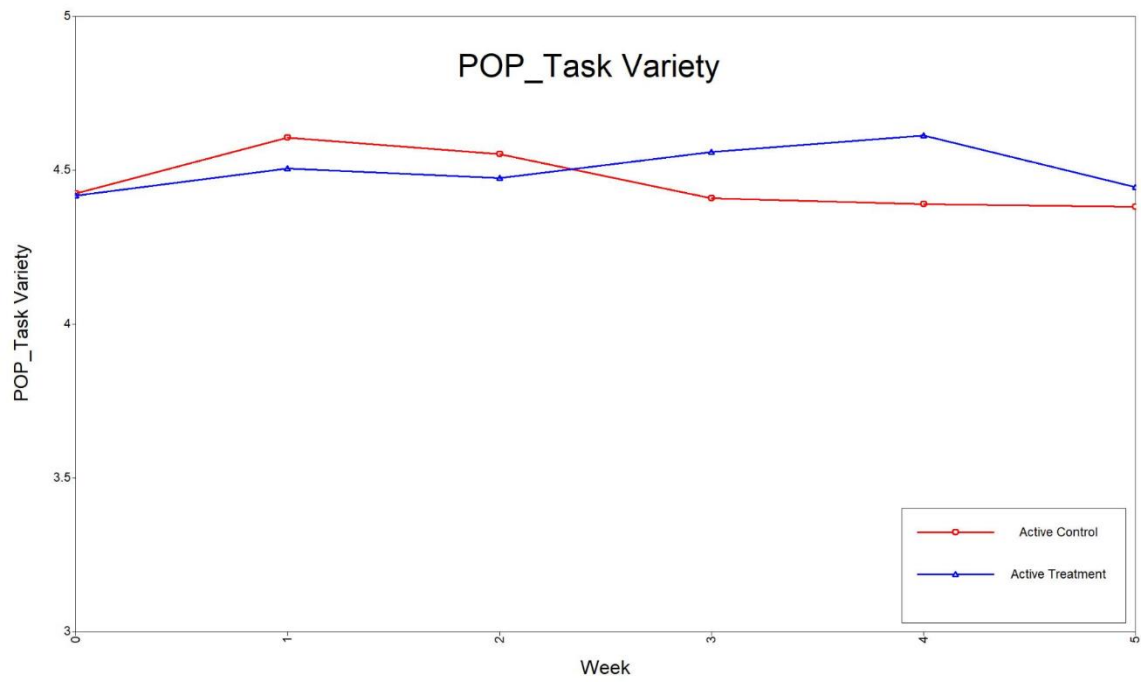


Figure 7 (Continued)

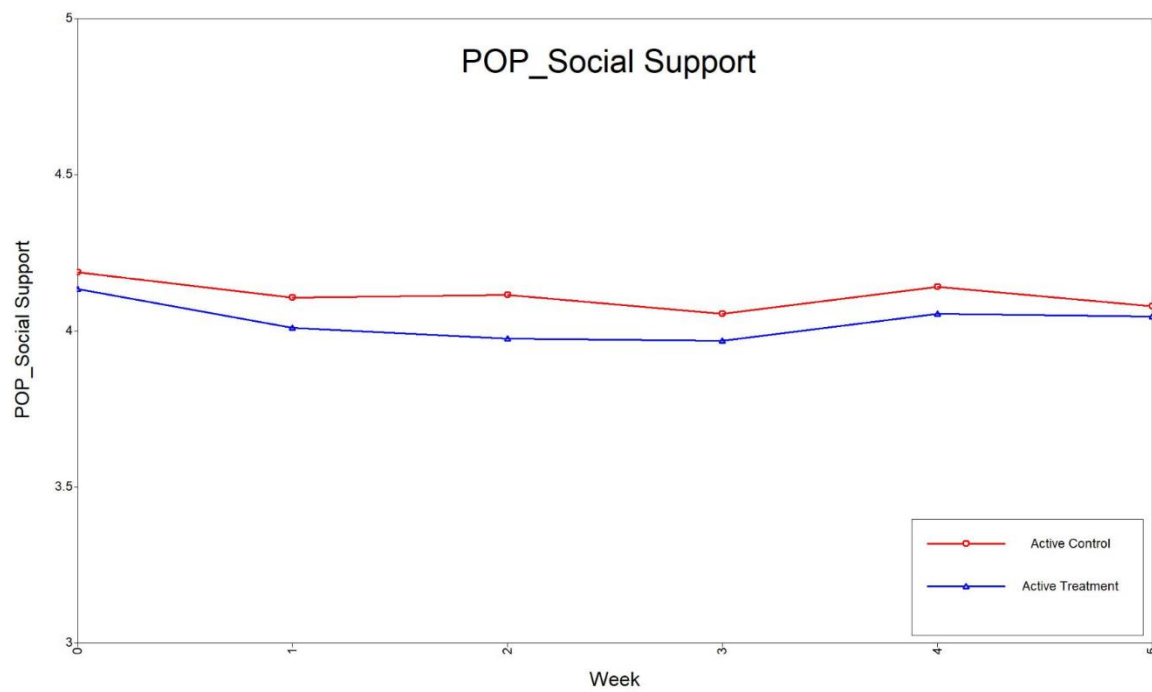
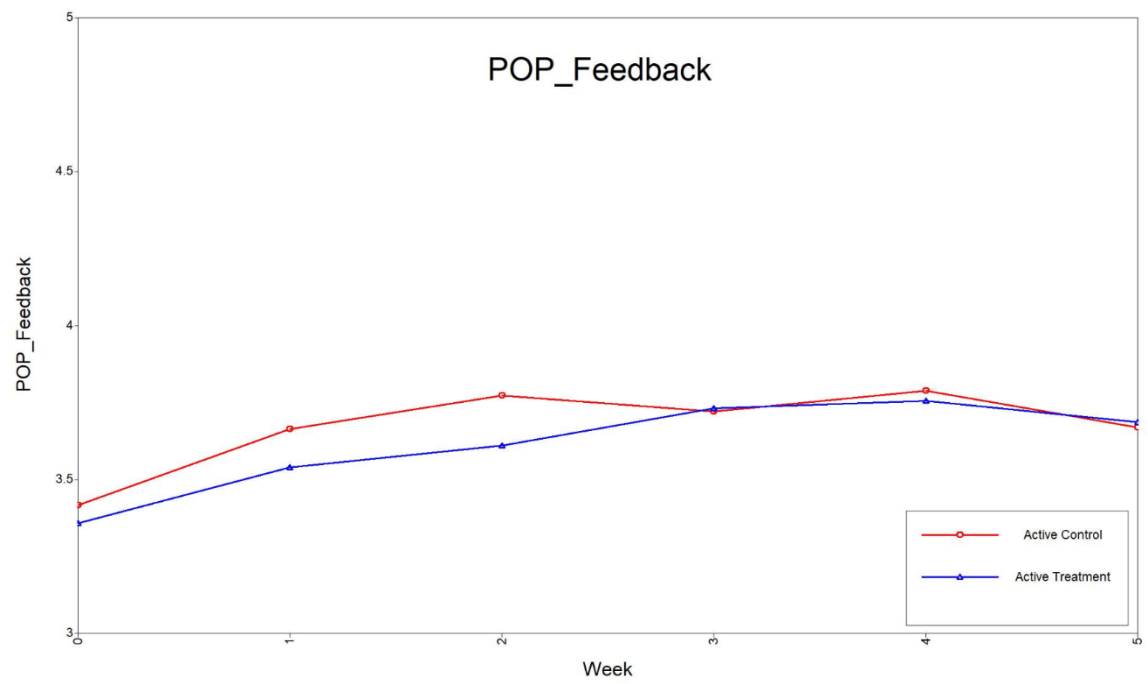


Figure 7 (Continued)

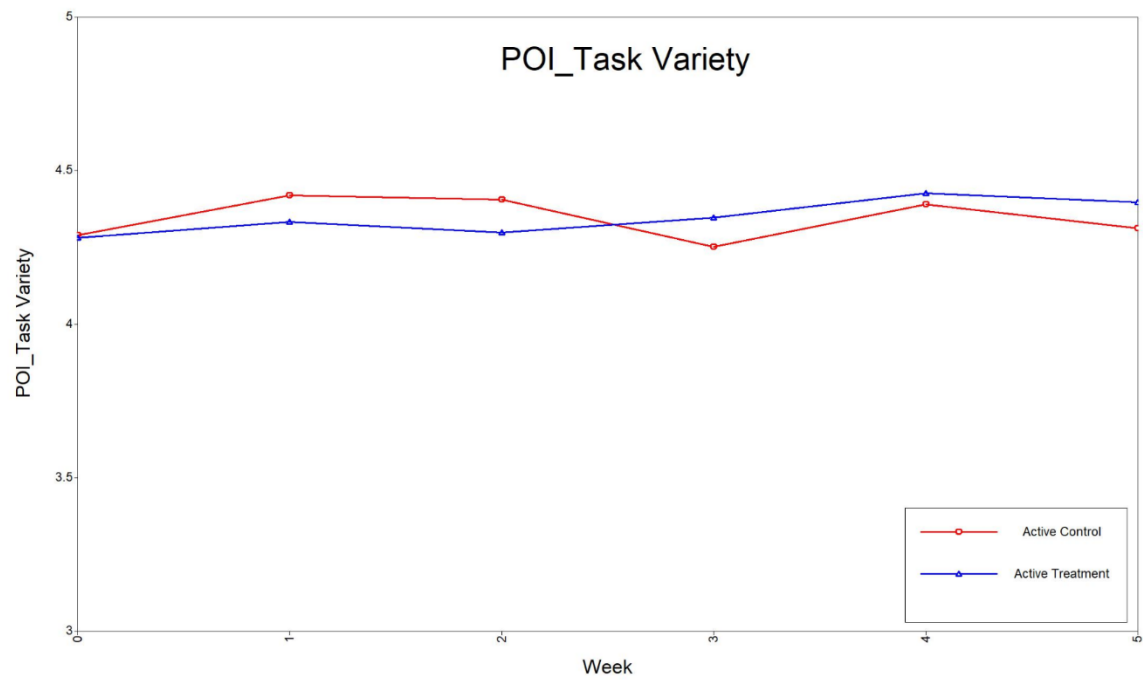
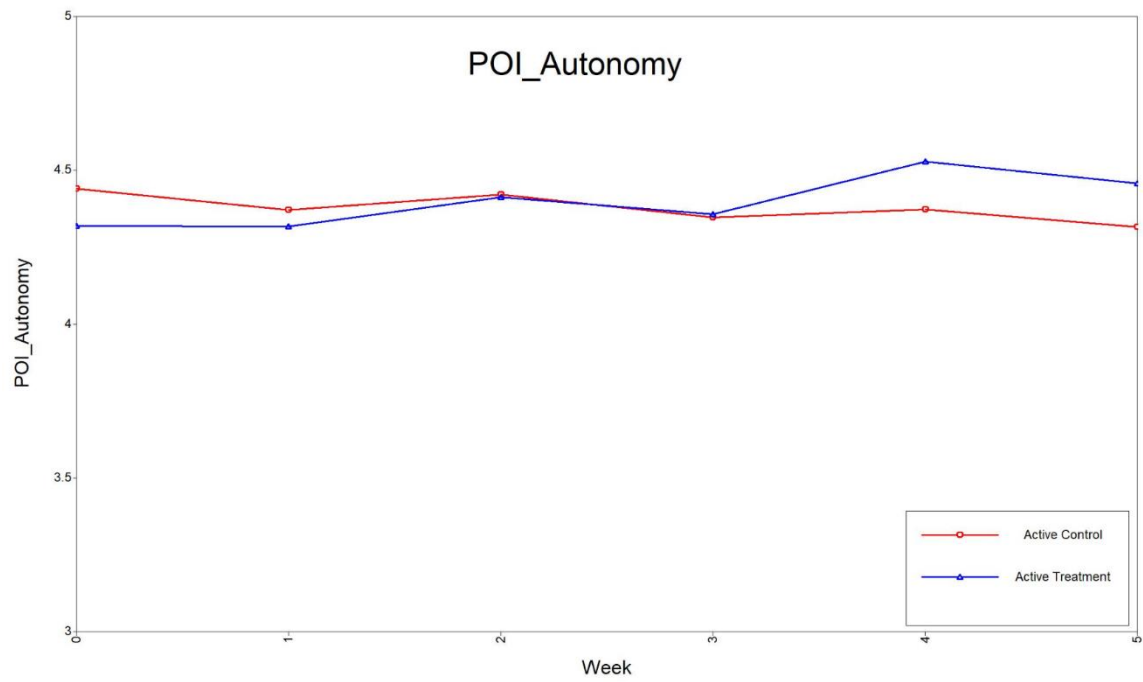


Figure 7 (Continued)

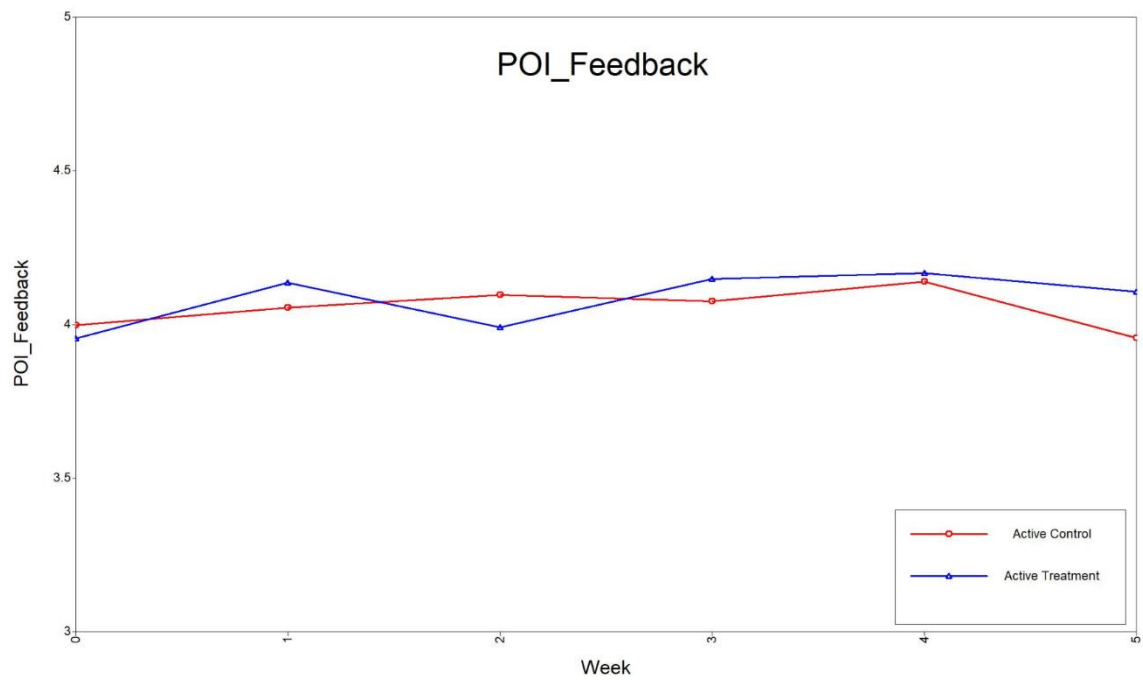
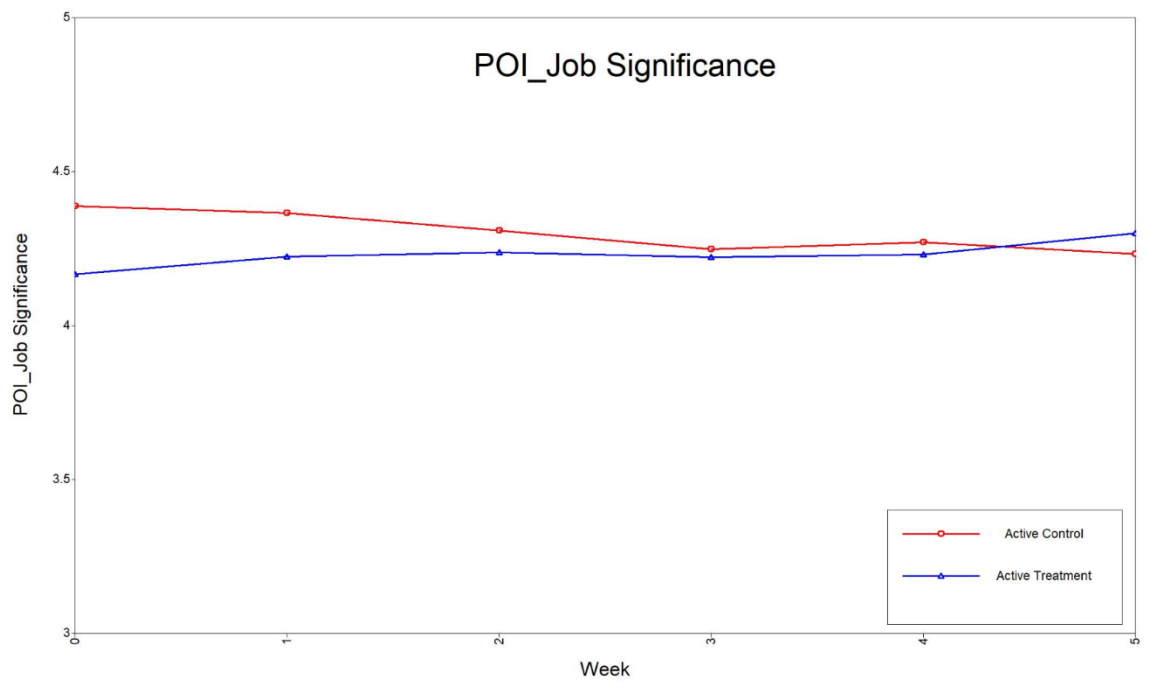


Figure 7 (Continued)

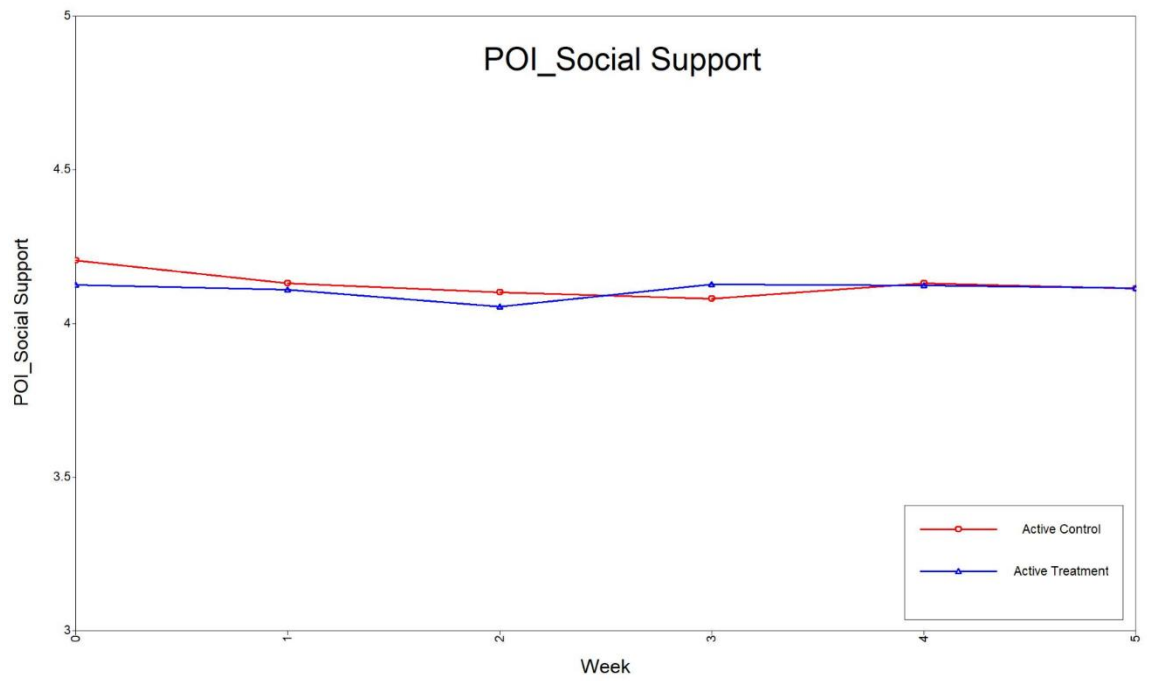


Figure 7 (Continued)

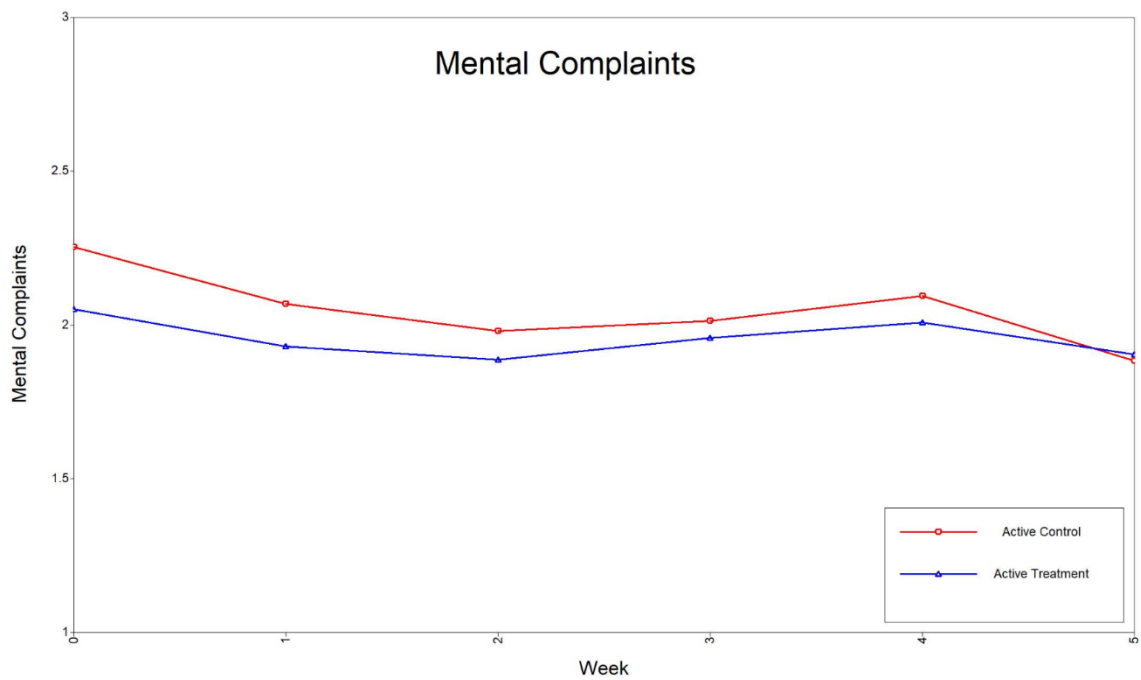
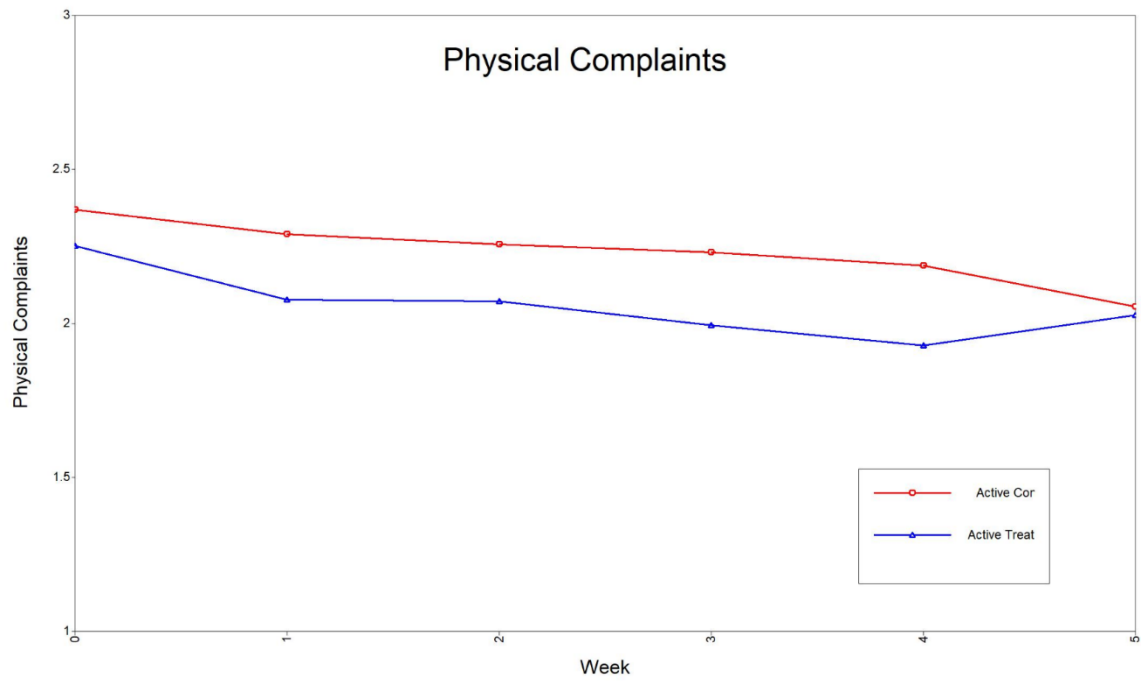




Figure 7 (Continued)

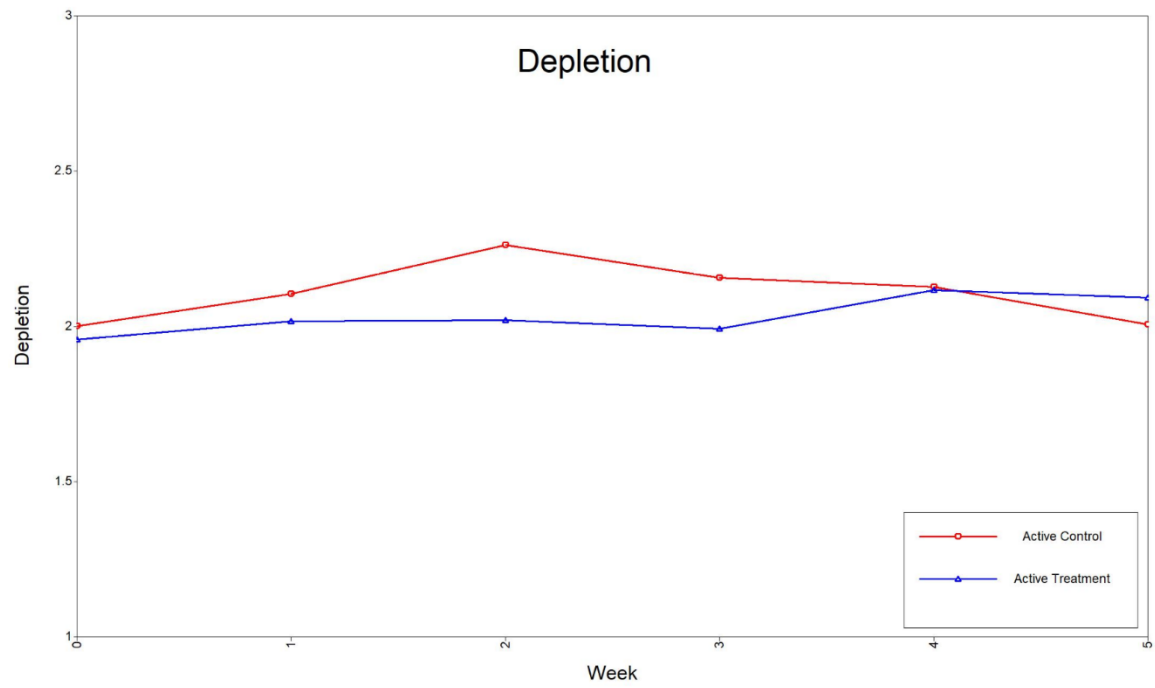
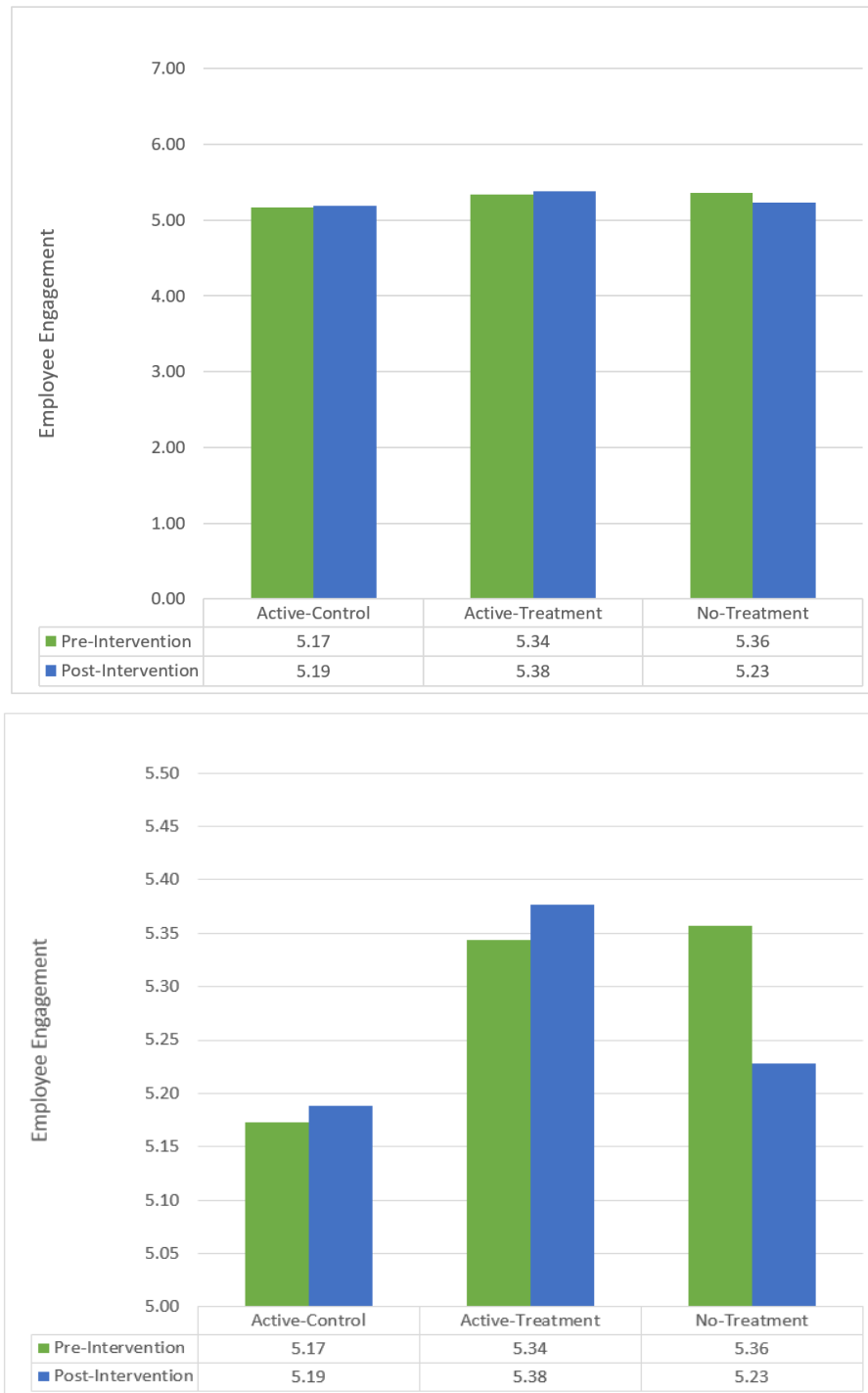


Figure 8

*A Comparison of Pre- and Post-Study Means of Employee Engagement by Condition  
(from Supplemental Analysis 2, using updated active-control condition)*



*Note.*  $N = 145$ .

Top graph shows full response scale (1-7). Bottom graph is a close-up of differences.

## References

- Agarwal, U. A., Datta, S., Blake-Beard, S., & Bhargava, S. (2012). Linking LMX, innovative work behaviour and turnover intentions: The mediating role of work engagement. *Career Development International*, 17(3), 208-230.
- Alarcon, G. M. (2011). A meta-analysis of burnout with job demands, resources, and attitudes. *Journal of Vocational Behavior*, 79(2), 549-562.
- Alessandri, G., Consiglio, C., Luthans, F., & Borgogni, L. (2018). Testing a dynamic model of the impact of psychological capital on work engagement and job performance. *Career Development International*, 23(1), 33-47.
- Avery, D. R., McKay, P. F., & Wilson, D. C. (2007). Engaging the aging workforce: The relationship between perceived age similarity, satisfaction with coworkers, and employee engagement. *Journal of Applied Psychology*, 92(6), 1542.
- Bakker, A. B., & Albrecht, S. (2018). Work engagement: Current trends. *Career Development International*, 23(1), 4-11.
- Bakker, A. B., & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology*, 83(1), 189-206.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309-328.
- Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, 13(3), 209-223.
- Bakker, A. B., & Demerouti, E. (2014). Job demands–resources theory. *Wellbeing: A Complete Reference guide*, 1-28.

- Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273.
- Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005). Job resources buffer the impact of job demands on burnout. *Journal of Occupational Health Psychology*, 10(2), 170.
- Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. I. (2014). Burnout and work engagement: The JD–R approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 1(1), 389-411.
- Bakker, A. B., Hakanen, J. J., Demerouti, E., & Xanthopoulou, D. (2007). Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology*, 99(2), 274.
- Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. (2008). Work engagement: An emerging concept in occupational health psychology. *Work & Stress*, 22(3), 187-200.
- Bakker, A. B., Van Veldhoven, M., & Xanthopoulou, D. (2010). Beyond the demand-control model. *Journal of Personnel Psychology*, 9(1), 3-16.
- Beehr, T. A., Walsh, J. T., & Taber, T. D. (1976). Relationships of stress to individually and organizationally valued states: Higher order needs as a moderator. *Journal of Applied Psychology*, 61(1), 41.
- Bentein, K., Vandenberghe, C., Vandenberg, R., & Stinglhamber, F. (2005). The role of change in the relationship between commitment and turnover: a latent growth modeling approach. *Journal of Applied Psychology*, 90(3), 468.
- Biggs, A., Brough, P., & Barbour, J. P. (2014). Strategic alignment with organizational

- priorities and work engagement: A multi-wave analysis. *Journal of Organizational Behavior*, 35(3), 301-317.
- Bliese, P. D., & Halverson, R. R. (1998). Group size and measures of group-level properties: An examination of eta-squared and ICC values. *Journal of Management*, 24(2), 157-172.
- Bolino, M. C., & Turnley, W. H. (2005). The personal costs of citizenship behavior: The relationship between individual initiative and role overload, job stress, and work-family conflict. *Journal of Applied Psychology*, 90(4), 740.
- Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, 17(3), 303-316.
- Bono, J. E., Glomb, T. M., Shen, W., Kim, E., & Koch, A. J. (2013). Building positive resources: Effects of positive events and positive reflection on work stress and health. *Academy of Management Journal*, 56(6), 1601-1627.
- Borman, W. C., & Motowidlo, S. J. (1997). Task performance and contextual performance: The meaning for personnel selection research. *Human Performance*, 10(2), 99-109.
- Bowling, N. A., Alarcon, G. M., Bragg, C. B., & Hartman, M. J. (2015). A meta-analytic examination of the potential correlates and consequences of workload. *Work & Stress*, 29(2), 95-113.
- Breevaart, K., Bakker, A. B., Demerouti, E., & Hetland, J. (2012). The measurement of state work engagement. *European Journal of Psychological Assessment*, 28(4), 305-312.
- Bryant, F. B. (1989). A four-factor model of perceived control: Avoiding, coping,

- obtaining, and savoring. *Journal of Personality*, 57(4), 773-797.
- Byrne, B. M. (2013). *Structural Equation Modeling with Mplus: Basic Concepts, Applications, and Programming*. New York, NY: Routledge.
- Campion, M. A., & McClelland, C. L. (1991). Interdisciplinary examination of the costs and benefits of enlarged jobs: A job design quasi-experiment. *Journal of Applied Psychology*, 76(2), 186.
- Chan, D. (1998). The conceptualization and analysis of change over time: An integrative approach incorporating longitudinal mean and covariance structures analysis (LMACS) and multiple indicator latent growth modeling (MLGM). *Organizational Research Methods*, 1, 421-483.  
<https://doi.org/10.1177/109442819814004>
- Chan, D., & Schmitt, N. (2000). Interindividual differences in intraindividual changes in proactivity during organizational entry: A latent growth modeling approach to understanding newcomer adaptation. *Journal of Applied Psychology*, 85, 190-210.  
<https://doi.org/10.1037/0021-9010.85.2.190>
- Chen, S., Westman, M., & Eden, D. (2009). Impact of enhanced resources on anticipatory stress and adjustment to new information technology: A field-experimental test of conservation of resources theory. *Journal of Occupational Health Psychology*, 14(3), 219.
- Cho, S. J., Preacher, K. J., & Bottge, B. A. (2015). Detecting intervention effects in a cluster-randomized design using multilevel structural equation modeling for binary responses. *Applied Psychological Measurement*, 39(8), 627-642.
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A

- quantitative review and test of its relations with task and contextual performance. *Personnel Psychology*, 64(1), 89-136.
- Cifre, E., Salanova, M., & Rodríguez-Sánchez, A. M. (2011). Dancing between theory and practice: Enhancing work engagement through work stress intervention. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 21(3), 269-286.
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: a theoretical extension and meta-analytic test. *Journal of Applied Psychology*, 95(5), 834.
- Dahm, P. C., Glomb, T. M., Manchester, C. F., & Leroy, S. (2015). Work–family conflict and self-discrepant time allocation at work. *Journal of Applied Psychology*, 100(3), 767.
- Dalal, R. S., Brummel, B. J., Wee, S., & Thomas, L. L. (2008). Defining employee engagement for productive research and practice. *Industrial and Organizational Psychology*, 1(1), 52-55.
- Daniel, S., & Sonnentag, S. (2014). Work to non-work enrichment: The mediating roles of positive affect and positive work reflection. *Work & Stress*, 28(1), 49-66.
- Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, 7(3), 181-185.
- Demerouti, E. (2014). Design your own job through job crafting. *European Psychologist*, 19(4), 237-247.
- Demerouti, E., & Bakker, A. B. (2006). Employee well-being and job performance:

- Where we stand and where we should go. *Occupational Health Psychology: European Perspectives on Research, Education and Practice, 1*, 83-111.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499.
- DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. *Journal of General Internal Medicine, 21*(3), 267.
- Dillon, W. R., Kumar, A., & Mulani, N. (1987). Offending estimates in covariance structure analysis: Comments on the causes of and solutions to Heywood cases. *Psychological Bulletin, 101*(1), 126-135.
- Dyer, N. G., Hanges, P. J., & Hall, R. J. (2005). Applying multilevel confirmatory factor analysis techniques to the study of leadership. *The Leadership Quarterly, 16*(1), 149-167.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191.
- Fleiss, J. L. (2011). *Design and Analysis of Clinical Experiments* (Vol. 73). New York, NY: John Wiley & Sons.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218.
- Freeney, Y., & Fellenz, M. R. (2013). Work engagement, job design and the role of the



- social context at work: Exploring antecedents from a relational perspective. *Human Relations*, 66(11), 1427-1445.
- Frijda, N. H. (1988). The laws of emotion. *American Psychologist*, 43(5), 349.
- Frijda, N. H., Kuipers, P., & Ter Schure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology*, 57(2), 212.
- Gable, S. L., Reis, H. T., Impett, E. A., & Asher, E. R. (2004). What do you do when things go right? The intrapersonal and interpersonal benefits of sharing positive events. *Journal of Personality and Social Psychology*, 87(2), 228.
- Gallup. (2017). State of the global workplace. New York, NY: Gallup Press. Retrieved from [https://www.gallup.com/workplace/238079/state-global-workplace-2017.aspx?utm\\_source=2013StateofGlobalWorkplaceReport&utm\\_medium=2013SOGWReportLandingPage&utm\\_campaign=2013StateofGlobalReport\\_Redirectto2017page&utm\\_content=download2017now\\_textlink](https://www.gallup.com/workplace/238079/state-global-workplace-2017.aspx?utm_source=2013StateofGlobalWorkplaceReport&utm_medium=2013SOGWReportLandingPage&utm_campaign=2013StateofGlobalReport_Redirectto2017page&utm_content=download2017now_textlink)
- Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies*, 14(4), 1241-1259.
- Gawke, J. C., Gorgievski, M. J., & Bakker, A. B. (2017). Employee intrapreneurship and work engagement: A latent change score approach. *Journal of Vocational Behavior*, 100, 88-100.
- Geiser, C. (2012). *Data Analysis with Mplus*. New York, NY: Guilford press.
- Gerbing, D. W., & Anderson, J. C. (1987). Improper solutions in the analysis of

- covariance structures: Their interpretability and a comparison of alternate respecifications. *Psychometrika*, 52, 99-111.
- Giannopoulos, V. L., & Vella-Brodick, D. A. (2011). Effects of positive interventions and orientations to happiness on subjective well-being. *The Journal of Positive Psychology*, 6(2), 95-105.
- Goldberg, D. P. (1972). *The Detection of Psychiatric Illness by Questionnaire*. London: Oxford University Press.
- Hackman, J. R., & Oldham, G. R. (1974). The Job Diagnostic Survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects.
- Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, 60(2), 159.
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16(2), 250-279.
- Hackman JR, Oldham GR. (1980). *Work Redesign*. Reading, MA: Addison-Wesley.
- Hakanen, J. J., Bakker, A. B., & Demerouti, E. (2005). How dentists cope with their job demands and stay engaged: The moderating role of job resources. *European Journal of Oral Sciences*, 113(6), 479-487.
- Halbesleben, J. R. (2010). A meta-analysis of work engagement: Relationships with burnout, demands, resources, and consequences. *Work engagement: A handbook of essential theory and research*, 8(1), 102-117.
- Halbesleben, J. R., & Wheeler, A. R. (2008). The relative roles of engagement and embeddedness in predicting job performance and intention to leave. *Work & Stress*, 22(3), 242-256.

- Hallberg, U. E., & Schaufeli, W. B. (2006). "Same same" but different? Can work engagement be discriminated from job involvement and organizational commitment?. *European Psychologist*, 11(2), 119-127.
- Hayes, A. F. (2017). *An Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. New York, NY: Guilford Press.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, 6(4), 307.
- Hobfoll, S. E., Halbesleben, J., Neveu, J. P., & Westman, M. (2018). Conservation of resources in the organizational context: The reality of resources and their consequences. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, 103-128.
- Hom, P. W., & Griffeth, R. W. (1991). Structural equations modeling test of a turnover theory: Cross-sectional and longitudinal analyses. *Journal of Applied Psychology*, 76(3), 350.
- Huyghebaert, T., Gillet, N., Beltou, N., Tellier, F., & Fouquereau, E. (2018). Effects of workload on teachers' functioning: A moderated mediation model including sleeping problems and overcommitment. *Stress and Health*, 34(5), 601-611.
- Idaszak, J. R., & Drasgow, F. (1987). A revision of the Job Diagnostic Survey: Elimination of a measurement artifact. *Journal of Applied Psychology*, 72(1), 69.
- James, J. B., McKechnie, S., & Swanberg, J. (2011). Predicting employee engagement in an age-diverse retail workforce. *Journal of Organizational Behavior*, 32(2), 173-196.
- Janoff-Bulman, R. 1992. *Shattered assumptions: Towards a New Psychology of Trauma*.

New York: Free Press.

Jaros, S. J. (1997). An assessment of Meyer and Allen's (1991) three-component model of organizational commitment and turnover intentions. *Journal of Vocational Behavior*, 51(3), 319-337.

Jiang, L., & Johnson, M. J. (2018). Meaningful Work and Affective Commitment: A Moderated Mediation Model of Positive Work Reflection and Work Centrality. *Journal of Business and Psychology*, 33(4), 545-558.

Jones, F., & Fletcher, B. C. (1996). Job control and health. In M. J. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), *Handbook of Work and Health Psychology* (pp. 33–50). Chichester: Wiley.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), 692-724.

Kammeyer-Mueller, J. D., Wanberg, C. R., Rubenstein, A. L., & Song, Z. (2013). Support, undermining, and newcomer socialization: Fitting in during the first 90 days. *Academy of Management Journal*, 56, 1104-1124.  
<https://doi.org/10.5465/amj.2010.0791>

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology*, 3(4), 322.

Knight, C., Patterson, M., & Dawson, J. (2017). Building work engagement: A systematic review and meta-analysis investigating the effectiveness of work engagement interventions. *Journal of Organizational Behavior*, 38(6), 792-812.

- Krosnick, J. A., & Fabrigar, L. R. (1997). Designing rating scales for effective measurement in surveys. In L. Lyberg et al. (Ed), *Survey Measurement and Process Quality*, (pp. 141-164). New York, NY: Wiley.
- Langston, C. A. (1994). Capitalizing on and coping with daily-life events: Expressive responses to positive events. *Journal of Personality and Social Psychology*, 67(6), 1112.
- Lazarus, R. S. (1991). *Emotion and Adaptation*. New York, NY: Oxford University Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York, NY: Springer.
- Lee, R. T., & Ashforth, B. E. (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology*, 81(2), 123.
- Lin, S. H. J., & Johnson, R. E. (2015). A suggestion to improve a day keeps your depletion away: Examining promotive and prohibitive voice behaviors within a regulatory focus and ego depletion framework. *Journal of Applied Psychology*, 100(5), 1381.
- Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based positive approach. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 339-366.
- Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology*, 1(1), 3-30.
- Mills, M. J., Culbertson, S. S., & Fullagar, C. J. (2012). Conceptualizing and measuring

- engagement: An analysis of the Utrecht Work Engagement Scale. *Journal of Happiness Studies*, 13(3), 519-545.
- Morgeson, F. P., & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology*, 91(6), 1321.
- Motowidlo, S. J., & Van Scotter, J. R. (1994). Evidence that task performance should be distinguished from contextual performance. *Journal of Applied psychology*, 79(4), 475.
- Muthén, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods & Research*, 22(3), 376-398.
- Nahrgang, J. D., Morgeson, F. P., & Hofmann, D. A. (2011). Safety at work: A meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes. *Journal of Applied Psychology*, 96(1), 71.
- Naruse, T., Taguchi, A., Kuwahara, Y., Nagata, S., Sakai, M., Watai, I., & Murashima, S. (2015). The effect of skill mix in non-nursing assistants on work engagements among home visiting nurses in Japan. *Journal of Nursing Management*, 23(4), 532-541.
- Nixon, A. E., Mazzola, J. J., Bauer, J., Krueger, J. R., & Spector, P. E. (2011). Can work make you sick? A meta-analysis of the relationships between job stressors and physical symptoms. *Work & Stress*, 25(1), 1-22.
- Orth, M., & Volmer, J. (2017). Daily within-person effects of job autonomy and work

- engagement on innovative behaviour: The cross-level moderating role of creative self-efficacy. *European Journal of Work and Organizational Psychology*, 26(4), 601-612.
- Preacher, K. J. (2010). Latent growth curve models. *The Reviewer's Guide to Quantitative Methods in the Social Sciences*, 1, 185-198.
- Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures*, 6(2), 77-98.
- Preacher, K. J., Wichman, A. L., MacCallum, R. C., & Briggs, N. E. (2008). *Latent Growth Curve Modeling* (No. 157). Thousand Oaks, CA: Sage Publications, Inc.
- Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2016). Multilevel structural equation models for assessing moderation within and across levels of analysis. *Psychological Methods*, 21(2), 189.
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, 15, 209-233.
- Richter, P., & Hacker, W. (1998). *Belastung und Beanspruchung: Streß, Ermüdung und Burnout im Arbeitsleben*. [Workload and strain: Stress, fatigue, and burnout in working life]. Heidelberg, Germany: Asagner.
- Rodríguez-Muñoz, A., Sanz-Vergel, A. I., Demerouti, E., & Bakker, A. B. (2014). Engaged at work and happy at home: A spillover–crossover model. *Journal of Happiness Studies*, 15(2), 271-283.
- Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology*, 21(7), 600-619.
- Schaubroeck, J., Cotton, J. L., & Jennings, K. R. (1989). Antecedents and consequences

- of role stress: A covariance structure analysis. *Journal of Organizational Behavior*, 10(1), 35-58.
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 25(3), 293-315.
- Schaufeli, W. B., & Bakker, A. B. (2010). Defining and measuring work engagement: Bringing clarity to the concept. *Work Engagement: A Handbook of Essential Theory and Research*, 10-24.
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement*, 66(4), 701-716.
- Schaufeli, W. B., Bakker, A. B., & Van Rhenen, W. (2009). How changes in job demands and resources predict burnout, work engagement, and sickness absenteeism. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 30(7), 893-917.
- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies*, 3(1), 71-92.
- Schaufeli, W. B., Taris, T. W., & Bakker, A. B. (2006). Dr. Jekyll or Mr. Hyde: On the



- differences between work engagement and workaholism. In R. J. Burke (Ed.), *Research Companion to Working Time and Work Addiction* (pp. 193-217). Northampton, MA: Edward Elgar Publishing.
- Seers, A., McGee, G. W., Serey, T. T., & Graen, G. B. (1983). The interaction of job stress and social support: A strong inference investigation. *Academy of Management Journal*, 26(2), 273-284.
- Seligman, M. E. (2012). *Flourish: A Visionary New Understanding of Happiness and Well-Being*. New York, NY: Simon and Schuster.
- Seligman, M. E., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychological Association*, 55(1), 5.
- Seligman, M. E., Rashid, T., & Parks, A. C. (2006). Positive psychotherapy. *American Psychologist*, 61(8), 774.
- Seligman, M. E., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, 60(5), 410.
- Seppälä, P., Mauno, S., Feldt, T., Hakanen, J., Kinnunen, U., Tolvanen, A., & Schaufeli, W. (2009). The construct validity of the Utrecht Work Engagement Scale: Multisample and longitudinal evidence. *Journal of Happiness Studies*, 10(4), 459.
- Shimazu, A., Schaufeli, W. B., Kubota, K., & Kawakami, N. (2012). Do workaholism and work engagement predict employee well-being and performance in opposite directions?. *Industrial Health*, 50(4), 316-321.
- Shirom, A. (2003). Feeling vigorous at work? The construct of vigor and the study of

- positive affect in organizations. In P. L. Perrewe and D. C. Ganster (Eds.) *Emotional and Physiological Processes and Positive Intervention Strategies (Research in Occupational Stress and Well-Being, volume 3)* (pp. 135-164). Emerald Group Publishing Limited.
- Shuck, B., & Wollard, K. (2010). Employee engagement and HRD: A seminal review of the foundations. *Human Resource Development Review*, 9(1), 89-110.
- Sims Jr, H. P., Szilagyi, A. D., & Keller, R. T. (1976). The measurement of job characteristics. *Academy of Management Journal*, 19(2), 195-212.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, 65(5), 467-487.
- Society for Human Resource Management. (2015). Business and human capital challenges today and in the future: A research report by the Society for Human Resource Management. Retrieved from [https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/15-0502%20Bus\\_HC\\_Challenges\\_Report\\_FINAL.pdf](https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/15-0502%20Bus_HC_Challenges_Report_FINAL.pdf)
- Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: a new look at the interface between nonwork and work. *Journal of Applied Psychology*, 88(3), 518.
- Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, 36(S1), S72-S103.
- Sonnentag, S., & Grant, A. M. (2012). Doing good at work feels good at home, but not

- right away: When and why perceived prosocial impact predicts positive affect. *Personnel Psychology*, 65(3), 495-530.
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the positive and negative affect schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38(2), 227-242.
- Van Scotter, J. R., & Motowidlo, S. J. (1996). Interpersonal facilitation and job dedication as separate facets of contextual performance. *Journal of Applied Psychology*, 81(5), 525.
- Van Wingerden, J., Bakker, A. B., & Derks, D. (2017). Fostering employee well-being via a job crafting intervention. *Journal of Vocational Behavior*, 100, 164-174.
- van Woerkom, M., Bakker, A. B., & Nishii, L. H. (2016). Accumulative job demands and support for strength use: Fine-tuning the job demands-resources model using conservation of resources theory. *Journal of Applied Psychology*, 101(1), 141.
- van Woerkom, M., Oerlemans, W., & Bakker, A. B. (2016). Strengths use and work engagement: A weekly diary study. *European Journal of Work and Organizational Psychology*, 25(3), 384-397.
- Wedell, D. H., Parducci, A., & Lane, M. (1990). Reducing the dependence of clinical judgment on the immediate context: Effects of number of categories and type of anchors. *Journal of Personality and Social Psychology*, 58(2), 319.
- Westerberg, C. E., Lundgren, E. M., Florczak, S. M., Mesulam, M. M., Weintraub, S., Zee, P. C., & Paller, K. A. (2010). Sleep influences the severity of memory disruption in amnesic mild cognitive impairment: Results from sleep self-

assessment and continuous activity monitoring. *Alzheimer Disease and Associated Disorders*, 24(4), 325.

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational behavior*, 74(3), 235-244.

Zhou, L., Park, J., Kammeyer-Mueller, J. D., Shah, P. P., Campbell, E. M., & Lee, C. K. (2020). *Rookies connected: Interpersonal relationships among newcomers, newcomer adjustment process, and socialization outcomes*. Manuscript submitted for publication.

## **Appendix A**

### **Intervention Instructions**

We think too much about what goes wrong and not enough about what goes right in our lives, school, and work. Of course, sometimes it makes sense for us to analyze bad events so we can learn from them and avoid them in the future. However, people tend to spend more time thinking about what is bad than is helpful. One way to keep this from happening is to develop the ability to think about the good things in life.

Please read the prompt below and write down a few thoughtful sentences in response. Before answering, dedicate a few minutes to really reflect on the assigned topic and questions, and be detailed in your response.

#### **Autonomy**

Write about a time today in which you were able to exercise autonomy at work, or choose, on your own, how to complete your work tasks. Describe the situation. What did you decide to do? How did this autonomy, or freedom to choose, help to make your workday better?

#### **Task Variety**

Write about a time today in which your job allowed you to perform a *variety* of tasks or activities (rather than doing the same thing over and over). Describe some of the different tasks you worked on today. How did this variety of activities help to make your workday better?

#### **Job Significance**

Write about a time today at work in which, by doing your job, you made a difference in someone else's life. Describe the situation. What, specifically, did you do to help someone else? How has your job significantly affected him or her? How did the significance or value of your job help to make your workday better?

#### **Feedback**

Write about a time today at work in which you received positive feedback about your job performance. This could range from formal feedback from a supervisor, to something small and informal from coworkers, parents, or even students. Describe the situation. Who provided the feedback? What did they say or do? How did this feedback encourage you in your job, or help to make your workday better?

**Social Support**

Write about a time today at work in which you received help, support, advice, or friendship from others. This can range from a coworker offering suggestions to help with a challenge you are facing, to a kind word of friendship from someone else. Describe the situation. Who was the person, and what did he/she say or do? How did this social interaction help to make your workday better?

**Active Control**

Write about something good that happened in your life during the past 24 hours. This can include events at home, at work, during your daily commute, while running errands, etc. Describe the situation and what happened. What made your good thing so good? How did this good thing help to make your day better?

## **Appendix B Surveys**

### **Background Survey**

#### **Part 1: About Your Job**

Below are questions about your job, and how you feel about your job. Please remember that all answers are confidential and will not be shared directly with any employee of the ABC Public School District.

#### **1. Utrecht Work Engagement Scale (UWES)**

The following nine statements are about how you generally feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, select “0” in the space after the statement. If you have had this feeling, indicate how often you felt it by selecting the number (from 1 to 6) that best describes how frequently you feel that way.

0 = Never; 1 = Almost never/a few times a year or less; 2 = Rarely/once a month or less; 3 = Sometimes/A few times a month; 4 = Often/once a week; 5 = Very often/A few times a week; 6 = Always/Every day

- a) At my work, I feel bursting with energy.
- b) At my job, I feel strong and vigorous.
- c) I am enthusiastic about my job.
- d) My job inspires me.
- e) When I get up in the morning, I feel like going to work.
- f) I feel happy when I am working intensely.
- g) I am proud of the work that I do.
- h) I am immersed in my work.
- i) I get carried away when I am working.

#### **2. Perceptions of Presence: Autonomy**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The job allows me to make decisions about what methods I use to complete my work.
- b) The job gives me considerable opportunity for independence and freedom in how I do the work.

- c) The job allows me to decide on my own how to go about doing my work.

### **3. Perceptions of Importance: Autonomy**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having autonomy, or the freedom to make decisions about how I complete my work, is important to me.

### **4. Perceptions of Presence: Task Variety**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The job involves a great deal of task variety.
- b) The job involves doing a number of different things.
- c) The job requires the performance of a wide range of tasks.
- d) The job involves performing a variety of tasks.

### **5. Perceptions of Importance: Task Variety**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having variety in the tasks I do at work is important to me.

### **6. Perceptions of Presence: Job Significance**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The results of my work are likely to significantly affect the lives of other people.
- b) The job itself is very significant and important in the broader scheme of things.



- c) The job has a large impact on people outside the organization.
- d) The work performed on the job has a significant impact on people outside the organization.

### **7. Perceptions of Importance: Job Significance**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having a job that significantly affects the lives of others is important to me.

### **8. Perceptions of Presence: Feedback**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) I receive a great deal of information from my manager and coworkers about my job performance.
- b) Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.
- c) I receive feedback on my performance from other people in my organization (such as my manager or coworkers).

### **9. Perceptions of Importance: Feedback**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Receiving feedback from others about my job performance is important to me.

### **10. Perceptions of Presence: Social Support**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) I have the opportunity to develop close friendships in my job.
- b) I have the chance in my job to get to know other people.
- c) I have the opportunity to meet with others in my work.
- d) My supervisor is concerned about the welfare of the people that work for him/her.
- e) People I work with take a personal interest in me.
- f) People I work with are friendly.

### **11. Perceptions of Importance: Social Support**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Receiving friendship and support from others at work (coworkers and/or managers) is important to me.

### **12. Workload**

Please indicate the extent to which you agree or disagree with the following statements about your workload *in general*.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The amount of work I am expected to do is too great.
- b) I never seem to have enough time to get everything done at work.
- c) It often seems like I have too much work for one person to do.

### **13. Turnover Intentions**

Please indicate how much you agree or disagree with each of the following statements.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) I often think about quitting this organization.
- b) I intend to search for a position with another employer within the next year.

## Part 2: About Yourself

In this section, we would like you to provide some background information about yourself. Please remember that your responses are confidential.

### **1. Gender**

What is your gender?

- a) Male
- b) Female
- c) Choose not to answer

### **2. Age**

What is your age? (in years)

### **3. Race**

Select as many as apply to you:

- a) American Indian or Alaska Native
- b) Asian
- c) Black or African American
- d) Hispanic or Latino
- e) Native Hawaiian or Other Pacific Islander
- f) White
- g) Choose not to answer

### **4. Marital Status**

What is your marital status?

- a) Single
- b) Married
- c) Same-sex domestic partner
- d) Living with a significant other or partner
- e) Divorced or separated
- f) Widowed
- g) Choose not to answer

### **5. Parental Status**

How many children do you have?

- a) 0
- b) 1
- c) 2
- d) 3

- e) 4
- f) 5
- g) More than 5

**6. Education**

What is the highest level of education you have completed? (select one)

- a) Some high school (grade 11 or less)
- b) Graduated from high school or G.E.D.
- c) Some college or technical training beyond high school (1–3 years)
- d) Graduated from college (B.A., B.S. or other Bachelor's degree)
- e) Some graduate school
- f) Graduate or professional degree (MA, Master's, Ph.D., J.D., etc.)

**7. Tenure at School District**

How long have you worked for ABC Public Schools? (in years)

**8. Tenure at Current Job**

How long have you worked at your current job, in your current school? (in years)

## Weekly Survey

### 1. Utrecht Work Engagement Scale (UWES)

The following nine statements are about how you felt at work *this past week*. Please read each statement carefully and decide if you ever felt this way about your job. If you have never had this feeling, select “0” in the space after the statement. If you have had this feeling, indicate how often you felt it by selecting the number (from 1 to 6) that best describes how frequently you feel that way.

0 = Never; 1 = Almost never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Very often; 6 = Always/Constantly

- a) This week at work, I felt bursting with energy.
- b) This week at my job, I felt strong and vigorous.
- c) This week, I was enthusiastic about my job.
- d) This week, my job inspired me.
- e) This week, when I got up in the morning I felt like going to work.
- f) This week, I felt happy when I was working intensely.
- g) This week, I was proud of the work that I did.
- h) This week, I was immersed in my work.
- i) This week, I got carried away when I was working.

### 2. Perceptions of Presence: Autonomy

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The job allows me to make decisions about what methods I use to complete my work.
- b) The job gives me considerable opportunity for independence and freedom in how I do the work.
- c) The job allows me to decide on my own how to go about doing my work.

### 3. Perceptions of Importance: Autonomy

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having autonomy, or the freedom to make decisions about how I complete my work, is important to me.

#### **4. Perceptions of Presence: Task Variety**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The job involves a great deal of task variety.
- b) The job involves doing a number of different things.
- c) The job requires the performance of a wide range of tasks.
- d) The job involves performing a variety of tasks.

#### **5. Perceptions of Importance: Task Variety**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having variety in the tasks I do at work is important to me.

#### **6. Perceptions of Presence: Job Significance**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) The results of my work are likely to significantly affect the lives of other people.
- b) The job itself is very significant and important in the broader scheme of things.
- c) The job has a large impact on people outside the organization.
- d) The work performed on the job has a significant impact on people outside the organization.

#### **7. Perceptions of Importance: Job Significance**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Having a job that significantly affects the lives of others is important to me.

## **8. Perceptions of Presence: Feedback**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) I receive a great deal of information from my manager and coworkers about my job performance.
- b) Other people in the organization, such as managers and coworkers, provide information about the effectiveness (e.g., quality and quantity) of my job performance.
- c) I receive feedback on my performance from other people in my organization (such as my manager or coworkers).

## **9. Perceptions of Importance: Feedback**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Receiving feedback from others about my job performance is important to me.

## **10. Perceptions of Presence: Social Support**

Below are statements about your job. Please indicate how much you agree or disagree with each statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) I have the opportunity to develop close friendships in my job.
- b) I have the chance in my job to get to know other people.
- c) I have the opportunity to meet with others in my work.
- d) My supervisor is concerned about the welfare of the people that work for him/her.
- e) People I work with take a personal interest in me.
- f) People I work with are friendly.

### **11. Perceptions of Importance: Social Support**

Please indicate how much you agree or disagree with the following statement.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) Receiving friendship and support from others at work (coworkers and/or managers) is important to me.

### **12. Workload**

Please indicate the extent to which you agree or disagree with the following statements about your workload *in the past week*.

1 = Strongly disagree; 2 = disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree

- a) This past week, the amount of work I was expected to do was too great.
- b) This past week, I never seemed to have enough time to get everything done at work.
- c) This past week, it often seemed like I had too much work for one person to do.

### **13. Physical Complaints**

To what extent did you experience the following symptoms *this past week*?

1 = Not at all; 2 = Slightly; 3 = Moderately; 4 = A great deal; 5 = Severely

- a) Upset stomach?
- b) Neck or back pain?
- c) Headaches?
- d) Feel tired or fatigued?
- e) Painful or tense muscles?

### **14. Mental Complaints**

To what extent did you experience the following symptoms *this past week*?

1 = Not at all; 2 = Slightly; 3 = Moderately; 4 = A great deal; 5 = Severely

- a) Difficulty concentrating?
- b) Difficulty making decisions?
- c) Difficulty “switching off” your mind after work?



### 15. Depletion

To what extent do the following statements describe how you felt *this past week*?

1 = Not at all; 2 = Slightly; 3 = Moderately; 4 = A great deal; 5 = Very much

- a) I felt drained.
- b) My mind felt unfocused.
- c) It took a lot of effort for me to concentrate on something.
- d) My mental energy was running low.
- e) I felt like my willpower was gone.

## Appendix C

### Univariate Model Tests

*Perceptions of Presence: Autonomy.* There was no significant difference between the linear and quadratic trajectories (Satorra-Bentler scaled  $\Delta\chi^2 = 10.029$ ,  $\Delta df = 8$ ,  $p > .05$ ). Both the cubic and freely estimated models failed to converge. In addition, there was no significant difference with or without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 17.596$ ,  $\Delta df = 10$ ,  $p > .05$ ), nor was there a significant difference with or without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 8.692$ ,  $\Delta df = 11$ ,  $p > .05$ ). Thus, for the sake of parsimony, I selected a model with a linear trajectory and without autoregressive terms or constrained residuals.

*Perceptions of Presence: Task Variety.* The model with a quadratic trajectory demonstrated significantly better fit than the model with a linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 17.982$ ,  $\Delta df = 8$ ,  $p < .05$ ). Both the cubic and freely estimated models failed to converge. The model with autoregressive terms fit significantly better than the model without (Satorra-Bentler scaled  $\Delta\chi^2 = 23.257$ ,  $\Delta df = 10$ ,  $p < .01$ ), although there was no significant difference between the models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 16.240$ ,  $\Delta df = 11$ ,  $p > .05$ ). The final model was a quadratic trajectory with autoregressive terms, and no constrained residuals.

*Perceptions of Presence: Job Significance.* The model with the quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 27.605$ ,  $\Delta df = 8$ ,  $p < .001$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference between the models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 9.387$ ,  $\Delta df = 10$ ,  $p > .05$ ), although the model with constrained residuals fit significantly better than the model without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 35.172$ ,  $\Delta df = 11$ ,  $p < .001$ ). The final model included a quadratic trajectory with constrained residuals, but no autoregressive terms.

*Perceptions of Presence: Feedback.* The model with the quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 26.570$ ,  $\Delta df = 8$ ,  $p < .001$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference between the models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 18.295$ ,  $\Delta df = 10$ ,  $p > .05$ ), neither was there a significant difference between models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 9.233$ ,  $\Delta df = 11$ ,  $p > .05$ ). Thus, for the sake of parsimony, the final model I selected included a quadratic trajectory without autoregressive terms or constrained residuals.

*Perceptions of Presence: Social Support.* The model with the quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 20.525$ ,  $\Delta df = 8$ ,  $p < .01$ ). Both the cubic and freely estimated models failed to converge.

The model with autoregressive terms fit significantly better than the model without (Satorra-Bentler scaled  $\Delta\chi^2 = 28.151$ ,  $\Delta df = 10$ ,  $p < .01$ ), although there was no significant difference between the models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 14.254$ ,  $\Delta df = 11$ ,  $p > .05$ ). For the sake of parsimony, the final model included a quadratic trajectory with autoregressive terms, but no constrained residuals.

*Perceptions of Importance: Autonomy.* There was no significant difference between the model with a linear trajectory and the model with a quadratic trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 6.683$ ,  $\Delta df = 8$ ,  $p > .05$ ). The cubic model failed to converge. In addition, there was no significant difference between the linear trajectory model and the freely estimated model (Satorra-Bentler scaled  $\Delta\chi^2 = 15.394$ ,  $\Delta df = 8$ ,  $p > .05$ ). There was also no significant difference between linear models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 8.873$ ,  $\Delta df = 10$ ,  $p > .05$ ). The model with constrained residuals fit significantly better than the model without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 25.283$ ,  $\Delta df = 11$ ,  $p < .01$ ). The final model consisted of a linear trajectory with constrained residuals, and without autoregressive terms.

*Perceptions of Importance: Task Variety.* There was no significant difference between the model with a linear trajectory and the model with a quadratic trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 8.9$ ,  $\Delta df = 8$ ,  $p > .05$ ). The cubic model failed to converge. There was no significant difference between the model with a linear trajectory and the freely estimated model (Satorra-Bentler scaled  $\Delta\chi^2 = 6.044$ ,  $\Delta df = 8$ ,  $p > .05$ ), and there was no significant difference between linear models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 2.729$ ,  $\Delta df = 10$ ,  $p > .05$ ). The model fit significantly better with constrained residuals than without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 39.984$ ,  $\Delta df = 11$ ,  $p < .001$ ). The final model included a linear trajectory with constrained residuals and no autoregressive terms.

*Perceptions of Importance: Job Significance.* There was no significant difference between models with linear and quadratic trajectories (Satorra-Bentler scaled  $\Delta\chi^2 = 6.577$ ,  $\Delta df = 8$ ,  $p > .05$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference between models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 6.227$ ,  $\Delta df = 10$ ,  $p > .05$ ), although the model with constrained residuals fit significantly better than the model without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 24.608$ ,  $\Delta df = 11$ ,  $p < .05$ ). The final model consisted of a linear trajectory with constrained residuals and without autoregressive terms.

*Perceptions of Importance: Feedback.* The model with a quadratic trajectory fit significantly better than the model with a linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 20.640$ ,  $\Delta df = 8$ ,  $p < .01$ ). Both the cubic and freely estimated models failed to converge. The model with autoregressive terms fit significantly better than the model without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 21.305$ ,  $\Delta df = 10$ ,  $p < .05$ ). However,

there was no significant difference between models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 14.162$ ,  $\Delta df = 11$ ,  $p > .05$ ). The final model consisted of a quadratic trajectory with autoregressive terms but no constrained residuals.

*Perceptions of Importance: Social Support.* The model with a quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 20.489$ ,  $\Delta df = 8$ ,  $p < .01$ ). Both the cubic and freely estimated models failed to converge. The model with autoregressive terms fit significantly better than the model without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 37.877$ ,  $\Delta df = 10$ ,  $p < .001$ ), although there was no significant difference between models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 19.497$ ,  $\Delta df = 11$ ,  $p > .05$ ). The final model included a quadratic trajectory with autoregressive terms but no constrained residuals.

*Job Performance.* The model with a quadratic trajectory fit significantly better than the model with a linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 67.876$ ,  $\Delta df = 8$ ,  $p < .001$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference between models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 8.167$ ,  $\Delta df = 10$ ,  $p > .05$ ), although the model with constrained residuals fit significantly better than the model without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 22.124$ ,  $\Delta df = 11$ ,  $p < .05$ ). The final model consisted of a quadratic trajectory with constrained residuals and without autoregressive terms.

*Physical Complaints.* The model with the quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 15.670$ ,  $\Delta df = 8$ ,  $p < .05$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference between models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 11.523$ ,  $\Delta df = 10$ ,  $p > .05$ ), neither was there a significance difference between models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 14.51$ ,  $\Delta df = 11$ ,  $p > .05$ ). The final model consisted of a quadratic model without autoregressive terms or constrained residuals.

*Mental Complaints.* There was no significant difference between the model with the linear trajectory and the model with the quadratic trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 12.728$ ,  $\Delta df = 8$ ,  $p > .05$ ). Both the cubic and freely estimated models failed to converge. The model with autoregressive terms fit significantly better than the model without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 26.182$ ,  $\Delta df = 10$ ,  $p < .01$ ), although there was no significant difference models with and without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 4.267$ ,  $\Delta df = 11$ ,  $p > .05$ ). The final model consisted of a linear trajectory with autoregressive terms but no constrained residuals.

*Depletion.* The model with the quadratic trajectory fit significantly better than the model with the linear trajectory (Satorra-Bentler scaled  $\Delta\chi^2 = 17.818$ ,  $\Delta df = 8$ ,  $p < .05$ ). Both the cubic and freely estimated models failed to converge. There was no significant difference

between models with and without autoregressive terms (Satorra-Bentler scaled  $\Delta\chi^2 = 15.636$ ,  $\Delta df = 10$ ,  $p > .05$ ), although the model with constrained residuals fit significantly better than the model without constrained residuals (Satorra-Bentler scaled  $\Delta\chi^2 = 20.383$ ,  $\Delta df = 11$ ,  $p < .05$ ). The final model consisted of a quadratic trajectory with constrained residuals and without autoregressive terms.