

TASK ABSORPTION ANALYSIS IN THE JOB DEMANDS-RESOURCES THEORY: AN EPISODIC PERSPECTIVE

by

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A Dissertation

Submitted to the Faculty of Economics and Business of the University of Chile

In Fulfillment of the Requirements for the degree of

Ph.D. in Business Administration

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2022

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ACKNOWLEDGEMENTS

I would like to acknowledge the support from several individuals and institutions for helping me to complete this work. First, to my supervisor Dr. Juan Pablo Torres. I appreciate all the time that he has spent in my academic development. Dr. Torres is incredibly knowledgeable about theory and methodology. I'm deeply grateful for his willingness to set higher goals for me and for being an honest, constructive, and caring advisor. My most profound appreciation goes to Dr. Torres for all guidance.

My dissertation committee members, Dr. Pedro Leiva and Dr. Hector Madrid, were beneficial and constructive in improving crucial aspects of this dissertation. Dr. Leiva and Dr. Madrid were key pillars in my researcher development. I would also like to thank my program director, Dr. Leslier Valenzuela. Dr. Valenzuela was extremely helpful in improving this study and was a kind professor during the program.

I am thankful to the School of Economics and Business of the University of Chile for supporting my education over the last five years. I am grateful to my professors in different doctoral courses, especially Dr. Sergio Olavarrieta. Within the University of Chile, I would also like to thank my classmates, Mónica Villamizar, María Soledad Perez, Yuly Durán, and Emilio Rauld, for their friendship.

I would like to thank the Agencia Nacional de Investigación y Desarrollo (ANID). This dissertation was supported under grants Beca de Doctorado Nacional 21190010 and Fondecyt de Iniciación 11190146.

I would like to thank the Millennium Nucleus on the Evolution of Work (MNEW) for their support during the last months of my program. Mainly, I would like to thank Dr. Jeanne Lafortune, Dr. Mariana Bargsted, Dr. Pablo Egaña del Sol, Dr. Vicente Soto de Amesti, and Valentina Martínez.

I would like to thank my family, Eugenia Fuentes, Jesus Juyumaya Rojas, and Camilo Juyumaya Fuentes. I thank my mother Eugenia for their support during the first years of my studies. Finally, I would like to thank my wife, Maria Paz Sanchez. Maria Paz has genuinely been the mast of this challenge, but even more, we share the happiness of being first-time parents in the middle of my program. All my love to my daughter Julieta.

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EXECUTIVE SUMMARY

This doctoral research deals with understanding job demands and resources (JD-R) theory that fosters individuals' performance, with a focus on employees and managers. The objective of my doctoral research was to expand the knowledge of the JD-R theory. I would like to highlight that three previous articles from this doctoral research have been developed to increase the understanding of the JD-R theory. The first is a theoretical study. Grounded in JD-R theory and the digital world context, this research offers a work engagement framework that considers the boundary conditions of managers' digital tasks. The first contribution is the building of new job demands (sustained attention and timely reaction, and maintenance and deployment), new job resources (big data & artificial intelligence, and automation), and new personal resources (technological reflectiveness and ambidexterity) related to managers' digital tasks. I then embedded these new job demands and resources into the managers' work engagement framework. The second contribution is the proposal of direct links between job demands and resources. Most previous research has shown a negative correlation between job demands and resources. Nevertheless, I describe a new scenario in which job demands are positively related to resources. Finally, this study introduces two types of digital tasks: digital adoption and digital business model tasks. This work, titled: "Work engagement in a managerial digital world: New job demands and resources," is under review in *Frontiers in Psychology*. One of the previous versions of this last article was reviewed at the *Academy of Management Review* and presented at the *AoM Annual Meeting 2020* (doi: [abs/10.5465/AMBPP.2020.17251abstract](https://doi.org/10.5465/AMBPP.2020.17251abstract)). This study can be found in Appendix A.

The second study examined the role of job resources, specifically transformational leadership. This study aims to investigate the effect of transformational leadership on managers' creative performance and the mediating effect of work engagement. I also explored whether manager autonomy moderated the model. I captured information about transformational leadership, work engagement, creative performance, and autonomy using an experimental design and surveys of a sample of managers. I modeled the first-stage moderated mediation effect using Hayes' Process Macro. These results confirm that transformational leadership positively affects the creative performance of managers. This mediation effect was partially explained by work engagement. Interestingly, autonomy was a significant moderator of the mediation effect. This study closes the gap between transformational leadership and JD-R theory by providing evidence of the impact of transformational leadership, work engagement, and autonomy on managers' creative performance. I supplement the existing empirical tests by adopting an experimental design to eliminate potential alternative explanations. The findings suggest that learning-to-practice transformational leadership will positively motivate companies to increase managers' work engagement and creative performance. These outcomes, which are predictors of an organization's effectiveness, are associated with higher productivity and long-term satisfaction. This work titled: "Effects of transformational leadership and work engagement on managers' creative performance" was published in *Baltic Journal of Management* (doi:[10.1108/BJM-11-2021-0449](https://doi.org/10.1108/BJM-11-2021-0449); WoS impact factor 2021:2.753; AI:0.484; JCI: Q2). This study can be found in Appendix B.

The third study presented a mediation–moderated model of the relationship between psychological empowerment, work engagement, age, and task performance. I seek to provide a more nuanced understanding of the mediating role of work engagement in the positive effects of psychological empowerment on task performance. Further, I explored employee age as a moderating factor in this mediation. I used online surveys among a sample of Latin American textile industry employees to capture individual perceptions about psychological empowerment, work engagement, and task performance. I modeled a mediation–moderated model using Hayes’ Process Macro. The results confirmed that the positive impact of employee psychological empowerment on task performance is partially mediated by work engagement. Additionally, age was a significant moderator of the mediation effect. This study expands knowledge on how the psychological empowerment–work engagement relationship can predict task performance, including age as a boundary condition. Following JD-R theory, I also prove that conceptualizing psychological empowerment as a job resource can benefit the integration of psychological empowerment and the work engagement stream of research. Moreover, these findings may help human resource management researchers and practitioners acknowledge contextual differences in understanding the combined effects of psychological empowerment and work engagement. For instance, human resource managers in the textile industry can develop specific age-based human resource systems that empower and engage employees in emerging economies. This work titled: “How psychological empowerment impacts task performance: The mediation role of work engagement and moderating role of age” was published in *Frontiers in Psychology* (doi:10.3389/fpsyg.2022.889936; WoS impact factor 2021:4.232; AI:1.072; JCI: Q1). This study can be found in Appendix C.

Finally, this dissertation arises from this doctoral research work. This final work is titled: “Task absorption analysis in the JD-R theory: An episodic perspective.” This study explores task absorption in a decision-making task. This dissertation is divided into seven chapters. This work offers an episodic view of the JD-R theory, showing that task characteristics are related to episodic task absorption, namely that episodic task absorption fluctuates synchronously as a function of concurrent appraisals of demands and resources. Furthermore, I provided empirical evidence for the episodic process model (EPM) proposition that attention facilitates performance during an episode, namely that episodic task absorption positively relates to task performance, using evidence from physiological, behavioral, and self-reported data. In this study, the demand and resource levels changed during repeated decision-making episodes. The levels of demands and resources generate different levels of task absorption, which consequently result in different levels of task performance. Therefore, the task absorption varied within the task. The results of this study can be used for time management and job recovery programs and highlight the importance of physiological measures that can complement self-reported measures and provide a more objective indicator of task absorption. Overall, I offer an episodic view of JD-R theory, showing that demands and resources can be related to episodic task absorption. This dissertation presents the first approximation of episodic task absorption. It makes an incremental contribution that can supplement the JD-R theory and deliver empirical evidence to the EPM. Finally, it verifies the importance of experimental studies and lays the groundwork for future studies. In short, I will publish the findings of this study in a WoS journal. This study can be read on the following pages.

ABSTRACT

This dissertation offers an episodic view of job demands and resources (JD-R) theory, showing that task characteristics are related to episodic task absorption, namely that episodic task absorption fluctuates synchronously as a function of concurrent appraisals of demands and resources. Furthermore, I delivered empirical evidence for the episodic process model (EPM) proposition that attention facilitates performance during an episode, namely that episodic task absorption positively relates to task performance, using evidence from physiological, behavioral, and self-reported data. In this study, demand and resource levels change during repeated decision-making episodes. The levels of demands and resources generate different levels of task absorption that consequently cause different levels of task performance. Therefore, task absorption would vary within the task. The results of this study can be used for time management and job recovery programs, and highlight the importance of physiological measures that can complement self-reported measures and provide a more objective indicator of task absorption. All in all, I offer an episodic view of JD-R theory, showing that demands and resources can be related to episodic task absorption. This dissertation is the first approximation of episodic task absorption. It makes an incremental contribution that can supplement the JD-R theory and delivers empirical evidence to the EPM. Finally, it verifies the importance of experimental studies and lays the groundwork for future research.

Keywords: Task absorption; Attention; Immersion; Job demands-resources theory; Episodic perspective; Task performance; Eye-tracking analysis.

CHAPTER 1: INTRODUCTION

1.1. Establishing the Problem

When working on a task, individuals sometimes enter a state characterized by being fully absorbed up to the point where they tend to have shallow levels of self-reflection and are hardly conscious of their surroundings. This state of being fully concentrated and deeply engrossed in one's work is often referred to as absorption (Schindehutte et al., 2006). Absorption is frequently and anecdotally reported in the performance of artists, employees, managers, athletes, and scientists (Eisenberger et al., 2005).

From prior research, we know that task absorption is a mental state characterized by being so immersed that time seems to fly (Bakker & Demerouti, 2017) and by strong attention (Hopstaken et al., 2016). Task absorption has been the subject of some studies and has become one of the cornerstones of organizational psychology and management (Bakker & Demerouti, 2017; Nakamura & Csikszentmihalyi, 2014).

Many scholars consider task absorption highly relevant to human performance in various domains (e.g., Demerouti, 2006; Eisenberger et al., 2005). However, when the conditions are correct, task absorption may also occur in everyday life when involved in more daily challenging or exciting activities such as work or leisure time (Bakker, 2008; Demerouti et al., 2011; LeFevre, 1988).

Yet a complication comes about because there is currently still little insight about task absorption during an episode. As technology takes over the treatment, manipulation, or assembly of smaller objects, parts, or information, the human operator must work with more cognitively or mentally demanding features that require processing a significant amount of data during work episodes (Demerouti, 2021).

Visual attention refers to the cognitive operations that mediate the selection of relevant information and filter irrelevant information from cluttered graphic scenes. As Bainbridge (1983) noted, it is impossible for even a highly motivated human being to maintain adequate visual attention toward a source of information.

Currently, individuals face more visual attention and timely reaction demands, such as following the latest, complex, and balanced scorecard or other business intelligence tools. Additionally, workload variation due to automation, from underload to rapid overload (Parker & Grote, 2020), requires managers to react on a timely basis. Therefore, job demands based on physical strength have shifted to demand for timely reactions and sustained attention (Juyumaya & Torres, 2022).

A large amount of data demands that individuals pay visual attention to and react opportunely. Individuals need to respond quickly to various stimuli and then manage the information to deploy a solution to diverse problems, such as reading algorithm black boxes, providing timely responses to customers and clients, managing the supply chain, or managing the relationships between the company and stakeholders and shareholders because of the latter's requests through various digital platforms.

A decision-making task is an episode that frequently occurs in the work environment (Csikszentmihalyi, 2014), especially in future jobs. To a better understanding of this type of episode, this study examines an episode that has been divided into sub-episodes of decision-making within the task. The sub-episodes are on a tremendously small temporal segment. I examine the sub-episodes of the first milliseconds in which an individual identifies, organizes, and interprets relevant information about resources to make a decision to satisfy a demand. The proposed hypotheses were settled using an episodic perspective at the decision-making level during a task.

This complication is of concern because when an individual is more absorbed at a given time, the or higher success rate will be higher in the learning, problem-solving, and decision-making tasks, whether in the laboratory's confines or the natural world's complexity (Csikszentmihalyi & Nakamura, 2010). Furthermore, I argue that studying the concept using neuroscience techniques helps to understand task absorption more fully. One of the limitations of the field is that absorption has mainly been studied using self-report measures.

Although the experience of absorption is subjective by nature, an overreliance on personal (self-report) methods limits the refinement of the construct and its divergent validity vis-à-vis other constructs, such as motivation or simply optimal task performance. For example, there is an ongoing discussion on how task absorption differs from other mental states, such as mindfulness or intense concentration (Kee & Wang, 2008; Reid, 2011; Sheldon et al., 2014). One of the advantages of doing so is that it opens up possibilities for new insights into task absorption and novel ways of measuring the phenomenon.

The course of action to address this concern entails studies of the interaction between task characteristics and episodic task absorption based on job demands and resources (JD-R) theory (Bakker & Demerouti, 2017) and the episodic process model (EPM) (Beal et al., 2005). JD-R theory (Demerouti et al., 2001) explains different individuals' states of mind in the context of work. One of the JD-R theories is that job demands and resources instigate two different processes: strain and motivation (Bakker & Demerouti, 2017).

On the other hand, the EPM (Beal et al., 2005) proposes that an individual's experience during a working day is organized around episodes. An episode is a time segment with coherent thematic organization around a work-related goal (Weiss et al., 2004). Based on these theories, I propose that task characteristics, namely demands and resources, are related to an individual's task absorption, namely immersion, and attention.

As previously mentioned, I resorted to eye-tracking analysis to measure task absorption during the task. Several studies have shown a relationship between an individual's attention and pupil diameter (e.g., Hopstaken et al., 2012; Hopstaken et al., 2015). Compared with other biomarkers (e.g., sweat analysis or cardiac activity), pupil diameter is a good proxy for attention in decision-making tasks. The pupil diameter captures data in a cleaner manner (i.e., less space for confounding variables). It accurately captures data (i.e., allows the analysis of attention to stimuli in short periods, such as milliseconds). The task involves managing demands and resources during a specific time with different levels of demand/resource (cf. Setting the Conditions section).

This dissertation contributes to the literature. First, I offer an episodic view of JD-R theory, showing that task characteristics are related to episodic task absorption, namely that episodic task absorption fluctuates synchronously as a function of concurrent appraisals of demands and resources (Bakker & Demerouti, 2017). Thus, the episodic view adds a more experiential understanding of how task absorption may change within one person depending on the specific conditions —a constellation of job demand/resources — in which the individual is involved during the task. This approach complements the within-person perspective of how task absorption differs between different conditions over time during an episode. With these insights, I can say that JD-R prediction is not always static.

Second, I delivered empirical evidence for the EPM proposition that attention facilitates performance during an episode, namely that episodic task absorption positively relates to task performance, using evidence from physiological, behavioral, and self-reported data. In this study, demand and resource levels change during repeated decision-making episodes. The levels of demands and resources generate different levels of task absorption

that consequently cause different levels of task performance. Therefore, task absorption would vary within the task.

Also, this study contributes to managerial practices. The results of this study can be used for time management and job recovery programs in which individuals become aware of their pacing styles and the importance of breaks when performing a decision-making task (Berman & West, 2007), highlighting the importance of physiological measures that can complement self-reported measures (Bakker & Demerouti, 2017) and provide a more objective indicator of task absorption.

In sum, I offer an episodic view of JD-R theory, showing that demands and resources can be related to episodic task absorption. This dissertation is the first approximation of episodic task absorption. It makes an incremental contribution that can supplement the JD-R theory (Bakker & Demerouti, 2017) and delivers empirical evidence to the EPM (Beal et al., 2005). Finally, it verifies the importance of experimental studies and lays the groundwork for future research.

1.2. Purpose of the Study and Research Objectives

Following the episodic process model (EPM) proposition that job performance is episodic (Beal et al., 2005), I test the JD-R premises (Bakker & Demerouti, 2017; job demands and resources instigate two very different processes, namely a health-impairment process and a motivational process) at the episode level in an individual task setting. Specifically, I study whether job resources in a work activity relate to higher episodic task absorption, particularly in combination with job demand (Bakker & Demerouti, 2014). In terms of practical implications for individual career development, this research informs

individuals about the importance of learning how to utilize their job resources to deal with the job demands they experience during a work activity.

I examine how task characteristics (i.e., episodic job demands and job resources) adopted from JD-R theory (Bakker & Demerouti, 2014) explain within-subjects' variability in task absorption. The choice of an experimental study enabled us to observe how individuals experience episodic task absorption during a specific work activity. This study's design investigates episodic fluctuations as opposed to general experiences, allowing us to test whether variations in episodic task characteristics result in immediate changes in task absorption (Ilies et al., 2007). Additionally, a neuroscience method gives us more insight into a person's specific drivers of task absorption at the activity level. It integrates more objective indicators of task absorption. In particular, the formal objectives of the study are the following.

Research objective 1: Examine how job demand and job resources relate to episodic task absorption:

Research objective 1a: Empirically analyze the individual's immersion (decision time) during a decision-making task.

Research objective 1b: Empirically analyze the individual's attention (pupil diameter) during a decision-making task.

Research objective 2: Examine if episodic task absorption is positively related to task performance.

Research objective 2a: Empirically analyze the relationship between individual's attention and task performance during a decision-making task.

This dissertation tests a central proposition in the JD-R theory using an episodic perspective at the task level. Hence, this research examines how individual task absorption

fluctuates synchronously as a function of concurrent appraisals of job demands and job resources. Combining JD-R theory with the episodic perspective may result in better predictions and fruitful insights regarding the specific conditions (constellations of job demands and job resources) that trigger positive experiences and facilitate compelling performances.

Besides, most JD-R studies have used self-reported job demands and resources and self-reported measures of task absorption. The problem with such measures is that the same person provides all information. Therefore, statistical relationships between constructs may be inflated due to common source bias. Future studies will also benefit and impact other research fields if scholars integrate more objective indicators of the prevailing job demands and resources and the possible results.

1.3. Organization of the Study

This dissertation will have the following structure. In chapter 2, I review the literature on JD-R research at the individual level of analysis. This review will emphasize the nature of task absorption. Chapter 3 explain a method from neuroscience called the eye-tracker. Chapter 4 introduces the theory and the hypotheses and describes new job demands at a theoretical level. Then I discuss theoretical arguments to predict and test several Hypotheses. Chapter 5 describes the methodology of the main study, including a description of measures and data collection strategies. This chapter also describes the analytic approaches to test each specific hypothesis. Chapter 6 describes the main results of the hypothesis testing procedures, and Chapter 7 discusses the results, evaluates their implications, and proposes future lines of research. Finally, Chapter 8 highlights the conclusions of the present dissertation.

CHAPTER 2: LITERATURE REVIEW

2.1. Overview of the JD-R Theory

The number of studies that use the Job Demands-Resources model is constantly increasing (Bakker & Demerouti, 2007; Demerouti & Bakker, 2011; Demerouti et al., 2001; Juyumaya & Torres, 2022). The model has been used to predict work engagement (Bakker et al., 2005, 2008; Demerouti et al., 2001; Bakker et al., 2007; Hakanen et al., 2006), including absorption. In addition, the JD-R model has been used to predict the consequences of these experiences, including sickness absenteeism (Clausen et al., 2012; Schaufeli et al., 2009) and various types of job performance (Bakker et al., 2008; Bakker et al., 2004; Juyumaya, 2022). There are many studies, new propositions, and meta-analyses (Crawford et al., 2010; Nahrgang et al., 2011) that the model has matured into a theory.

We can understand, explain, and predict employee well-being and job performance with the JD-R theory. Thus, two broad categories of working conditions are identified, i.e., job demands and resources, applied to three different occupations, namely, employees that work with things, information, or people. This results in Proposition 1 of the model, namely that all task characteristics can be classified into job demands and resources. Job demands are those physical, psychological, social, or organizational aspects that require sustained physical and psychological effort and are associated with specific physiological and psychological costs (Demerouti et al., 2001; Juyumaya et al., 2021). Examples are high work pressure and emotionally demanding interactions with clients or customers.

Job resources refer to those physical, psychological, social, or organizational aspects of the job that are functional in achieving work goals, reducing job demands and the

associated physiological and psychological costs, or stimulating personal growth, learning, and development (Bakker & Demerouti, 2007; Bakker, 2011; Juyumaya & Demicheli, 2022). Examples of resources are autonomy, skill variety, performance feedback, and growth opportunities.

Proposition 2 of JD-R theory is that job demands and resources instigate two very different processes: health impairment and motivation. Proposition 3 argues that resources can buffer the impact of job demands on the strain. For example, Xanthopoulou, Bakker, Dollard, et al. (2007) found in their study among home care professionals that several resources (autonomy, social support, performance feedback, and opportunities for professional development) could buffer the relationship between job demands (emotional demands, patient harassment, workload, and physical demands) and burnout. This means that home care professionals did not experience high levels of exhaustion and cynicism after confronting demanding client interactions when they had access to sufficient resources.

Proposition 4 in JD-R theory is that resources influence motivation when high job demands. This proposition is consistent with Hobfoll's (2001) notion that all resources gain their motivating potential and become particularly useful when needed. Jobs that combine high demands with high resources are so-called active jobs (Karasek, 1979) that challenge employees to learn new things and motivate them to use new behaviors.

Proposition 5 is that personal resources such as optimism and self-efficacy can play a similar role as resources. Personal resources refer to people's beliefs regarding how much control they have over their environment. Individuals high in optimism and self-efficacy believe that good things will happen to them and handle unforeseen events. In addition, personal resources are expected to buffer the undesirable impact of job demands on the strain and boost the desirable effect of (challenge) job demands on motivation.

Proposition 6 in JD-R theory is that motivation positively impacts job performance, whereas job strain harms job performance. Motivation helps to be goal-oriented and focused on the work tasks. In addition, engaged workers have all the energy and enthusiasm to perform well. In contrast, workers with high exhaustion or health complaints do not have the energy to reach their work goals and objectives.

Proposition 7 in JD-R theory is that employees motivated by their work are likely to use job crafting behaviors, leading to higher levels of job and personal resources and motivation. Over the last five years, research has provided convincing evidence for the effectiveness of job crafting. For example, Tims et al. (2013) found that job crafting in seeking challenges and resources predicted positive changes in the work environment, indirectly related to increased task absorption and job satisfaction and decreased burnout.

Vogt et al. (2016) also used a longitudinal design. They found that employees who proactively built a resourceful and challenging work environment increased their psychological capital (hope, resilience, self-efficacy, and optimism) and task absorption. Finally, Proposition 8 is as follows: Employees who are strained by their work are likely to show self-undermining behaviors, leading to higher job demands and even higher levels of job strain.

In applied research in organizations, job demands and resources are usually assessed at the individual level. JD-R theory (Bakker & Demerouti, 2014; 2017) is one of the most often used theories to explain task absorption. This theory proposes that task characteristics and personal resources predict job performance through employee task absorption. Accordingly, task absorption is most likely when workers are confronted with high challenges and have the right job and personal resources available to deal with these challenges (e.g., Bakker & Sanz-Vergel, 2013; Tadic et al., 2015; Juyumaya, 2019). Still, much needs to be learned

about the complex link between stable traits and fluctuating task characteristics on the one hand and task absorption on the other.

JD-R theory proposes that task characteristics and personal resources predict job performance through task absorption. Most job demands and resources can evoke two separates, albeit related, processes: (1) an energetic process of wearing out in which high job demands exhaust employees' mental and physical resources and may therefore lead to burnout and eventually to ill health; and (2) a motivational process in which resources boost task absorption (Schaufeli & Bakker, 2004). For instance, Schaufeli & Bakker (2004) applied the JD-R to explain absenteeism and turnover intention of call center employees of a telecom company.

Job demands were the most important predictors of health problems, which, in turn, were related to absence because of sickness (e.g., duration and long-term absence). Nevertheless, job resources, such as transformational leadership, performance feedback, and time control, were the predictors of task absorption, which, in turn, were related to turnover intentions. Because of their intense dedication to and focus on their work, engaged employees display better task performance (Xanthopoulou et al., 2009; Christian et al., 2011; Juyumaya, 2018).

Moreover, engaged employees have more creative ideas because of their openness to new experiences. They are more likely to innovate and be entrepreneurial. In addition to these individual-level performance results, research has shown that engaged employees are more inclined to help their colleagues. Task absorption has been positively associated with team performance (Tims et al., 2011). Task absorption crosses over from one individual to another and has essential ripple effects on teams (van Mierlo & Bakker, 2018).

This research delves into studying the cognitive dimension of task absorption (i.e., absorption). Bakker et al. (2008) argue that task absorption is a positive, fulfilling, work-related experience that encompasses three complementary dimensions: energetic (vigor), affective (dedication), and cognitive (absorption). Vigor refers to high levels of energy while working (Bakker, 2020). Dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, and work challenge. Finally, the absorption dimension is related to being immersed in their work activities that time seems to fly. Absorption is related to visual attention, concentration, and task engagement. For instance, visual perception affects decisions, including how job resources satisfy job demands (van der Linden et al., 2021). In section 2.3. I explain absorption using at task level.

2.2.The Episodic Process Model

The first step toward meeting the goal of linking affective experiences to within-person performance is to describe a within-person temporal unit of performance that complements the time-bound, transient, and changing nature of affective states. This task involves disaggregating performance aggregations into time-bound units, in which performance is responsive to momentary changes in affective conditions.

Barker (1963) was the first to recognize that the stream of experience that constitutes people's daily lives is composed of a series of episodes that have a coherent thematic organization and are associated with specific people, occurrences, and goals. Individuals get up, have breakfast, go to work, have lunch, take a break, and otherwise engage in all compartmentalized, coherent activities. Barker realized that the continuous flow of daily behavior could be segmented into natural units, making behavioral episodes a cornerstone of ecological psychology.

Behavior episodes refer to these activity units with recognizable thematic coherence. Research within and outside the ecological psychology tradition has found that actors and observers' structure behavioral streams episodically and generally agree on the breakpoints for these episodes, with goal structures serving as organizing elements (Newtson & Engquist, 1976). Barker also observed that episodic behavior is organized around goals, personal strivings, or desired states (Craik 2000). Specifically, Barker claimed that episodes have, as a standard feature, behavior directed toward a single end state or goal (Barker, 1968).

Beal et al. (2005) suggested that within the daily stream of behaviors engaged at work (i.e., one element of the stream of experience) are units called performance episodes. These are naturally segmented, relatively short episodes thematically organized around work-relevant immediate goals or desired end-states. Performance episodes are essential to EPM because they affect performance and provide a within-person performance structure to complement the transitory states of moods and emotions. Like affect, they are time-bound, and their beginnings and endings are subjectively experienced. Furthermore, they form a structure through which people describe their performance experiences.

Beal et al. (2005) did not say that performance episodes are equivalent to affecting episodes in time. However, transient affective states overlap with performance episodes, compete for resources, influence attentional focus, and affect behavioral styles relevant to effective task accomplishment. The coexisting affective state controlled the quality of each performance episode.

In addition, performance episodes are not equivalent to tasks. Tasks such as episodes are organized around organizationally relevant goals or objectives. However, episodes are also bound by a structural element of time. The episode ends when one either reaches the desired end state or abandons achieving that end state. However, tasks can be quickly

returned later. Each time someone returns to work on a task, they begin a new performance episode (Beal et al., 2005).

Thus, performance episodes are nested within tasks if people work on the same task multiple times. Furthermore, not all behavior episodes involve objective organizational themes; therefore, not all are performance episodes. Thus, suppose a manager receives an important yet organizationally irrelevant phone call. In this case, the call represents a behavior episode (assuming some desired end state to the conversation) but not a performance episode (Beal et al., 2005).

Performance episodes are behavioral segments thematically organized around organizationally relevant goals or objectives (Beal et al., 2005). Of course, the stream of behavior is not as linear as implied by the preceding discussion. People's daily lives are more experienced than the progression of self-contained segments. Individuals move back from one activity to another, sometimes with little closure, and often attempt to juggle multiple objectives. Some episodes may remain active or open as they progress from one activity to another. Although they do not hold momentary attention, they do not subjectively feel that they have decided to terminate an episode. Indeed, the concept of polychronicity, or the act of engaging in several activities simultaneously, captures this complexity and has received recent attention in organizational literature (e.g., Bluedorn, 2002; Palmer & Schoorman, 1999).

Consistent with the literature, Beal et al. (2005) acknowledged that multiple episodes can coexist. However, they made two critical assumptions when describing the concept of performance episodes. First, although attention may shift from one performance episode to another, the bulk of an individual's attention can only be focused on one activity at a time. People may have polychronic experiences that they label multitasking. However, it is unclear

whether attention is applied to two or more things simultaneously or whether attention constantly shifts back and forth, imparting only the perception of simultaneity.

Second, even when people subjectively experience shifting from one task to another, when they have more than one open episode, they can adequately ask about performance during a single focal episode. Attempts to focus attention on more than one event or episode ultimately decrease a person's ability to perform on one or more of the competing targets (Schneider & Fisk, 1982). In sum, Beal et al. (2005) stated that performance episodes describe the temporal progression of work-related activities throughout the day. These episodes are time-bound units of work activity nested within tasks.

Affective states influence one's ability to perform effectively during these episodes. As people approach their work, they bring various resources to bear on their tasks. These are skills, task-relevant knowledge, and general cognitive abilities (Ackerman, 1988). People vary in the number of available resources (Ackerman 1987; Humphreys 1978). Some developed more skills through training or experience. Some people were more conscientious. These relatively stable between-person characteristics account for workers' differences in their average performance levels (Ackerman, 1986). As such, these factors are prominent in general models of performance differences (McCloy et al., 1994).

It is also readily apparent that successful performance at any particular time requires people to bring these different resources to bear the problem (Kanfer et al., 1994). People have to direct their resources toward task accomplishments. The broad concept of attentional focus thus captures this concept. Performance is facilitated to the extent that attention and resources are focused on the work (Hirst & Kalmar, 1987; Kahneman, 1973). The performance will suffer when attention and resources are focused elsewhere (Schneider & Fisk, 1982; Speier et al., 1999). This is a simple but essential idea. During an entire

performance episode, someone can devote 100% of their resources to a task. In this case, that person will be maximally effective, with maximal effectiveness gauged in terms of the limitations of the person's own general and stable levels of resources (Beal et al., 2005).

Beal et al. (2005) argued that an important way in which affective states influence episodic performance is by creating attentional demands that take people off task. Here, we only wanted to introduce off-task attentional demand as a core influence on episodic performance. There are several ways a person's attention can be pulled away from a task. The most apparent off-task demand for an individual's attention is a distraction or interruption. People and conditions in their work environments often occupy attentional resources that can be used for performance-related activities (Jett & George, 2003). We reserve our discussion of these processes and other performance-relevant processes.

It is important to note that these distractions can easily have an affective tone and, therefore, may be the source of further attentional demands beyond the mere presence of a distraction. In particular, interruptions can often generate additional thoughts long after the cause of the interruption has been left (Klinger, 1996; Yee & Vaughan, 1996). To the extent that these thoughts are not focused on the focal performance episode, they represent demands on a person's attention, which can negatively affect performance. This negative impact can be exacerbated if cognitive interference has goal relevance.

Indeed, many authors have discussed how ruminative thoughts can consume cognitive resources that might otherwise be used for immediate performance (e.g., Martin & Tesser, 1996; Thompson et al., 2002). These demands can result from affective events and experiences. Therefore, they play a crucial role in how people regulate their cognitive resources for episodic performances. However, when off-task concerns are present in the work environment, it is not impossible to stay focused on work activities; people frequently

focus on tasks despite a myriad of off-task events, thoughts, and circumstances. To the extent that these factors can be easily ignored, attention to the focal performance episode will be facilitated. The process by which people determine in what direction they will apply their resources represents another concept that includes an individual's core processes (Beal et al., 2005).

From an episodic perspective, regulation determines whether people can and will focus their resources on accomplishing the primary work task in the face of demands that naturally divert their attention. Successful regulation, that is, success from the viewpoint of episodic performance, requires that people regulate the direction of their attention and the application of their resources to the work task in the face of natural inclinations to do otherwise. Achieving successful regulation is a function of two key factors: regulatory resources and task attentional pull.

Muraven & Baumeister (2000) suggest that regulatory resources apply to all aspects of self-regulation. Therefore, whether a person is trying hard to stay focused on work, suppressing the urge to laugh or yell, or simply staying true to a diet plan, regulatory resources are consumed and may not be available later to maintain attentional focus on the task at hand. Although such a claim may meet with some skepticism, Baumeister and his colleagues repeatedly found evidence supporting the notion that vastly different forms of self-regulation draw on the same resource (e.g., Baumeister et al., 1998).

Furthermore, cognitive resources have been found not to deplete this resource (Muraven et al., 1998). Conversely, prior self-regulatory efforts appear to affect task effort and persistence but not the cognitive aspects of tasks (Baumeister et al., 2002; Vohs et al., 2013). Thus, regulatory resources seem to provide an "engine" specifically for acts of self-regulation, not for pure cognition. Of course, many forms of higher-order understanding

require the brain's executive function (Crinella & Yu, 1999) and, therefore, will deplete regulatory resources to some extent.

The relative levels of regulatory resources play a prominent role in influencing episodic performance. At various times of the day, depending on the regulatory efforts that have occurred throughout the day, the ability to regulate attention toward the task at hand fluctuates with this resource. Thus, regulatory resources determine an individual's ability to control resource allocation.

In addition to the implications for the performance of a single person across the workday, it seems likely that the overall level of resources will vary from person to person, suggesting an area of individual differences that should predict performance, particularly on tasks that require greater levels of regulation for successful completion. Regulatory resources help individuals resist the pull of off-task attentional demand. So, too, does the attentional pull of the task itself. Many factors can relieve the regulatory burden of staying on a task; we present a few examples to illustrate this concept. Here, we refer to the importance of the task, intrinsic interest in the task, presence and difficulty of task goals, the existence of deadlines, etc. Many of these factors map to the broad literature on work motivation. For example, a phone call from one's spouse may be particularly distracting; however, the importance of the task may make it easier to focus attention on the task.

For example, it is well known that specific challenging goals enhance performance (Locke and Latham 1990). Locke and Latham suggested that this performance effect results from four processes: task-relevant knowledge and strategies, increased effort, persistence, and attention. Therefore, setting challenging, specific goals and avoiding distracting elements of emotional events may be easier than without those goals. Shah, Friedman, and Kruglanski (2002) showed that activating one goal inhibits the accessibility of other purposes. This

finding is consistent with our idea that goals produce attentional pull. However, research still needs to be conducted on whether the shielding effect of goals can be more generally applied to other distractions. Another example of task attentional pull involves intrinsic motivation (Harackiewicz et al., 2005; Pintrich & de Groot, 1990). Suppose that a task generates significant interest in employees. In this case, it should be easier for these employees to effectively regulate their attention toward the task instead of other potential distractions, including interfering with emotional events. To the extent that tasks are intrinsically motivating, they should have a relative advantage over less intrinsically motivating tasks in combating distractions and cognitive interference.

In the present study, I propose that the motivational process proposed by JD-R theory may also become apparent at the episodic level. Theoretically, we refer to EPM (Weiss et al., 2004) to explain episodic fluctuations in job demands and resources. This model proposes that people's experiences during a working day are organized around episodes with a coherent thematic organization around the work-related goal. As these goals change, employees' work activities and the number of job resources and demands around the activity (Sonnentag, 2017).

Furthermore, JD-R theory claims that job demands interact with job resources to predict employee well-being. The nature of this interaction may depend on the type of demands that the task absorption-performance link employees' encounter. According to the challenge-hindrance stressor framework (Cavanaugh et al., 2000), demands can be categorized as challenging or hindering job demands. Challenge demands are defined as aspects of the job that cost effort and energy but also provide fulfillment and opportunities for growth. Examples of challenge demands include workload, time urgency, and job complexity. Hindrance demands are aspects of the job that cost energy and evoke stress but

constrain the individual interfering with a person's ability to achieve goals. Such demands in organizations include red tape, hassles, and role conflicts.

Previous empirical studies have shown that when workers confront hindrance job demands, they experience adverse work outcomes (Crawford et al., 2010), such as lower task absorption (Tadić et al., 2015) and impaired job satisfaction (Cavanaugh et al., 2000). In this study, I investigated whether an episodic hindrance job demand that managers confront during a work activity undermines the association between job resources and task absorption. JD-R theory claims that job resources positively influence task absorption, especially when job demands are high.

According to our study, individuals may use job resources to transform stress (potential energy) triggered by challenging job demands into motivational energy, resulting in episodic task absorption (Bakker & Sanz-Vergel, 2013; Kühnel et al., 2012; Tadić et al., 2015). It is a person's focus on attention, absorption, and available energy directed toward work-related tasks (Bakker, 2014).

2.3. Task Absorption

Absorption reflects a condition where one is concentrated and happily engrossed in one's work, whereby time passes quickly, and one has difficulties detaching oneself from work (Schaufeli & Bakker, 2004). To the best of my knowledge, there is not a well-established scale of task absorption with an episode perspective. Hence, trying to measure this construct was a challenge. For this reason, I resorted to a method from neuroscience named eye-tracking (cf. Chapter 3). In the chapter, I explain this method and the use of pupil diameter as a biomarker of task absorption.

Following the mentioned definition, this research defines task absorption as a state of mind related to being fully concentrated and happily engrossed in one's task, whereby time passes quickly. One has difficulties detaching oneself from the task. The theoretical basis for the construct derives from several closely inter-related research streams (Saadé & Bahli, 2005), which identify task absorption either as an individual's trait involving a high propensity to engage in events with total attention (e.g., Tellegen & Atkinson, 1974) or as a state of heightened concentration, positive affect, and feelings of timelessness that is considered to be characteristic for conditions identified as flow (Csikszentmihalyi, 1990), engrossment (Mainemelis, 2001), and task absorption (Schaufeli & Bakker, 2004).

With this basis, I follow the criteria of coherence and scope (Podsakoff et al., 2016; Suddaby, 2010) of task absorption, considering their key relationships: (1) Task absorption emergence from job demands and job resources, based on the JD-R theory (Bakker & Demerouti, 2017); and (2) Task absorption consequences and outcomes and results (i.e., task performance) based in the EPM perspective of task performance (Beal et al., 2005).

The current organizational demands necessitate careful management of scarce temporal resources for employees to experience task absorption even under the pressure of tight deadlines. According to the interactionist approach, individual and organizational factors are essential in creating such an environment (Woodman et al., 1993). Prior research has supported the role of personal temporal characteristics, such as time urgency (Landy et al., 1991), time perspective, and polychronic (Bluedorn et al., 1992), in the formation of work experiences and outcomes (Conte & Jacobs, 2003; Hecht & Allen, 2005; Gilson & Shalley, 2004). Van der Linden et al. (2020) related task absorption with the flow. Flow is likely when there is a match between a person's skills and the task challenge. In this paper, van der Linden et al. (2020) discuss a set of large brain networks that may be involved in establishing the

core dimensions of flow. The interaction between three large-scale attentional networks, namely the Default Mode Network, Central Executive Network, and the Salience Network, is proposed to play a role in the strong task absorption, low self-referential thinking, feedback, and feelings of control in flow. They suggest that dopaminergic and noradrenergic systems mediate intrinsic motivation and activate mood states typical for flow. Therefore, flow is a state of complete task absorption accompanied by a strong drive and low self-referential thinking levels. Whereas, this research is focus in absorption, future studies need to continue investigate the flow-absorption relationship. In the next section, I make the hypotheses development.

CHAPTER 3: HYPOTHESES DEVELOPMENT

4.1. Setting the Conditions

The classic JD-R approach has been challenged by findings of a dynamic approach to task characteristics when people perform episodic work activities (see Reina-Tamayo et al., 2018; Hopstaken et al., 2015). This approach has led to a new interpretation of task characteristics as multi-faceted, signaling that by considering what various measures of task characteristics assess, it is possible to differentiate different aspects of task characteristics (i.e., job demands and job resources).

Beal & Weiss (2013) suggest that work experience consists of coherent segments (episodes). The most critical elements of these episodes are deeply encoded in memory and form our daily expertise related to performance at work. Therefore, we need to focus on episodes to grasp work experience and understand the interplay between work events/situations/characteristics and experiences/well-being/motivation.

Critical for effective functioning at work is whether individuals can invest the right job resources in the task, whether they are able and motivated to keep their attention to the task, and affective experiences during task execution. This research delves into studying task absorption. The absorption is related to being immersed in their work activities that time seems to fly. Further, absorption is related to visual attention, concentration, and cognitive effort (Bakker & Demerouti, 2017; van der Linden et al., 2020). In line with this idea, Hopstaken et al. (2015) reported that task engagement is related to pupil diameter.

Oerlemans & Bakker (2013) and Weiss & Cropanzano (1996) suggest that a dynamic approach to task characteristics echoes other episodic processes, where the interpretations of

specific events as they happen to cause essential changes in the task experience. The lack of extensive research about episodes and task absorption in most previous studies may have restricted scholars in the possibility of exploring a more dynamic view of the JD-R theory by only allowing focus on either daily work or other average subjective work conditions that partially contain information about behavioral and physiological evidence about perceived job demands and job resources.

Thus, the present study aims to create a more comprehensive understanding of task absorption during an episode by introducing job demands and job resources in a task environment. Furthermore, this research aims to provide a more precise and comprehensive understanding of task absorption during an episode and deepen knowledge about perceived task characteristics through pupil diameter.

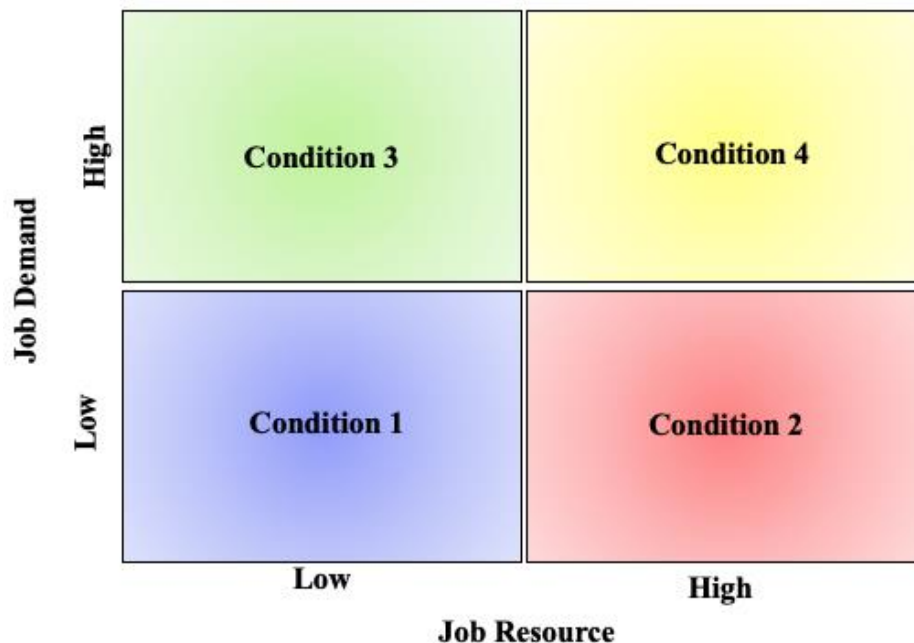
This dynamic process in the JD-R theory occurs on a small scale and repeatedly during the task's duration. Assuming this perspective, an individual might feel engaged at one point and exhausted at another. In addition, while a large amount of job demand and a large number of job resources can generate motivation, it is also possible that it creates job strain since this process will depend on the perception of the gap in job resources that the individual perceives at the moment. That is, of its evaluation between the job resources required and the job resources available.

As in any assessment, cognitive biases also can play a crucial role in constructing this perception of the gap in job resources. Nevertheless, a complication occurs because these cognitive limitations affect how individuals perceive job demands and job resources at the task level. Job demands pressure to have further job resources (Bakker & Albrecht, 2018). Starbuck & Milliken (1988) state that effective perceptual filtering amplifies relevant information and attenuates irrelevant information. The relevant information enters the

perceptual foreground, and the irrelevant information recedes into the background. The filtered information is less accurate, but if the filtering is practical.

The study of fluctuations in the visual attention of individuals involves a cognitive process associated with how the individuals perceive the stimuli of job demands and job resources. I argue that individuals' cognitive limitations also influence how they respond to job demands using resources in a specific task environment. I build four conditions to study the different job demand/resource combinations. Conditions are the sets of the trials that follow the task characteristics looked: (1) Condition 1: Low job demand/Low job resource; (2) Condition 2: Low job demand/High job resource; (3) Condition 3: High job demand/Low job resource; and (4) Condition 4: High job demand/High job resource. Figure 1 shows the established conditions for this experiment.

FIGURE 1
Established Conditions



Because it would be very complex to tender job demands and job resources at the task level at a social or cognitive level, we used the Beer Distribution Game to promote these changes. Specifically, the job demand will be the demand for beer per week, and the job resources will be the level of the final inventory at the time the beer order is made. In this way, I can create our four conditions, these conditions which will be related to different psychological states, such as boredom in the state (condition 1), apathy (condition 2), exhaustion (condition 3), and absorption (condition 4).

As I mentioned, in JD-R theory, job demands are defined as aspects of work that require effort and are associated with physical and psychological costs. Job demands play a crucial role in the health-impairment process but not in the motivational process. However, some authors have argued that job demands may also be motivational. LePine et al. (2005) distinguish between hindrance and challenge job demands. Hindrance job demands are defined as work demands or circumstances involving excessive or undesirable constraints that interfere with or inhibit an individual's ability to achieve valued goals (Cavanaugh et al., 2000).

Examples of hindrance job demands are role conflict, role overload, and role ambiguity. In contrast, challenging job demands are defined as demands that cost effort but potentially promote the employee's personal growth and achievement (Podsakoff et al., 2007). Examples of challenging stressors are high workload levels, time pressure, and responsibility (McCauley et al., 1994). These job demands have the potential to be seen as rewarding work experiences well worth the discomfort involved and are therefore considered "good" stressors. However, research has shown that challenge demands may be experienced as hindrance demands (and vice versa) depending on the context.

Although it is possible to separate the job demands into challenging and exhausting, several studies mention that this categorization will depend on the context and how the participant perceives it. For instance, Bakker & Sanz-Vergel (2013) found that nurses experienced work pressure as a hindrance demand rather than a challenge job demand. Moreover, some scholars have found that demands are sometimes challenging and hindering (e.g., Searle & Auton, 2015; Webster et al., 2011). Given the characteristics of the task and the participants, it is that in this study, we will not make the distinction between these two types of demands.

4.2. Time of the Decision

Individuals' visual attention changes the perception of job demands and resources during task execution. Thus, the interaction between job demands and resources is not perceived with the same intensity. As we said early, task absorption is related to being immersed in their work activities that time seems to fly. Absorption is related to visual attention, concentration, and task absorption (van der Linden et al., 2021).

Task absorption can be generated depending on visual attention. This investigation delves into how visual perception affects the decision-making of individuals who must adjust their resources to job demands. We supplement the study of task absorption by analyzing the individual's visual attention to the job demand and job resources during the task, explaining the task performance of the strategic decision-making process associated with this type of episode.

Human information processing is limited in capacity. Selective attention is vital in reducing information overload by prioritizing relevant information for further processing. Knowledge is assumed to be selected according to behavioral goals and inhibited when it is

irrelevant. Yet, task-irrelevant stimulus salience also attracts attention. In visual search, studies have shown that a stimulus that matches a top-down attentional set captures attention; for example, a stimulus that matches the contents of working memory is located faster in a selection task (Yang, 2017). By contrast, other studies focusing on bottom-up attention illustrate automatic attentional capture by task-irrelevant salient distractors (e.g., abrupt onset, color singleton).

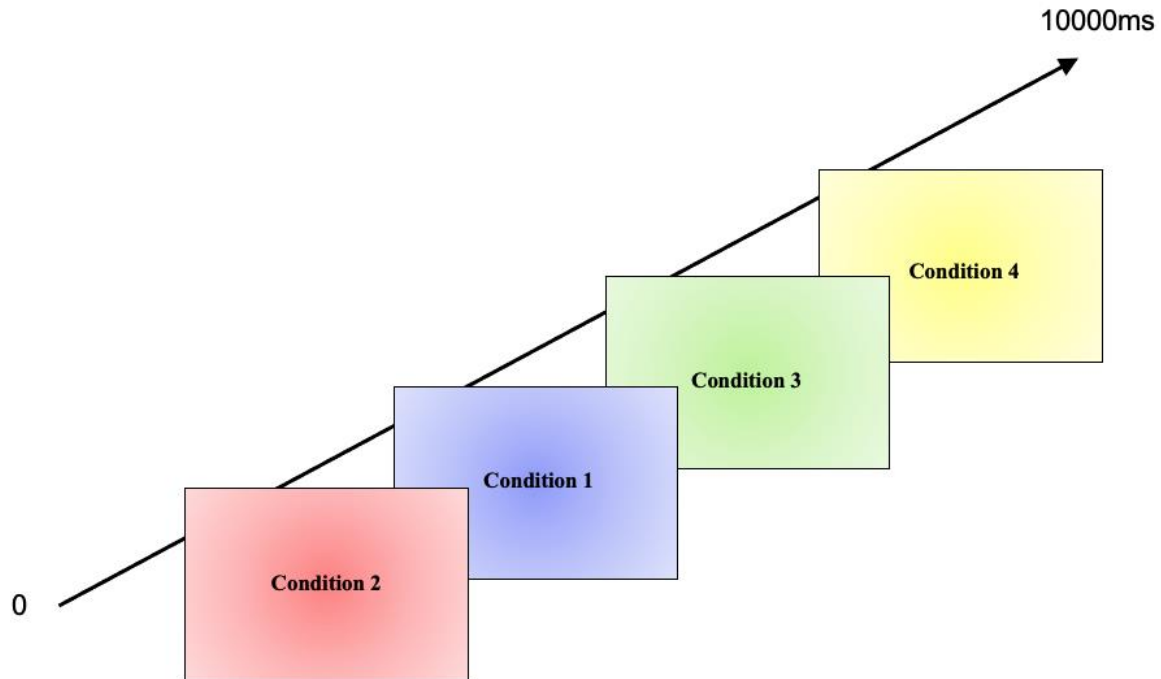
Both top-down goals and bottom-up salience and their interaction bias attention to select information at the perceptual processing level (i.e., biasing attention to a specific visual dimension for further processing). The interaction between top-down and bottom-up factors during perception should affect the subsequent decision-making because information accumulation is thought to involve sampling evidence from the percept to drive a decision process.

However, few studies have systematically examined top-down factors such as task characteristics, job demands, and job resources. Eysenck (1979) has suggested that task characteristics are associated with high levels of task absorption due to the increasing time that the individual uses to make a decision. Further, Bakker (2014) argues that absorption captures how individuals experience their work as something to which they want to devote time. Thus,

Hypothesis 1. Different levels of demand/resource generate different levels of episodic immersion during a decision-making task.

For a better understanding, Figure 2 represents the hypothesis related to time decisions where different levels of demand/resource generate different levels of episodic immersion during a decision-making task.

FIGURE 2
The Hypotheses of Time Decision



4.3. Job Demands/Job Resources Conditions

In complex environments, individuals' effective perceptual filtering requires detailed knowledge of the task environment. For instance, systems engineers sometimes try to design filters that minimize perceived errors, including extraneous information, biases, noise, static, or interference between simultaneous messages (Sage, 1981). To develop an error-minimizing filter for some tasks, an engineer would make assumptions about the possible stimuli sources and distinguish relevant from irrelevant sources.

An error-minimizing filter predicts where errors will occur in perception and either removes or prevents them. An error-minimizing filter would incorporate numerous complex assumptions in a task environment as complex as most real-life environments (Ashby, 1960). For the filter to reduce perceptual error, these assumptions must be correct.

Hence, individuals do not perceive job resources with the same intensity. A continuous pattern is not followed. The individuals do not perceive the job resources the same way. The pattern is not constant. Thus, individuals' decision heuristics are anchored to the perception of the relevance of job demands and job resources. I can study this perception through individuals' pupil diameter. The study conducted by Krucien et al. (2017) states that visual attention: 1) Would be best described as a continuous rather than a binary concept, and 2) recognizing the continuous nature of attention would reveal more information about individuals' preferences. Additionally, Shimojo et al. (2003) and Krajbich & Rangel (2011) argue that visual attention and preferences cannot be perfectly dissociated as they influence each other in a positive feedback loop: 'The longer I look at something, the more I like it, and the more I like something, the longer I look at it.' This suggests that visual attention contains valuable information about individuals' preferences.

The visual perception process has three significant aspects (Krucien et al., 2017): 1) Identification of the stimulus; 2) Organization, related to the organization of the information and the creation of heuristics; and 3) Interpretation process for decision-making. In other words, a continuous pattern is not followed. Accordingly, there are some things clear related to this process: 1) The person does not perceive in the same way the job demands and resources; 2) The pattern is not constant, and 3) Individual decision heuristics are anchored to the perception of the relevance of job demands and job resources. Intensity differences in how resources and demands are perceived. Because the resources and demands are not perceived from it. This perception of how relevant the individual perceives. Therefore, we must understand the individual's fluctuation in visual attention.

I argue that individuals perceive task characteristics differently because job demands and job resources are not perceived in the same intensity due to the individual's perception of

cognitive bias during the task's duration. Individuals do not perceive job demands with the same power during different periods. Therefore, the perception of job demands and resources varies over time. For example, suppose the individual perceives a gap in their job resources in a short period. In that case, that is to say, the desire of the level of job resources to face the job demand is greater than the current level of their job resources.

This last state leads to a persistent loss of motivation in the assigned task, which leads to a decrease in task absorption and task performance on an episode. It could generate a state of strain. Job demands create the need for job resources; then, individuals perceive the required job resources to perform the task. The individuals will generate a perception of the job resource gap. This gap is based on their evaluation of the necessary job resources and the available job resources. If the individual perceives that the gap is too large, job strain will increase (e.g., exhaustion). Consequently, task performance will decrease. Job strain will also decrease motivation. On the other hand, if the gap is smaller, task absorption will increase. Therefore, it will improve task performance.

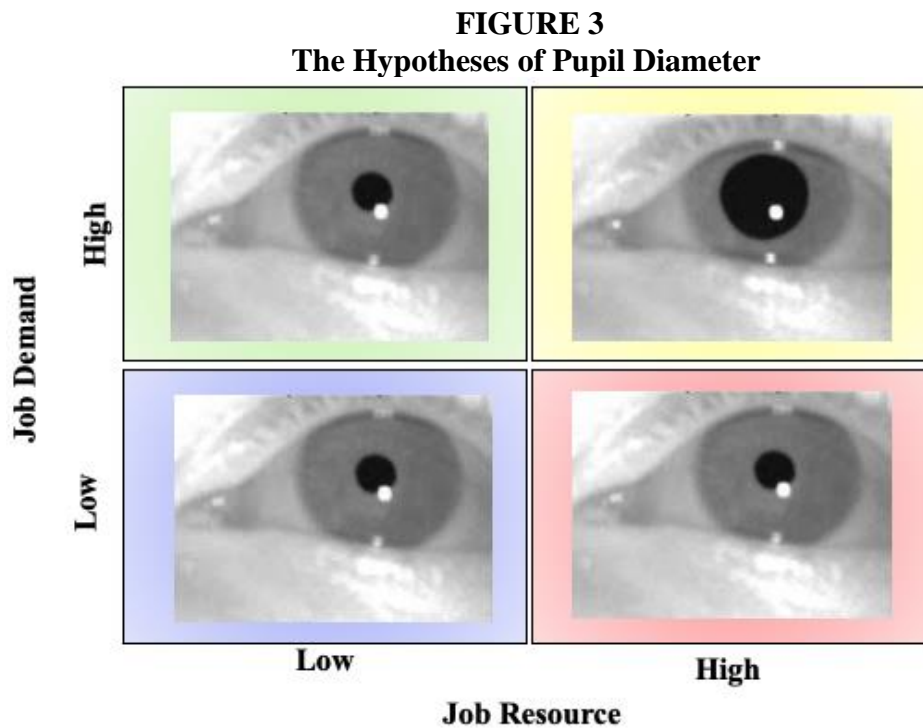
This dynamic process in the JD-R theory occurs on a small scale and repeatedly during the task's duration. Assuming this perspective, an individual might feel engaged at one point and exhausted at another. In addition, while a large amount of job demand and a large number of job resources can generate motivation, it is also possible that it creates job strain since this process will depend on the perception of the gap in job resources that the individual perceives at the moment. That is, of its evaluation between the job resources required and the job resources available. As in any assessment, task absorption is crucial in constructing this perception of the gap in job resources (Gevers & Demerouti, 2013).

A recent eye-tracking lab study showed that intermediate pupil diameter, which reflects task absorption, is positively associated with performance in a visual letter n-back task

(Hopstaken et al., 2016). Additionally, a study on student task absorption showed that students who were actively absorbed while solving matching problems had better performance on that task than students who were passively engaged (Ota & DuPaul, 2002). Additionally, Beal & Weiss (2013) state that critical for effective functioning at work is when employees keep their attention to invest the right resources during an episode and Bakker & Demerouti (2017) mention that constellations of demands and resources can trigger task absorption. Then,

Hypothesis 2. Different levels of demand/resource generate different levels of episodic attention during a decision-making task.

Figure 3 represents the hypothesis related to pupil diameter for a graphical representation, where different levels of demand/resource generate different levels of episodic attention during a decision-making task.



4.4. Task Absorption and Task Performance

The EPM outlines how cognitive processes during work activities are theoretically related to job performance. Specifically, Beal et al. (2005) postulate that for individuals to perform well, their attention needs to be entirely focused on the task. As I mentioned in this research, task absorption refers to attention and cognitive effort during a task. Absorption draws a person's attention toward it, facilitating the self-regulation of attention toward it (Weiss et al., 2004).

Beal et al. (2005) proposed that task job demands may also influence performance by diverting an employee's attention during the task. Cognitive interference is a representation of such diversion of attention, defined as thinking about past activities or personal worries that disrupt an employee's concentration (Sarason et al., 1986). When individuals experience cognitive interference, they cannot allocate all the necessary cognitive resources to the activity at hand, preventing the employee from achieving optimal task performance (Dolcos, 2006; Hopstaken et al., 2016; Kurosawa & Harackiewicz, 1995). Other studies by Reina-Tamayo et al. (2018) show a link between work engagement and task performance.

In sum, few studies have shown that task absorption and task performance are related at the activity level; nevertheless, empirical evidence is still lacking for the relationship between task absorption and task performance in an episode. I propose that absorbed individuals achieve higher task performance during a work activity by using all the attention experienced during that episode to channel their effort toward high-quality episodic performance. Thus, we will examine this relationship in an episode at the task level to test the ecological validity of the episodic task absorption-task performance link.

In our study, I focus on the experience of task absorption during an episode. To exemplify the conceptualization of task absorption, we refer to the literature on visual spatial

attention that examines the phenomenon of attentional capture. For example, Beal et al. (2005) state that task absorption pull is a process that is intentional and draws a person's attention to the task. Ota & DuPaul (2002) show that individuals who were more absorbed while solving problems had better task performance than those who were less absorbed and Beal et al. (2005) state that attention boost task performance during an episode. Accordingly, pupil diameter is positively related to task performance. I argue that task absorption is a cognitive process that facilitates episodic task performance. Therefore, I hypothesize,

Hypothesis 3. *Episodic attention is positively related to task performance.*

In the next section I will explain the method of this dissertation.

CHAPTER 4: METHOD

4.1. Eye-Tracking Methodology

The research objective of the present study involves knowing, through eye-tracking analysis, the cognitive process related to managers' absorption. Because absorption in a decision-making task is a process that occurs on a concise time scale (i.e., milliseconds), eye-tracking analysis is a unique way to capture absorption. Eye tracking analysis measures the point of gaze by employing an eye-tracker. To achieve the research objectives, participants performed a task in a simulator in front of a computer.

While performing the task, we performed eye-tracking using an eye-tracker device. Eye-tracking analysis procedures have no contraindications or risks associated with device use (Astudillo et al., 2018). Nevertheless, this study considers constant monitoring by a team member. Given that the experiment contemplates face-to-face data collection, given the current COVID-19 pandemic context, this protocol incorporates procedures that protect participants from possible contagion (cf. Procedure section).

Eye movements are arguably the most frequent human movement (Bridgeman, 1992). Large ballistic scanning movements, called saccades, typically occur 3-4 times per second. As an early researcher put it, there seems to be almost constant twitching, as if resting for more than an instant was the one thing not to be endured (Stratton, 1906). Virtually all animals with developed visual systems actively control their gaze using eye or head movements (Land, 1995).

This movement is a consequence of the enormous amount of visual information available to an organism. Rather than devoting resources to processing it in eye-tracking

analysis, evolution appears to have selected a solution whereby small portions of the visual world are inspected rapidly (Treue, 2001). Consequently, the human eye monitors a visual field of about 200° but receives eye-tracking analysis-led information from only 2° (Levi et al., 1985). This region, about the size of a thumbnail at arm's length, is called the fovea and is jerked at speeds of up to 500° a second, during which its sensitivity drops to near blindness levels (Matin, 1974; Thiele et al., 2002).

During the 200-300 milliseconds, it was at rest. However, over 30,000 densely packed photoreceptors in the fovea provide high-acuity color vision. Therefore, eye movements are fundamental to the operation of the visual system. 'Eye movement research' relates to a patchwork of fields more diverse than the study of perceptual systems. Owing to their close relation to attentional mechanisms, saccades can provide insight into cognitive processes such as language comprehension, memory, mental imagery, and decision-making.

Eye movement research is of great interest in the study of neuroscience and psychiatry, as well as ergonomics, advertising, and design. Because eye movements can be controlled volitionally to some degree and tracked by modern technology with great speed and precision, they can now be used as powerful input devices and have many practical applications in human-computer interactions.

Eye-tracking methods are widely used in neuroscience. According to Holmqvist & Andersson (2017), eye-tracking allows researchers to select fixation targets based on peripheral vision. The experimental design considered understanding participants' attention to different business stimuli through an eye-tracker. The human eye is a complex organ vital to the visual system. Moreover, it is the primary ingredient for all eye-tracking studies. This study used an eye-tracker to measure pupil diameter. Eyetracking disposition is a sensor technology that detects a person's presence and follows what they are looking at in real time.

This technology converts eye movements into a data stream that contains information such as pupil position, gaze vector for each eye, and gaze point. Essentially, this technology decodes eye movements and translates them into insights that can be used in various applications or as an additional input modality. Typically, an eye-tracking system comprises one or more cameras, light sources, and computing capabilities. Algorithms translate the camera feed into data points using machine learning and advanced image processing.

4.2. Pupil Diameter

This research argues that task absorption can be generated depending on an individual's visual attention to task characteristics. The experimental design considers understanding participants' visual attention to different stimuli, job demands, and job resources through an eye-tracker. Through eye-tracking analysis, the research objective was to determine the behavioral and cognitive processes related to how individuals engage in a task. With evidence accumulated in the last decade, pupils have become a focus of attention in this field of research worldwide (e.g., Waschke et al., 2021). One of the latest published studies on the relationship between this structure of the visual system and the brain indicates, with records within the same central nervous system, that neurons can also be modified symmetrically with the pupil. Studies have suggested that pupil diameter is closely related to individual differences in intelligence. Specifically, according to this report, the larger the pupils, the greater the intelligence evaluated through reasoning, attention, and memory tests.

Behavioral changes in humans adapt the nervous system to different internal and environmental demands. In this context, attention is a cognitive process that responds to environmental needs and changes over time. Researchers explain that fluctuations in cognitive processing alter pupil activity and appear to identify neural dynamics related to

states of attention. Several cognitive neuroscience studies have shown a relationship between pupil diameter and mental effort (e.g., Beatty & Lucero-Wagoner, 2000; Just et al., 2003). Furthermore, other studies have argued that pupil diameter is related to task performance (e.g., Tsukahara et al., 2016).

The reviewed studies show that pupil diameter can be used as an indirect index of cognitive effort during tasks. Across the domains of update, switch, and inhibition, studies have shown that pupil diameter closely responds to changes in task demands and, in some cases, predicts improved task performance. Future work that integrates other physiological indices of cognitive effort with neuroimaging techniques is needed to advance our understanding of the intricate role of the brain and body mechanisms that underlie mental effort.

On the other hand, the management literature has begun to show interest in visual attention. For instance, a firm's attention-based view (ABV) (Ocasio, 1998; Ocasio & Joseph, 2005) has emerged as a core theoretical perspective in research on strategic organizations. The ABV develops three core principles that theorize strategic behavior: focusing and channeling attention. At the individual level of analysis, three types of attention have been identified through various techniques: 1) selective attention emphasizes that, due to cognitive limitations, individuals cannot attend to all cues and issues; 2) attentional vigilance is concerned with how individuals sustain attention to a particular cue or issue over time; and 3) executive attention involves allocating limited attentional resources to signals that are inconsistent with established schema-based knowledge.

Future studies should establish a bridge between behavioral strategy and cognitive neuroscience by performing an experimental design that uses eye-tracking analysis to understand the effect of visual attention on the heuristics of individual decisions. However,

research using this method, especially on organizational behavior, is relatively scarce. There are other attempts; for example, Hopstaken et al. (2015, 2016) reported that task engagement is related to pupil diameter.

This study shifted the visual attention during an episode. It uses subjective (scales), behavioral (performance), and physiological (pupil diameter) data. This research uses the Beer Distribution game task to capture new job demands and absorption. The beer game interface simulates 300 weeks of orders. The average pupil diameter was analyzed for one week. An eye-tracker was used to obtain this measurement. Following Hopstaken et al. (2015, 2016), I reported that task absorption is related to pupil diameter. Additionally, I controlled for the level of personal resources using a psychological capital scale.

4.3. Participants

I called managers with five or more years of work experience. The University's Ethics Committee accepted the informed consent protocol. I selected 19 participants, but collected valid data from 18 participants. One participant was discarded after the data collection procedure because of problems collecting valuable data from the eye tracker. I collected two types of information: (1) information about decisions during the task, such as ordering decisions, inventory, demand, and cumulative costs per round, and (2) information about ocular activity (i.e., pupil diameter) when participants faced all visual stimuli in each round of decisions.

The final sample was eighteen healthy managers aged 28 to 65 years ($M = 35$ years, $SD = 5.87$) who were employed by different companies in Chile. The participants were 14 males and four females, with an average age of 35 years, and the average work tenure was 10.2 years ($SD = 5.45$) (cf. Table 1). Participants' occupations were as follows:

business/management professionals (43.7 percent), civil engineers (28.1 percent), sociologists, psychologists, political scientists (15.3 percent), and others (lawyers and military; 12.9 percent). Finally, participants were members of organizations within the services (50.4 percent), financial and accounting (30.6), information technology (18.1 percent), and other (5.9 percent) economic sectors.

At the time of the study, 100 percent of the participants had worked as executive managers. I recruited individuals with a Master of Business Administration (MBA) degree to ensure a similar background, business knowledge, and organizational experience. I intentionally excluded CEOs, top management teams, corporate individuals, firms' founders, low-level managers, and first-line managers because I wanted to test our hypotheses on managers. Managers have skills and experience in resource management (Andrade-Valbuena & Torres, 2018).

Data were collected weekly through electronic survey-based questionnaires when the participants attended the experiment in the laboratory. First, they answered a questionnaire regarding their demographics. Next, participants were asked about the psychological capital scale. The final sample size included 18 participants. There were no exclusions or missing data.

4.4. Procedures

To test these hypotheses, I conducted an experimental study. I checked that all participants were well rested and in good health, as measured by self-report. The participants reported having slept for seven or more hours. They were asked to withhold caffeine and alcohol for 24 hours before the experiment. The participants provided written informed consent (cf. Appendix E). All participants had normal vision, did not report any psychiatric

or neurological conditions, and did not consume drugs that acted on the nervous system. I note that these requirements are crucial because they can influence pupil diameter.

The risks associated with the survey data collection procedures and those collected via eye tracking will not exceed the possible discomforts or dangers similar to those experienced daily (Astudillo et al., 2018). Designs with eye-tracking analysis have no contraindications or risks associated with using the device because it is a non-invasive procedure. Given the above, the measurement procedure employing an eye-tracking analysis does not imply a threat to physical and psychological health or any possible discomfort associated with using the eye-tracker. In any case, the researcher was trained to interrupt the procedure for detecting abnormal behavior in the participants.

Given that the proposal contemplates face-to-face data collection and given the current pandemic context, it incorporates practices that protect participants from possible contagion. To face the risks associated with the COVID-19 pandemic, the day before the experiment session, the participants will be asked for a health passport form so that they can declare if they present symptoms and provide data regarding the people who live with them so that a traceability analysis can be carried out in case of risk. If possible, to minimize the risk of contagion, the researcher will avoid contact with the participant entirely or as much as possible.

Additionally, the researcher was accredited with a PCR test that he did not have COVID-19. It should be noted that participants had to respect the physical distance from the leading researcher (2 m). The experiment was approved by and carried out following the recommendations of the Human Research Ethics Committee of the Faculty of Medicine and Faculty of Economics and Business at the Universidad de Chile.

The laboratory is a small room (3×3 m) with blackout curtains. Participants were seated in a darkened room with their heads comfortably resting on a head stabilizer. A camera was placed in front of the screen that recorded the participants. I programmed a tutorial on the computer to train participants before running the simulations. The stimuli were presented on an LED monitor (ViewSonic, 27") 52 cm from the subject, covering a visual field of 33° x 49.5°.

Calibration adjustment was performed before starting the experiment, during which the participants were instructed to explore freely. Simultaneously, ocular behavior and pupil diameter were binocularly recorded with an eye-tracking system (Eye Link 1000®, SR Research, Ltd., Mississauga, ON, Canada) at a 500 Hz sampling rate. The EyeLink eye-tracker can detect changes in pupil diameter of only 0.1% of the pupil diameter, and their high sampling rates allow pupil responses to be measured with exceptional eye-tracking analysis.

One neuroscience assistant supervised this tutorial, which took 10 minutes to read and test. The assistant then connects and calibrates the eye-tracker and verifies all experimental conditions. Subsequently, the assistant provided an iPad containing the survey. The Qualtrics XM platform was used to conduct the survey and automatically collect all participants' responses. The survey comprised informed consent, requests for the participants' age, sex, and years of work experience, and four scales. The scales had numerical (1 to 5) and verbal ("Strongly disagree" to "Strongly agree") anchors. Finally, the participants began the execution of the experimental task.

4.5. Stimuli

We used the Beer Distribution Game to set up the experiment using the Presentation® software. Presentation® is a stimulus delivery and experimental control program for neuroscience. The Beer Distribution Game is a role-playing simulation of an industrial production and distribution system developed at MIT to introduce management students to business dynamics and computer simulation. Thousands of people have played the game worldwide for nearly 60 decades, ranging from high school students to chief executive officers (CEOs) and government officials (Sterman, 1989).

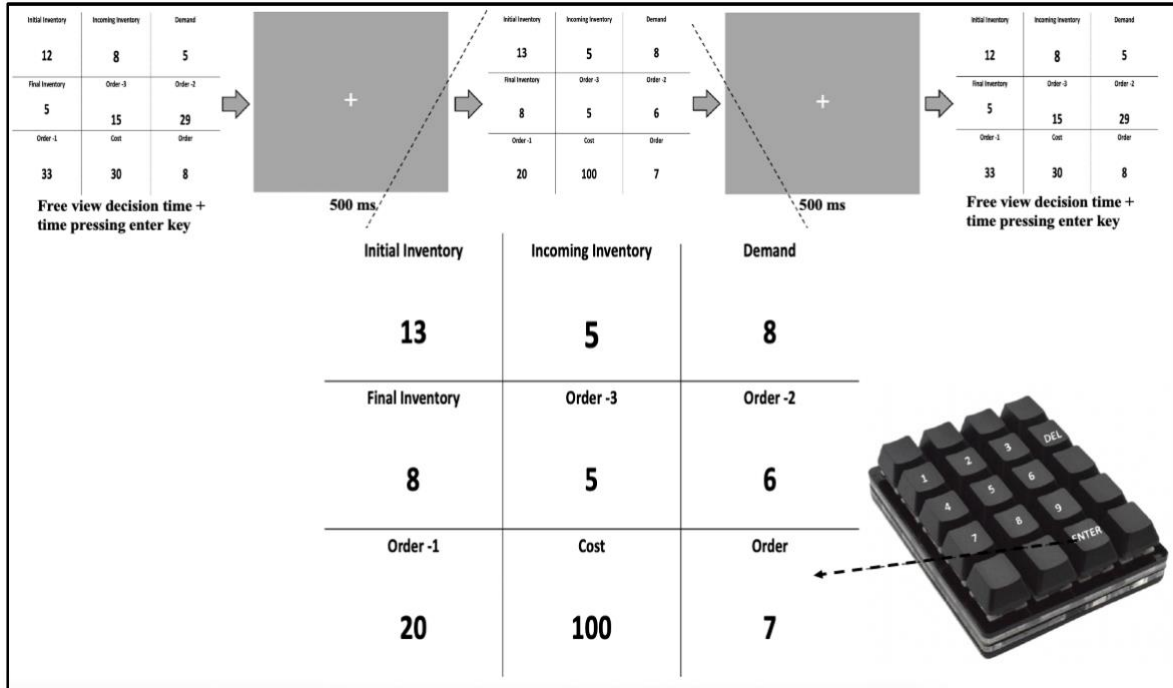
I programmed a computational interface that allowed a single participant to play the beer game as an eye-tracking analysis, where the incoming order matched precisely with the simulated demand. As mentioned before, this experiment measured the time in milliseconds.

When the stimuli appear, which are fixed stimuli, the participants have a free vision of the screen. The screen was split into nine ROIs during each decision round. The Initial Inventory was the number of units in the inventory during the first trial. The Incoming Inventory is the incoming delivery ordered.

The Final Inventory is the Initial Inventory plus the Incoming Inventory minus order. The demand is the incoming order. The number of shipments was automatically computed. The order decision value appeared empty until the participant typed a number.

Then, the participant presses the “enter” button to move to the following screen with the information for making the next decision. After every ordering decision, the algorithm displays a fixation cross at the center of the screen. Figure 4 shows the screen for each trial.

FIGURE 4
The Sequence of Screens and Stimuli During the Task



Notes: The nine ROIs displayed on the screen for each trial were as follows: (ROI 1) Initial Inventory, (ROI 2) Incoming Inventory, (ROI 3) demand, (ROI 4) Final Inventory, (ROI 5) Order -3, (ROI 6) Order -2, (ROI 7) Order -1, (ROI 8) cumulative cost, and (ROI 9) the amount of the order.

4.6. Subjective, Behavioral, and Pupil Data Strategy of Analysis

This research used subjective (self-reported scales), behavioral (task performance score), and physiological (pupil diameter) data to test the study’s hypotheses. We used these multiple datasets to model the regression models using SPSS v.23.

Subjective measures. I used a self-reported psychological capital scale to add additional control variables. Psychological capital is a set of personal resources comprising hope, efficacy, optimism, and resilience. Previous research has supported the importance of general workplace performance (Madrid et al., 2018). Luthans et al. (2007) argue that psychological capital has been defined as an individual’s positive psychological state of development and is characterized by: (1) self-efficacy, having confidence to take on and put in the necessary

effort to succeed at challenging tasks; (2) optimism, making a positive attribution about succeeding now and in the future; (3) hope, persevering toward goals and, when necessary, redirecting paths to goals to succeed; and (4) resilience, when beset by problems and adversity, sustaining and bouncing back and even beyond to attain success. Psychological capital was also measured (Luthans et al., 2007). I used Madrid et al. (2018) Spanish version of the following scales: hope, self-efficacy, resilience, and optimism (cf. Appendix D). In the next section, I report the statistical analysis following the criteria for conducting organizational research suggested by Mitchell (1985).

Behavioral measure. The behavioral measure used in this experiment was episodic task performance. Each participant scored a number called “game performance.” This number was used for statistical analysis. The inventory level determines the costs. When this value is positive, the cost per unit of the stock is 0.5. When the inventory is negative, the cost is one per unit. Fewer costs indicate better performance in the beer game, and higher costs mean lower performance. However, this score was inverted to facilitate analysis and interpretation of the results.

Pupil diameter. The recorded ocular behavior and pupil data were processed and analyzed with custom-made MATLAB v.R2021a scripts. The pupil signal was processed as follows: blinks were cleaned using linear interpolation, and a low-pass filter was applied. Raw data were normalized to the z-score to control for pupil diameter variability among subjects (Astudillo et al., 2018). Each trial is cut from the beginning of the screen with the elements to the end of the trial (i.e., where participants press the “enter” button) and part of the fixation cross. The baseline was calculated as the average signal 500 ms before the transition. The participants watched a fixation cross before all the trials. A fixation cross

before stimulus presentation focuses or diverts attention on or away from a particular position on the screen (Fiedler et al., 2020).

Controls. In line with previous research (Walumbwa & Hartnell, 2011), I included participants' age, gender, and work experience as control variables because these variables can influence task performance.

CHAPTER 5: RESULTS

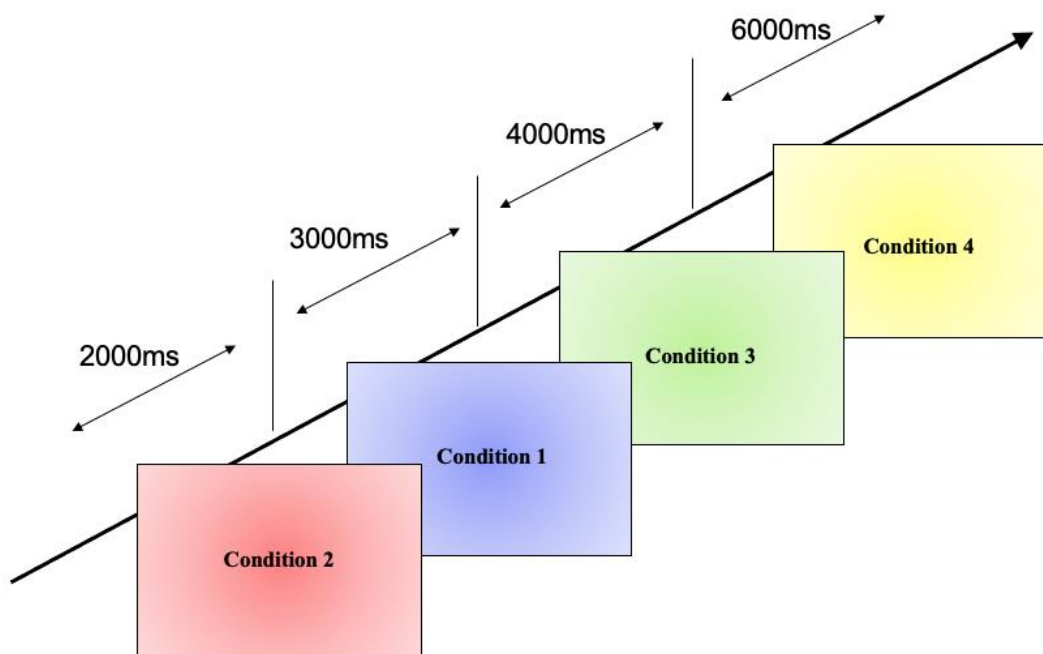
5.1. Task Absorption

Hypothesis 1 was supported. Different levels of demand/resource generate different levels of episodic immersion during a decision-making task. To ensure that immersion differs from each condition, I performed an ANOVA on the decision time [$F(1,108) = 4.71, p = 0.032^*$]. $*p < .05$.

Figure 5 show the pupil diameter along with all the trial. Figure 5 includes the time of the decision for the four's conditions. As I expected decision times are consecutively ordered. These results support Hypothesis 1. In condition 2, the decision time is shorter than in condition 1. In condition 1, the decision time is shorter than in condition 3. In condition 3, the decision time is shorter than in condition 4. The total task average trial time was 5000 ms.

Nevertheless, the trial's average duration that follows the condition was 6000 ms. In condition 1, the decision was made after 1800 ms. In condition 2, the decision was made after 2900 ms. Condition 3 lasted 3900 ms. The most prolonged decision trial duration was condition 4 with 6000 ms.

FIGURE 5
Representation of the Time Decision

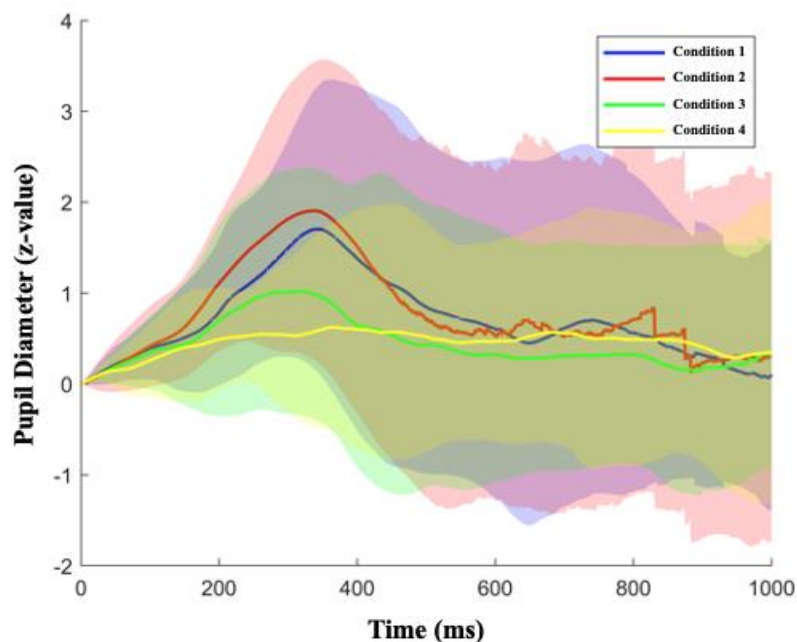


As mentioned, I collected the data from the eye tracker for all the participants. I followed the analysis based on the four conditions. To do this, I built a new data set called conditions by subject. It has conditions in the columns and the rows with the subjects. With this data, I create Figures 6 and 7 using MATLAB. The pupil diameter dynamics plot has the standard deviation between subjects shaded around the mean curve. Even though the results are not significant, there is a clear tendency for a variation between the four conditions regarding pupil diameter.

Hypothesis 2 was not supported, namely, different levels of demand/resource not necessarily generate different levels of episodic attention during a decision-making task. To ensure that attention differs from each condition, I performed an ANOVA on the pupil diameter [$F(1,104) = 7.52, p = 0.541$]. Exploring the four conditions in the first 1000 ms (cf. Figure 6), I found that immediately after the transition of each condition, the pupil exhibits a

fast dilation that reaches its most considerable value around 500 ms. This response was followed by a contraction phase, with the smallest value near 1000 ms for all the conditions. Figure 5 shows the normalized average pupillary response curve according to the conditions the subject transits.

FIGURE 6
Pupil Diameter by Conditions in 1000ms

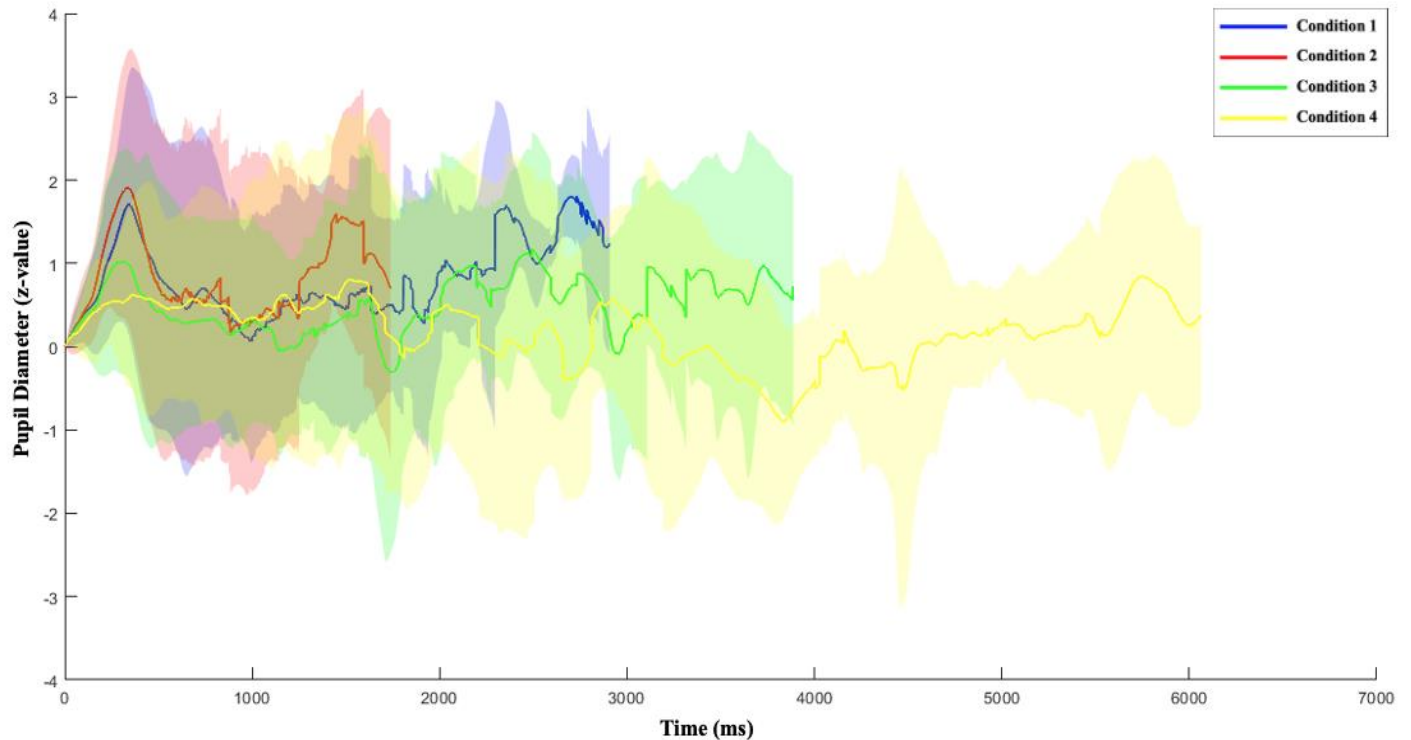


The average normalized curve of pupillary response according to the four conditions is shown in Figure 7. I found that the pupillary answer studied was influenced by the level of job demands and job resources, where differences exist from the contraction to the dilation phase. Pupil diameter is shorter when the individual is in a low job demand/low job resources condition (condition 1). Pupil diameter is shorter when the individual is in a low job demand/high job resources condition (condition 2).

Pupil diameter is larger when the individual is in a high job demand/low job resources condition (condition 3). Pupil diameter size is bigger when the individual is in a high job demand/high job resources condition (condition 4). In light of the results, hypotheses 2 was

not-supported. The pupil diameter varies across the four conditions. Interestingly, condition 4 is where the participants took the longest to make the decision. We discuss this result in the next section.

FIGURE 7
Pupil Diameter and Time Decision by Conditions



5.2. Task Performance

Means, standard deviations, correlations, and reliabilities of the variables are summarized in Table 1. Gender is a dichotomic variable (0 = male; 1 = female). Age was measured in years. Work experience was measured in years. As I mentioned, psychological capital is a score from a likert-type scale. Task absorption is measured using pupil diameter in z-score and task performance is a score. The task performance score is inverted, i.e., positive values indicate worse task performance, and negative numbers indicate better task performance.

TABLE 1
Means, Standard Deviations, and Correlations

Variables	M	SD	1	2	3	4	5
1. Gender	0.74	0.45					
2. Age	35.1	5.87	.21*				
3. Work experience	10.2	5.45	.38*	.90*			
4. Psychological capital	4.34	0.47	.11	.10*	.02*	(.90)	
5. Pupil diameter	.04	1.10	.45	.73*	.12**	.24*	
6. Task performance	.12	1.01	.39*	.32*	.29*	.26**	.73**

Notes: Reliabilities are in parentheses. * $p < .05$; ** $p < .01$

Hypothesis 3 was supported. Episodic attention is positively related to task performance. Model 1 (task performance = 0.09 + 0.67 task absorption) verifies this hypothesis. I perform a regression analysis to test the hypothesis considering this research's control variables. Model 1 shows that task absorption was directly and significantly associated with task performance ($b = 0.67$, $SE = 0.15$, $p < .05$).

I run other models to support the results. Model 2 (Table 2) shows that, after controlling for the psychological capital variable, high psychological capital was directly and significantly associated with task performance ($b = 0.23$, $SE = 0.18$, $p < .05$). I controlled our results using the participants' age (Model 3), work experience (Model 4) and gender (Model 5); the results were not significant. These results are shown in Table 2.

TABLE 2
Estimates of the Control Variables Effects on Task Performance

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	.09(.15)*	.09(.16)*	1.20(.32)*	.50(.34)*	.41(.36)*	.52(.18)*
Pupil diameter	.67(.15)*	.66(.16)*	.66(.45)*	.65(.15)*	.65(.16)*	.65(.45)*
Psychological capital		.23(.18)*				.25(.19)*
Age			.03(.03)			.02(.05)
Work experience				.04(.03)		.03(.06)
Gender					.02(.03)	.03(.16)
R ²	.44	.47	.48	.49	.47	.54
R ² Adj.	.42	.45	.47	.48	.45	.52

Notes: Unstandardized estimators reported. Standard errors are in parentheses. * $p < .05$

Due to the psychological capital being a significant control variable in Model, I perform an additional analysis about the role of psychological capital on the relationship between task absorption and task performance. I make a dichotomic regression with psychological capital variable. This type of analysis allows performing study considering two or more levels of analysis (Ilies et al., 2007). I perform an analysis of task absorption on task performance considering two groups. The established level was made using z-score. (1) Level 0 = low psychological capital (n = 9; >-2.99), and (2) Level 1 = high psychological capital (n = 9; >1.18). Results of the analysis are shown in Table 3.

TABLE 3
Estimates of the Psychological Capital on Task Performance

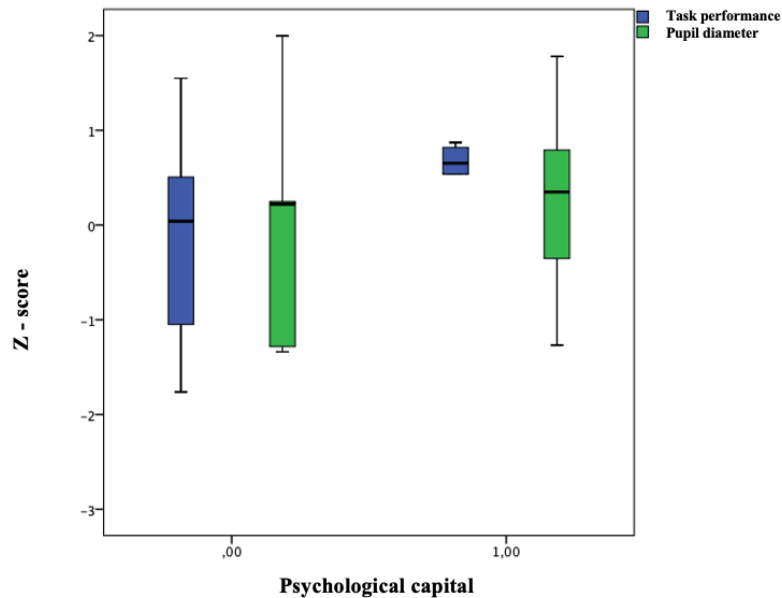
	Model
Intercept	.33(.15)
Psychological capital	.11(.15)
R ²	.36
R ² Adj.	.34

Notes: Unstandardized estimators reported. Standard errors are in parentheses.

Results of the estimates of regression analysis of the Model shows the fixed effect of task absorption on task performance through psychological capital. For high-psychological capital, the results were positive and significant ($b = 0.11$, $SE = 0.15$, $p < .05$; 95%, CI [0.01, 0.34]). Implications of these results are discussed in the next section.

Finally, I elaborate a boxplot to complement de results. Figure 8 shows the difference between high and low psychological capital considering task performance and pupil diameter. To better visualize the effects, again, I reversed the score of task performance. The results are not significant. However, the graph shows, on average, that low psychological capital' managers have worst task performance and less task absorption.

FIGURE 8
Boxplot of Task Performance and Pupil Diameter



In comparison, high psychological capital' managers have better task performance and high absorption levels (i.e., larger pupil diameter). Even though this additional analysis is not directly related to hypotheses. These results could be further explored in future studies (cf. Discussion section).

CHAPTER 6: DISCUSSION

6.1. Attention and Immersion

I employed the Beer Distribution Game and explored the dynamics of visual attention using an eye-tracking technique to collect measurements of pupil diameter. I empirically analyzed the pupil diameter during an episode at the task level. I investigated whether changes in demand and resources were related to changes in baseline pupil diameter. The pupil diameter is a physiological indicator of attention (Hopstaken et al. 2015; 2016). The results support Hypothesis 1 that different levels of demand/resource generate different levels of episodic immersion during a decision-making task. Thus, immersion differs for each condition (cf. Figure 5).

These results align with those of Eysenck (1979), who suggested that task characteristics are associated with high levels of task absorption owing to the increasing time the individual uses to make a decision. Moreover, Bakker (2014) argues that absorption captures how individuals experience their work as something they want to devote time to. Therefore, the results confirm the assumption of the time taken to make a decision fluctuates synchronously as a function of concurrent appraisals of demand/resources (Bakker, 2014).

Hypothesis 2 was not supported; that is, different levels of demand/resources did not necessarily generate different levels of episodic attention during a decision-making task (cf. Figure 6 and 7). Thus, attention did not necessarily differ for each condition. These results challenge Beal & Weiss (2013), which is critical for effective functioning at work, is when employees keep their attention to invest the right resources during an episode, and Bakker and Demerouti (2017) mention that constellations of demands and resources can trigger task

absorption. Attention does not fluctuate synchronously as a function of concurrent appraisals of demand/resources; individuals are not more attentive in high-demand/resource conditions.

Consistent with my argument, the relationship between pupil diameter and attention (i.e., task absorption) can be more complex than shown in previous research. The results of this study suggest that conditions 3 and 4 (i.e., high-demand conditions) do not necessarily increase attention (in fact, they show a contraction in pupil diameter). In contrast, conditions 1 and 2 (i.e., low-demand conditions) are related to a high pupil diameter (dilatation of the pupil diameter).

This result challenge the JD-R theory assumption that task absorption fluctuates synchronously as a function of concurrent appraisals of demand/resources; individuals are not more attentive in high-demand/resource conditions (Bakker & Demerouti, 2017). These results can complement JD-R theory and EPM (Beal et al., 2005) and suggest interesting avenues for further theoretical and empirical development. Perhaps Conditions 1 and 2 could activate some emotional processes.

The individual's valence (positive/negative) or arousal (high/low) can increase pupil diameter at the beginning of the trial (Russell, 1980). Consequently, this study supports the basic proposal of the EPM (Beal & Weiss, 2013), suggesting that considering the activation of feelings can enrich our understanding of moods and their correlates at work. Indeed, future studies would benefit from including and measuring task dedication and mood during an episode at the task level.

6.2. Absorption and Performance

Hypothesis 3 was supported. Episodic attention is positively related to task performance; namely, pupil diameter is positively associated with task performance (cf.

Table 2). These results are in line with those of Ota and DuPaul (2002), who showed that individuals who were more absorbed while solving problems had better task performance than those who were less absorbed, and Beal et al. (2005), who stated that attention boosted task performance during an episode. This result highlights the differences in the activation of feelings, which appears to be central to a more comprehensive approximation of the relationship between task absorption and task performance. Therefore, episodic attention is positively related to task performance, and absorbed managers have better task performance (Beal et al., 2005).

Moreover, our findings observed a better predictive power in pupil diameter-task performance under psychological capital but not demographics (i.e., gender, age, and work experience) (cf. Table 2). Furthermore, additional regression analysis revealed that psychological capital was a critical variable between task absorption and task performance (cf. Table 3).

Individuals with low psychological capital will have worse task performance than those with high psychological capital. Thus, psychological capital could be a crucial personal resource that allows managers to achieve higher levels of task performance. Due the lack of significance these results must be further explored. Figure 8 shows a boxplot with these variables to highlight the differences.

This research offers an episodic view of the JD-R theory showing that demands and resources can be related to episodic task absorption (i.e., immersion). Attention needs more exploration. Moreover, attention facilitates task performance during an episode.

This dissertation is a first approximation of the topic of episodic task absorption. It makes an incremental contribution that can supplement the JD-R theory (cf. Bakker & Demerouti, 2017) and deliver empirical evidence to the EPM (cf. Beal et al., 2005).

It verifies the importance of experimental studies and lays the groundwork for future studies that can measure task absorption. In the next section, I present theoretical and practical implications, limitations, and future research directions.

CHAPTER 7: CONCLUSIONS

8.1. Implications for Theory

The findings have several important theoretical implications. The results extend existing work by theoretically integrating JD-R theory with the EPM perspective. Following the central EPM's proposition that performance is episodic due to the changes in work activities throughout the day, I show that job resources and demands have an episodic nature. In line with the JD-R theory, I find that at the episodic level job resources can be initiators of a motivational process reflected in individuals experiencing higher task absorption across different work activities during an episode.

Furthermore, the findings indicate that job demands may undermine this positive relationship. Recent studies that integrate JD-R theory with the challenge and hindrance stressor framework (Bakker & Sanz-Vergel, 2013; Breevaart & Bakker, 2018; Tadić et al., 2015) show that the combined effect of challenging job demands with job resources leads to higher task absorption levels, while the combined impact of hindrance job demands with job resources leads to lower task absorption levels. The finding is that job demands, in this case, having a lot of clients' orders, do not necessarily undermine the positive relationship between job resources and task absorption (e.g., Tadić et al., 2015). It demonstrates that this relationship also holds at the episodic level.

First, I am one of the first to provide empirical support for the JD-R theory (Bakker & Demerouti, 2017) basic proposition that job resources facilitate task absorption while job demands initiate a straining process that decreases task absorption. To examine these processes, I use an episodic perspective (EPM) at the task level (Beal & Weiss, 2013). I relied

on Bakker & Demerouti (2017) to explore and examine how task absorption fluctuates synchronously as a function of concurrent appraisals of job demands and job resources. I found that task absorption is related to visual attention and concentration based on task characteristics. The results of our study indicate that when managers experience high job resources and high job demands, they are not necessarily more immersed during that work activity (Oldham et al., 1991).

Second, task absorption increases task performance during an episode. The more the individual is absorbed during the episode, the better task performance. This finding aligns with Beal et al.'s (2005) proposition that attention facilitates attending to work activity. Moreover, this finding aligns with experimental lab research on attentional capture, which shows that particular task features capture attention and facilitate decision-making (e.g., Ares et al., 2012; Wyble et al., 2013). Additionally, it is possible that the task performance could have affected the motivation of the individual. Suppose a person could successfully deal with the job resources. In that case, the job demands could be associated with experiencing higher motivation in the activity. I did not measure the emotional component of the motivation (e.g., dedication), so I cannot attest to this possibility in our study. However, it could be an exciting avenue for further research.

Finally, this study focused on episodic job resources and job demands to examine how episodic task absorption relates to episodic task performance. Our results suggest that concentrating all the individual attention (i.e., task absorption) on activity is essential for task performance, as is highlighted in EPM (Beal et al., 2005). Therefore, tasks (e.g., distribution interfaces) must attract managers' attention. This relates to enhancing concentration in the task, which is associated with better performance across work activities. However, the role of job demands and job resources on episodic task absorption in the relationship between

task absorption and task performance was only marginally significant. Finding a slightly significant effect after controlling for control variables effects is interesting as these results give a reasonable indication that, on the one hand, psychological capital (or other personal resources) can increase/decrease episodic task absorption, which in turn leads to higher episodic task performance. Future studies may examine the indirect relation between job demands, job resources, and task performance through task absorption using a larger sample size.

8.2. Implications for Practice

The project follows a multidisciplinary endeavor that combines organizational behavior and cognitive neuroscience disciplines to reveal the role of job demands and job resources in individual decisions. To the best of my knowledge, this is the first project to detect the basics of the absorption formation process, considering an episode and management decisions with real individuals and using a cognitive neuroscience approach. Results from this project have the potential to illuminate new ways to train executives in experiencing uncertain choices.

Task absorption depends on how individuals perceive job demands and job resources. Although Barney and Felin (2013) suggest that one of the fundamental analyses of the micro-foundation is to comprehend how organizational capabilities are built (e.g., the development of formal organizational processes, routines, and procedures); currently, there has been little agreement on the source of individual productivity among individuals responsible for making strategic decisions (Helfat & Peteraf, 2016). The contribution of this dissertation is to present a well-documented study that examines cognitive and behavioral processes related to how real individuals make repeated inventory ordering decisions. For instance, this study

demonstrates whether pupil diameter reflects an individual's attention to simulated business stimuli. Based on JD-R theory and adopting a visual attention approach, I trace new elements on which individual cognition researchers can improve efficiency in the relation between firms' human capital and task performance.

A multidisciplinary team can create training with neurofeedback. For example, "neuro-strategy-training" programs teach managers or employees to avoid problems that can trigger task absorption. Additionally, the insights of the present study can be used for individual time management training programs in which individuals become aware of their pacing styles and how to effectively manage the consequences of a particular type for one's level of task absorption and, consequently, one's task performance. Additionally, companies need to promote a wide range of personal resources, like psychological capital, to develop empowerment managers with better task performance.

8.3. Limitations

Although the present study adds further insight into task absorption during an episode, some limitations should be considered. Specifically, a large sample size will be significant for another study. Furthermore, designing a different task to test the hypotheses could benefit future research (e.g., bottom-up-based tasks, other types of job demands, and job resources). Another thing that could be seen as a limitation is that I chose to adopt a within-subject design to examine our research aims. An essential strength of the within-subjects design that I used is that it minimizes error variance and the influence of individual differences in reward evaluation.

Although I have no specific reason to expect that a study replication with a between-subjects design would yield very different results, I encourage scholars to pursue such a replication that would extend our present contribution.

One strength of this work was using a sample of individuals and the best measurement instruments and processes available in a neuroscience laboratory. Furthermore, I use an incentive to improve the ecological validity, considering an episode approach. However, future studies can improve ecological validity with portable instruments. In this line, executing experiments in the workplace in an authentic work environment can benefit the analysis and results of any future work. Additionally, I believe that organizational behavior can help if further investigation explores task engagement when humans work with robots (i.e., machines, robots, and algorithms). Future studies can better predict how managers perform in a digital era using cognitive neuroscience methods.

Finally, further studies based on other biomarkers of task absorption can be crucial to increase knowledge about physiological data and task absorption. For example, electroencephalogram (EEG) analysis explores whether task absorption is related to cerebral activity (e.g., theta and alpha waves, P300). Additionally, studies can add other subjective measures like control variables (e.g., skills and other personal resources).

8.4. Future Directions

Most JD-R studies have used self-reported job demands and resources and self-reported outcomes. The problem with such measures is that the same person provides all information. Therefore, statistical relationships between constructs may be inflated due to common source bias. The first study on the JD-R theory (Demerouti et al., 2001) used observer-ratings of job demands and job resources and found that observer-ratings are moderately high and

positively related to self-ratings JD-R observer-ratings were significantly associated with group-level burnout. No further systematic evaluation of task-level job demands and job resources were published after this study. Future studies will have more impact in other research fields (e.g., human resources, economics, neuroscience, medicine) if scholars integrate more objective indicators of the prevailing job demands and resources and the possible employee and organizational outcomes (Bakker & Demerouti, 2017).

Recent studies indicate a relationship between the pupil's activity, part of our visual system, and the manifestation of different attentional and cognitive conditions (Montefusco-Siegmund et al., 2022). The study focused on recording the brain and visual activity of 16 subjects under the hypothesis that pupil amplitude is modulated in the same variation as the so-called alpha waves or relaxation waves emitted by the brain in states of rest. This is progress because, usually, it is necessary to use more complex encephalography tools to detect this activity.

I verified a close relationship between the pupil's diameter change and the classic encephalographic signals, which reveal that our pupil is manifesting different cognitive states. Although human alpha-band activity is associated with inhibitory processes in cortical networks during visual processing, and its amplitude is modulated by attention, evidence is scarcely linking this narrow-band activity to pupil changes over time. Since alpha activity and pupil diameter show attentional variations over time, both parameters should vary simultaneously. Future research must study these parameters.

Another exciting research avenue is a deep understanding of the bottom-up and top-down processes. Bottom-up or stimulus-driven attention relates to stimulus features, like noise or color. While top-down or goal-oriented attention is related to reflexive thinking, the individual is aware of the task (Shepherd & Patzelt, 2018). Due to the task being goal-

oriented, the present study uses a top-down perspective. Future studies can design a task that allows a bottom-up analysis. It could be fascinating to contrast new information about task absorption.

8.5. Final Remarks

This dissertation makes several contributions. First, I offer an episodic view of JD-R theory, showing that task characteristics are related to episodic task absorption, namely that episodic task absorption fluctuates synchronously as a function of concurrent appraisals of demands and resources (Bakker & Demerouti, 2017). Thus, the episodic view adds a more experiential understanding of how task absorption may change within one person depending on the specific conditions, a constellation of job demand/resources, in which the individual is involved during the task. This approach complements the within-person perspective of how task absorption differs between different conditions over time during an episode. With these insights, I can say that JD-R prediction is not always static.

Second, I delivered empirical evidence for the EPM proposition that attention facilitates performance during an episode, namely that episodic task absorption positively relates to task performance, using evidence from physiological, behavioral, and self-reported data. In this study, demand and resource levels change during repeated decision-making episodes. The levels of demands and resources generate different levels of task absorption that consequently cause different levels of task performance. Therefore, task absorption would vary within the task.

Also, this study contributes to managerial practices. The results of this study can be used for time management and job recovery programs in which individuals become aware of their pacing styles and the importance of breaks when performing a decision-making task

(Berman & West, 2007), highlighting the importance of physiological measures that can complement self-reported measures (Bakker & Demerouti, 2017) and provide a more objective indicator of task absorption.

All in all, I offer an episodic view of JD-R theory, showing that demands and resources can be related to episodic task absorption. This dissertation is the first approximation of episodic task absorption. It makes an incremental contribution that can supplement the JD-R theory (Bakker & Demerouti, 2017) and delivers empirical evidence to the EPM (Beal et al., 2005). Finally, it verifies the importance of experimental studies and lays the groundwork for future research.

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APPENDIX A:

DISCLAIMER:

THIS ARTICLE IS UNDER REVISION IN FRONTIERS IN PSYCHOLOGY

JUYUMAYA, J. & TORRES, J. P. A MANAGERS' WORK ENGAGEMENT MODEL IN A DIGITAL ERA.

Work engagement in a managerial digital world: New job demands and resources

Abstract. Grounded in Job demands–resources theory and the digital world context, this article offers a work engagement framework that considers the boundary conditions of managers' digital tasks. The first contribution is the building of new job demands (sustained attention and timely reaction, and maintenance and deployment), new job resources (big data and artificial intelligence, and automation), and new personal resources (technological reflectiveness and ambidexterity) related to the managers' digital tasks. Then, we embedded these new job demands and resources in the managers' work engagement framework. The second contribution is the proposal of direct links between job demands and resources. Most past research shows a negative correlation between job demands and resources. Nevertheless, we describe a new scenario where job demands positively relate to resources. Finally, this research introduces two types of digital tasks: digital adoption tasks and digital business model tasks.

Keywords. Job demands–resources; managers; work engagement; digital tasks; digital world.

1. Introduction

Technological innovations are rapidly developing and are revolutionizing many industries (Parker & Grote, 2020). These emerging technologies, including intelligent technologies, artificial intelligence (AI), robotics, and algorithms (Brougham & Haar, 2018), have fundamentally changed how employees work today and in the future. Many companies seem to invest mainly in technological innovation instead of focusing on the human side of working with these technologies. This scenario has expanded the need for research within organizational behavior that clarifies the latest new job demands and the resources that will empower managers to deal with work engagement and performance in a digital world.

Work engagement is a work–related state of mind characterized by vigor, dedication, and absorption (Schaufeli & Bakker, 2010). Studies on work engagement have proliferated because engaged individuals have better health and higher well-being while contributing to organizational effectiveness, performance, sales, and customer satisfaction (Monje Amor, Xanthopoulou, Calvo, & Abeal Vázquez, 2021). JD–R theory is the most commonly used theory to explain work engagement. JD–R theory also suggests two types of resources to deal with job demands: 1) job resources, which can be physical, psychological, social, or organizational assets in the workplace setting, and 2) personal resources that the employee brings with them and can be related to personality traits and self–efficacy (Bakker et al., 2011). Both job and personal resources are functional in achieving work goals, reducing job

demands and the associated physiological and psychological costs, and stimulating personal growth, learning, and development (Bakker & Demerouti, 2017).

In the business and management field, digitalization refers to digital technologies to change a business model and provide new value-producing opportunities; it is moving toward a digital business (Annarelli et al., 2021). Digital business based on platforms, big data, machine learning, AI, and other algorithms is reshaping the concept of work because they are altering the practices and processes of human interaction. For instance, big data can support business intelligence tools. In contrast, AI can help classify information more efficiently using predictive analytics tools. Nevertheless, digital tasks' functions and networking structures are complex.

The spread of virtual realities, social networks, the internet of things, machine learning, robotics, 3D printers, big data, predictive analytics, algorithms, and AI create a digitalization that radically changes the work. Although technology can take over repetitive, complicated, or heavy tasks, managers hold more cognitively or mentally demanding positions. They require significant information processing. Managers carry out digital transformation processes in their companies and support and create digital business models. No overall research identifies new job demands and resources associated with digital transformation and managers' work engagement (Demerouti, 2021).

New job demands change managers' mindsets about the responsibility and vigilance of these new demands. New digital tasks require managers who pay sustained attention and react on a timely basis to a visual stimulus. Furthermore, new jobs and routines demand managers who have acquired new knowledge and continuously learn. However, these changes do not occur automatically; managers face more significant pressure due to adopting new technology, increased workload, and fatigue. In addition, managers need

personal resources to balance new job demands with the job resources available to perform digital tasks (Bakker et al., 2011).

Following the ongoing debate proposed by Wilkinson (2021), digitalization denotes the transformation of societies and organizations through digital technologies. By providing the means to immediate and almost unlimited information, digital technologies enable newer forms of business arrangements. This situation proposes exciting opportunities for future theory and empirical development.

This paper builds a framework that takes into account the boundary conditions of managers' digital tasks. This article synthesizes recent advances and ideas into a managers' work engagement framework to build this framework. This paper identifies the latest job demands and resources and proposes a positive interaction between job demands and resources. This research attempts to answer the following question: Which new job demands and resources affect managers' work engagement in a digital world, and what are the consequences for the JD–R framework?

We focus on managers' work engagement rather than employees to highlight that manager face several workplace changes that can boost (or decrease) performance in digital tasks. They can change according to the digitalization process in this digital world. Knowing new job demands and resources can help managers, scholars, and policymakers create new positive realities. Following Demerouti (2021), digitalization can contribute to healthy, stimulating jobs if (a) they are designed to support people's work, (b) people are in control and can craft their use, (c) job resources are maximized, and job demands are affordable, (d) economic growth is shared among stakeholders, including employees, and (e) authorities protect employees and employment conditions.

In this article, we make three contributions. First, we identify two new job demands (Proposition 1), two new job resources (Proposition 2), and two new personal resources (Proposition 3), which are associated with the manager's digital tasks. These three research propositions lay the foundations for further empirical explorations. In the context of digital tasks, the managers' work engagement framework proposes that job demands increase or decrease managers' work engagement concerning the interaction of job demands and resources (Proposition 4). It depends on the nature of the micro-tasks involved (new job demands).

Second, we propose a scenario (based on the manager and the digital tasks) where the links are direct and positive between job demands and resources (Proposition 4). Finally, the third contribution proposes two types of digital tasks: digital adoption tasks and digital business model tasks. At the individual level, the managers' work engagement is positively related to performance in these tasks (Proposition 5).

This paper will benefit practicing managers and academic scholars in research and development (R&D), human resources, innovation management, and, more broadly, organizational behavior and strategic management researchers and practitioners. Furthermore, the practical implications could be interesting to managerial practice and practitioners involved in digital tasks. For example, digitalization can provide opportunities and constraints for managers' well-being (Wilkinson, 2021). The proposed framework creates opportunities to develop managers' well-being by using their abilities to participate and co-shape better digital business models with a positive social impact.

2. Literature review

3. Proposition development

3.1. How do new job demands and resources lead to managers' work engagement and performance in a digital world?

The JD–R framework has been used to predict job burnout, organizational commitment, work enjoyment (Bakker & Albrecht, 2018), connectedness, and work engagement (Schaufeli & Salanova, 2007). The JD–R framework has been used to predict the consequences of these experiences, including sickness, absenteeism (Schaufeli et al., 2008), and job performance (Breevaart et al., 2015). Through JD–R theory, we can understand, explain, and predict employee well-being and job performance. Until now, many studies, propositions, and meta-analyses exist on the JD–R framework (Christian et al., 2011; Crawford et al., 2010).

Job characteristics can be separated into two categories: job demands and job resources. Job demands refer to the physical, psychological, social, or organizational aspects that require physical and psychological effort and are related to physiological and psychological costs. Examples are work pressure and emotionally demanding interactions with clients or customers. Although job demands are not necessarily opposing, they may turn into hindrance demands when meeting them requires significant effort from which the employee has not adequately recovered. Job resources refer to the physical, psychological, social, or organizational aspects of the job that are (a) functional in achieving work goals; (b) reducing job demands and the associated physiological and psychological costs; or (c) stimulating personal growth, learning, and development (Bakker et al., 2011).

Hence, resources are necessary to deal with job demands, but they are also crucial in their own right. Whereas meaningful job demands and resources can be found in almost

every occupational group, other job demands and resources are unique and related to the context. For instance, physical demands are still essential for construction employees and nurses. Nevertheless, cognitive demands are much more relevant for scientists and engineers. Another JD–R theory proposes that job demands and resources interact to predict occupational well–being (Bakker & Demerouti, 2017).

There are two ways in which demands and resources may have a combined effect on employee well–being and indirectly increase performance. The first interaction is where job resources buffer the impact of job demands on the strain. Research has shown that job resources, such as social support, autonomy, performance feedback, and development opportunities, can face job demands, including burnout (Xanthopoulou et al., 2009a). Employees who have many job resources can cope better with their job demands.

The second interaction proposes that job demands amplify the impact of job resources on work engagement (Bakker & Demerouti, 2017). Research has shown that job resources become salient and have the most decisive positive impact on work engagement when job demands are high. When a manager is confronted with challenging job demands, job and personal resources become valuable and foster vigor, dedication, and absorption in the tasks. It includes the investment of cognitive, emotional, and behavioral energies in work, dramatically impacting job satisfaction and performance (Kahn, 1999; Rich et al., 2010).

JD–R theory proposes that a combination of job characteristics and personal resources predicts job performance through employee work engagement. Job demands refer to the physical, psychological, social, or organizational aspects that require sustained physical and psychological effort. Hence, they are associated with specific physiological and psychological costs. Most studies have analyzed employees' work engagement, but few have explored managers' work engagement. Moreover, studies have identified several job

demands, such as work pressure, computer problems, emotional needs, changes in tasks, job resources, such as social support, autonomy, performance feedback, opportunities, and personal resources, such as optimism, self-efficacy, resilience, and self-esteem (Demerouti, 2021).

Job demands and job resources can evoke two separate, albeit related, processes: (1) an energetic process of wearing out in which high job demands exhaust employees' mental and physical resources and may therefore lead to burnout and eventually to ill health; and (2) a motivational process in which job resources boost work engagement (Schaufeli & Bakker, 2004). These characteristics do not differ from previous descriptions of employees' work; however, digital work also forces managers to reflect on adopting technology and how these technologies will positively impact task performance (Andrade-Valbuena & Torres, 2018).

JD-R theory predicts some critical organizational outcomes in tech organizations. Schaufeli and Bakker (2004) applied the JD-R to explain absenteeism and turnover intention of call center employees of a telecom company. Job demands were the most important predictors of health problems, which, in turn, were related to absence because of sickness (e.g., duration and long-term absence). Nevertheless, job resources, such as transformational leadership, performance feedback, and time control, were predictors of work engagement, which, in turn, were related to turnover intentions. Because of their intense dedication to and focus on their work, engaged employees display better task performance (Christian et al., 2011; Xanthopoulou et al., 2009b).

Work engagement crosses over from one individual to another and has essential ripple effects on teams (van Mierlo & Bakker, 2018). Bakker et al. (2008) argue that work engagement encompasses three complementary dimensions: 1) energetic (vigor), 2)

affective (dedication), and 3) cognitive (absorption), which the manager should exhibit in digital tasks. Vigor refers to high levels of energy while working (Bakker, 2020).

Digital tasks offer new, challenging problems that demand a higher level of vigor, such as nondeterministic polynomial–time (NP) problems (Felin et al., 2014; Ruiz–Vanoye et al., 2021). Dedication refers to being strongly involved in one’s work and experiencing a sense of significance, enthusiasm, and work challenge.

Empirical evidence suggests that managers experiencing technological failures (e.g., chief technology officers (CTOs)) lead their teams in significant work challenges, such as achieving better standardization and continuously removing dysfunctional routines (Say & Vasudeva, 2020). Finally, the absorption dimension is characterized by being fully concentrated and happily engrossed in one’s career.

Firms pursuing an aggressive technology strategy in industries where technology is a critical contingency, such as high R&D spending, encourage CTOs to concentrate entirely on the success of new innovative projects through a higher compensation scheme (Medcof & Lee, 2017). Hence, engaged managers who are highly active, enthusiastic about, and often fully immersed in their work should enhance organizational routines associated with digital tasks. Table 1 compares traditional and digital variables using the fundamental characteristics of the JD–R framework.

Table 1
Traditional vs. digital task characteristics in the JD-R model.

	Traditional characteristics	Authors	Digital Tasks characteristics	Authors
Job demands	Workload; emotional demand; work-home conflict; interpersonal violence	Demerouti et al. (2001); Schaufeli & Salanova (2007)	Sustained attention and timely reactions; maintenance and deployment	Demerouti (2021); Parker & Grote (2020)
Job resources	Autonomy; feedback; skill variety; group support	Bakker et al. (2010); Holman & Axtell (2016)	Big data, predictive analytics, and artificial intelligence; Automation	Hazen et al. (2012); Demerouti (2021)
Personal resources	Optimism; self-efficacy; resilience; self-esteem	Bakker et al. (2011); Mäkikangas et al. (2013)	Technological reflectiveness; Ambidexterity	Schweitzer et al. (2015); Morn et al. (2009)
Focus	Front-line employees; nonmanagerial employees; first-line managers	Reina-Tamayo et al. (2017); Xanthopoulos et al. (2009)	Managers (middle managers and top managers)	Hambrick & Mason (1984); El-Koo and Burke (2010)
Job attributes	Focused on inputs; repetitive tasks; traditional skills; tasks/jobs are clearly defined; siloed metrics; slow, methodical work	Caputo et al. (2019); Luoma (2000)	Focused on outputs; ad hoc activities; e-skills; tasks/jobs are not clearly defined; integrated functions and KPIs; fast, agile, and efficient	Hofmann & Rusch, (2017); Sivathanu & Pillai (2018)

Figure 1 outlines the five propositions and the managers' work engagement framework in a digital world. It is based on Bakker and Demerouti's (2017) job demands and resources model. The framework's left side depicts new job resources (big data and artificial intelligence and automation) and personal resources (technological reflectiveness and ambidexterity). We describe a framework where new job demands (sustained attention and timely reaction tasks and maintenance and deployment tasks) are positively related to new resources by focusing on the manager and digital tasks.

The right half of the framework illustrates the results of managers' work engagement. It concerns the impact of job demands and resources on task performance (digital adoption

tasks and digital business model tasks), following an individual level of analysis. This framework explores a number of five research propositions about the role of managers' digital tasks within the work engagement framework. It suggests how new job demands and resources could be further explored concerning managers' digital task performance.

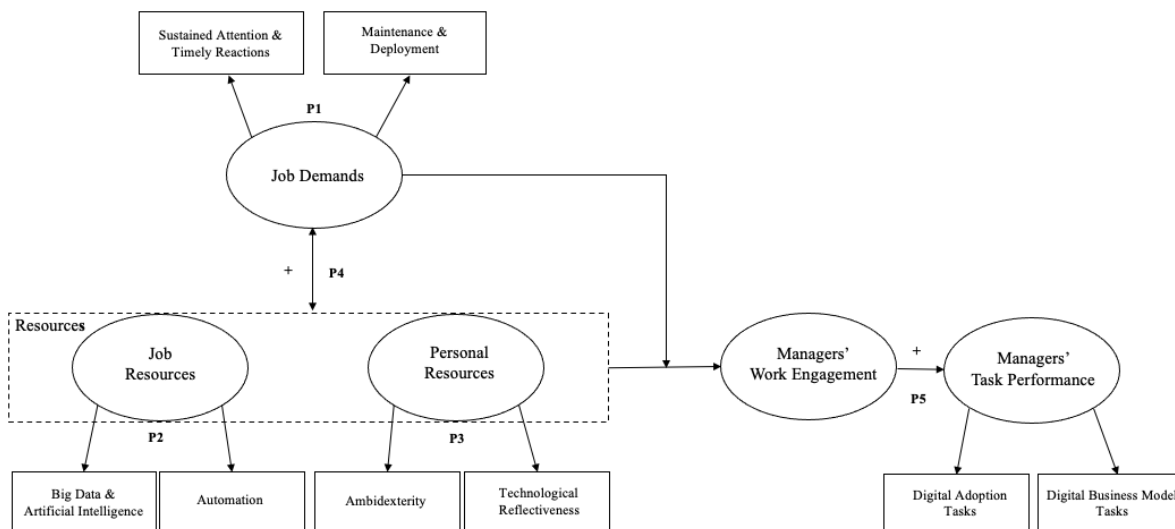


Figure 1. Work engagement in a managerial digital world.

3.2. New job demands

3.2.1. Sustained attention and timely reaction. Digital transformation has become mandatory for all companies and businesses. The new context is increased job demands as byproducts of technology introduction or an intrusion into private life facilitated by technology. For instance, evidence shows that the COVID–19 pandemic increases leader workload and work–family conflict. Technology can influence managers' well–being and make them more exhausted and less engaged in their work. Digitalization can provide opportunities and constraints for managers' well–being and health and for managers' abilities to participate and thus co–shape the developments they are affected by (Wilkinson, 2021).

Because technology takes over the treatment, manipulation, or assembly of smaller objects, parts, or information, the human operator must work with more cognitively or mentally demanding features that require processing a significant amount of data (Demerouti, 2021). Additionally, workload variation due to automation, from underload to rapid overload (Parker & Grote, 2020), requires managers to react on a timely basis. As Bainbridge (1983) noted, it is impossible for even a highly motivated human being to maintain adequate visual attention toward a source of information.

In neuroscience, visual attention refers to cognitive operations that mediate the selection of relevant information and filter irrelevant information from cluttered graphic scenes. Currently, managers face more visual attention and timely reaction demands, such as following the latest, complex, balanced scorecard or other business intelligence tools. Job demands based on physical strength have shifted to the demand for timely reactions and sustained attention.

A large amount of data demands that managers pay visual attention and react opportunely. Managers need to respond quickly to various stimuli and then manage the information to deploy a creative/innovative solution to diverse business problems, such as reading algorithm black boxes, giving timely responses to customers and clients, or managing the relationships between the company and stakeholders/shareholders because of the latter's requests through various digital platforms.

3.2.2. Maintenance and deployment. We argue that job demands change as employees take over maintenance and deployment tasks. Combining big data and artificial intelligence with other technologies creates additional capabilities for digitally transformed firms. These capabilities can develop economies of scale and scope for the organization. Under certain conditions, firms can favor employment structures with less skilled routine work but more

highly technical professional work related to control, planning, maintenance, and deployment.

Maintenance tasks are required to ensure optimal operating systems. Paradoxically, technology has supported and reduced specific tasks but has introduced new workloads associated with maintaining software, robots, and platforms that provide management control and monitoring. Managers involved in digital tasks increase the job demands of surveillance and performance monitoring (Parker & Grote, 2020) associated with these digital environments.

On the other hand, managers face deployment tasks (Parker & Grote, 2020). Deployment is where data mining yields results that impact task performance. The Cross-Industry Standard Data Mining Process, known as CRISP-DM, is an open standard process framework that indicates approaches used by data mining practitioners. It is the most widely used analytics framework.

According to CRISP-DM (Shearer, 2000), managers use data information to improve the way to do business or generate new forms of income through a value proposition embedded in a digital business model. Managers must continuously acquire new knowledge to validate, sort, and analyze big data to make strategic decisions (Meijerink et al., 2021). These new tasks require specific know-how and skills related to exploration and exploitation.

Ambidexterity can be an appropriate personal resource for managers to help complete deployment tasks. In digital tasks, the mechanical capabilities of machines are prioritized, and the purpose of human engagement with machines is reduced to only those aspects where robotic machines still lack capabilities. In many instances, this comprises highly

specific roles requiring limited abilities. The gig worker is controlled by digital platforms and algorithms (cf. Ravenelle, 2019).

Here, managers see their autonomy and job complexity augmented as there is a shift toward valuing “mental work” over “manual work” (Sennett, 2008). Human engagement is significantly mediated or replaced by mechanization and algorithmic control. The work process is highly structured and overdetermined; standardization is vital for efficiency and consistency. Most deployment and maintenance tasks are highly structured, involving significant time and cognitive stress. The effect of a job resource is dependent upon the micro–context. For example, job demands or other job resources are determined by the level and nature of job demands (van Veldhoven et al., 2019). In the context of digital tasks, job demands and resources are characterized by the micro–tasks described before (sustained attention and timely reaction, and maintenance and deployment). Therefore, the managers’ work engagement proposes that job demands can increase or decrease managers’ work engagement. This could be further explored for a more nuanced perspective of job demands. Thus,

Proposition 1. Sustained attention, timely reaction, and maintenance and deployment are job demands for managers’ digital tasks.

3.3. New job resources

3.3.1. Big data, predictive analytics, and artificial intelligence. Our proposed framework groups big data, predictive analytics, and artificial intelligence (BDAI) with several job resources, such as big data, predictive analysis, machine learning, and other computational algorithms. Traditional JD–R theory considers resources in terms of physical capital, human capital, technological capital, and tangible or intangible capital (Gunasekaran et al.,

2016). We consider big data a job resource because this body of knowledge is responsible for analyzing and extracting data from large sets that are too complex to be dealt with by traditional data-processing tools (Chen & Zhang, 2014). Data with many cases (rows) offer greater statistical power.

Big data resources include capturing, storing, analyzing, searching, sharing, transferring, visualization, querying, and updating information privacy and data sources (McAfee & Brynjolfsson, 2012). The new JD-R framework considers AI (Sidner et al., 2005) and automation (Parker & Groter, 2020). AI and automation enable a firm to deal with tasks that are difficult for humans because of the complexity of the operations and procedures (Gunasekaran et al., 2016). In contrast, data of greater complexity (more attributes or columns) may lead to a higher false discovery rate.

Despite the numerous advancements of BDAI, a large part of the existing literature considers them to be domains related only to a firm's processes and infrastructures (Chen & Zhang, 2014), while a few articles have put attention on the role of managerial cognition in facing new job demands based on BDAI (Caputo et al., 2019). An organization must develop BDAI acceptance and assimilation capabilities through BDAI routinization (Hazen et al., 2012). BDAI requires as much theoretical knowledge as it does a wide array of quantitative skills. Our framework supports the idea that BDAI is a job resource that can increase managers' work engagement because it involves a cognitive process of knowledge assimilation.

Managers are more likely to feel more engaged when their company's system and infrastructure have platforms and BDAI infrastructure because they need to address rapidly changing environments that integrate building and reconfigure internal and external data (Hazen et al., 2012). From a dynamic capability perspective, an organization needs to

develop BDAI acceptance and assimilation capabilities through the mediating construct of BDAI routinization. Routinization is the permanent adjustment of an organization's governance system to incorporate technology. Hazen et al. (2012) argue that routinization is the second stage of a threefold process: acceptance, routinization, and assimilation. Organizations must accept, routinize, and assimilate technologies to generate BDAI assimilation (Gunasekaran et al., 2016).

We argue that companies with BDAI resources could increase work engagement because managers perceive such resources to be relevant in dealing with new job demands. Caputo et al. (2019) state that it is necessary to accept, establish routines, and assimilate new technologies to obtain benefits. In this regard, in the BDAI process, the first stage is acceptance, routinization, and finally, assimilation. BDAI resources also include technology and market surveillance processes, enabling managers to understand the current and latest trends in industries and markets. BDAI assimilation empowers a manager to think about the impact of a technological product on its users and society in general because BDAI environments stimulate this type of thinking (Gunasekaran et al., 2016).

2.3.2. Automation. Automation is a new technology by which a process or procedure is performed without direct human assistance (Parker & Grote, 2020). For instance, managers can actively change the design of their jobs by choosing tasks, negotiating different job content, and assigning meaning to their tasks or jobs. The availability of healthy-designed jobs and working conditions facilitate manager motivation and reduce stress (Demerouti, 2021), but what if these favorable job conditions are not present?

Following the analysis of Demerouti (2021), automation can contribute to health, stimulating careers if (a) they are designed to support the work of humans, (b) humans are in control and can craft their use, (c) job resources are maximized, and job demands are

affordable, (d) economic growth is shared among stakeholders, including managers, and (e) authorities protect managers and employees. Automation uses various equipment operating control systems, such as machinery, processes in factories, boilers, heat-treating ovens, switching on telephone networks, steering and stabilizing ships, aircraft, and other applications and vehicles with minimal or reduced human intervention.

Job demands and resources change due to automation among ship engine room staff. The study analyzes the role of marine engineers from engineering to system operation. As the physical design initiatives incorporated in the vessel did not support the tasks to be performed, crew members found alternative and suboptimal ways to perform their functions, which may trigger unsafe behavior. It was also found that staffing had been reduced, and new tasks were added. Still, the crew's organization and the workplace's design remained unaltered. Providing sufficient resources for the demands posed by automation will enable good manager job performance. Nevertheless, managers need to increase their meaningfulness at the workplace to maintain well-being. Job crafting represents a bottom-up adjustment of the tasks and characteristics of the job to fit one's preferences and find meaning in the position.

According to JD-R theory, employees craft their job by expanding (seeking resources and challenges) or reducing their scope (diminishing or optimizing demands) (Demerouti, 2021). Automation and job crafting may be an excellent combination of resources to increase managers' work engagement in a digital world. Accordingly, automation reduces cognitive and physical goals because it supports a manager's digital tasks. To turn BDAI and automation into job resources, we need to analyze the nature and amount of the job resource (Van Veldhoven et al., 2019), as well as the way the job resource is valued by the managers as regards the task goal under consideration. Therefore,

Proposition 2. Big data and artificial intelligence, and automation are job resources related to managers' digital tasks.

3.4. New personal resources

3.4.1. Technological reflectiveness. We recognize a unique personal resource called technological reflectiveness, an individual's tendency to think about the impact of a technical product on different stakeholders, such as employees, customers, and shareholders (Schweitzer et al., 2015). This is an individual's tendency to think about a specialty product's impact on its users and society. Technological reflectiveness draws on theories on reflection and reflexivity (Trapnell & Campbell, 1999).

The managers' work engagement framework proposes that technological reflectiveness is a personal resource that can increase work engagement in the digital workplace characterized by digital tasks. Managers are more likely to feel more engaged when they have the individual tendency of technological reflectiveness. An individual's preference to think about the impact of a specialty product on its users and society can be critical in a digital context (Andrade-Valbuena & Torres, 2018).

The literature about technological reflectiveness aims to understand which individuals are effective contributors to technical innovations because they take society into account. In light of companies' R&D areas increasing endeavors to open up the innovation process and seize the abilities and skills of external sources in the innovation process (Gassmann, 2006), the measure of technological reflectiveness can be used to recruit externals with high technology reflectiveness scores to contribute to the innovation process. Despite the significance of technological reflectiveness, no previous studies link this resource to work engagement. Technological reflectiveness can supplement other job and personal resources,

such as autonomy, supervisory encouragement, team support, and managerial self-efficacy (Tierney & Farmer, 2002), to achieve managers' work engagement.

A creative work environment may enhance a manager's feeling of control and resiliency, motivating them intrinsically (Amabile, 1997), a prerequisite for work engagement (Xanthopoulou *et al.*, 2013). Technological reflectiveness is significantly related to the individual's willingness to promote new technologies (Andrade-Valbuena & Torres, 2018). Hence, technological reflectiveness can be a crucial resource in achieving managers' work engagement because thinking about the impact of a technical product on its users and society can be critical in digital environments. Managers in digital tasks must reflect deeply on how new technologies impact technical solutions in the firm, market, and society.

2.4.2. Ambidexterity. According to Mom *et al.* (2009), individual ambidexterity is a managerial orientation toward combining exploration- and exploitation-related activities within a particular timeframe. In the last decade, individual ambidexterity has become more concentrated on how leaders act ambidextrously to increase individual or group performance (McCauley *et al.*, 1994). The digital JD-R approach offers some arguments to support the idea that ambidexterity can be a personal resource that can boost managers' work engagement. Managers prepare strategic plans that involve short- and long-term investments (e.g., capital expenditures). Such initiatives must be approved annually by the board of directors. Strategy formulation requires significant resource mobilization, coordination, and integration to maintain exploitation and exploration activities.

Managers are involved in several tasks, such as information sharing and knowledge processing, that require balancing short- and long-term tensions. Furthermore, managers can

access the most valuable and diverse information to avoid separating explorative and exploitative behaviors.

Ambidextrous managers engage in complex cognitive processes such as integrative or paradoxical thinking to reconcile the tensions that may emerge in their pursuit of a range of different opportunities, goals, and needs that seem to conflict in terms of time horizon, risk profile, relationship to the current strategy, and managerial responsibilities. Ambidextrous managers are skilled at not stressing the polarity of seemingly conflicting opportunities, goals, and needs. They are motivated to develop creative solutions that combine all aspects by emphasizing their interrelatedness.

Another commonality is that ambidextrous managers are skilled and motivated to engage in a vast repertoire of different or opposing activities and roles, such as conducting routine and nonroutine activities, fulfilling entrepreneurial and administrative leadership roles, and acting outside the narrow confines of their job. Furthermore, they can shift attention quickly between such different behaviors and functions, depending on the situation and the broader interests of the organization. In this sense, ambidextrous managers have been called multitaskers and generalists rather than specialists.

Finally, studies indicate that ambidextrous managers have the skills and motivation to engage in learning activities, such as reliability enhancement, and increase learning activities to refine and refresh their knowledge and skills. They build internal linkages to cooperate, combine efforts with others, and develop and maintain rather large, dense personal networks to share knowledge and information.

We believe that ambidexterity can be a critical personal resource for managers that fosters explorative and exploitative behavior in employees by increasing or reducing the flexibility of desirable behavior (Mom et al., 2009). Considering the nature of the digital

tasks, these individual tendencies of technological reflectiveness and ambidexterity can be essential personal resources for managers' task performance. Therefore,

Proposition 3. Technological reflectiveness and ambidexterity are personal resources related to managers' digital tasks.

3.5. Direct links in the JD–R framework

The JD–R literature does not specify the sign of the relationship between job demands and resources. However, both categories of working conditions can covary in the context of work. Bakker and Demerouti (2017) mention that this may depend on the occupational sector, level of education, hierarchical level (e.g., managers vs. nonmanagers or top managers vs. first–line managers), and occupational situation. Employees of higher status or in prestigious occupations with increased responsibilities often have an exceedingly high workload.

This argument suggests that the correlation between job demands and resources will usually be optimistic in this occupation. A large workload usually implies little time for feedback, opportunities for growth, and various skills, resulting in limited work resources for other jobs. Therefore, the correlation between job demands and resources is negative in most cases. By focusing on the manager, we describe a scenario where job demands are positively related to resources, which we could verify in future studies (cf. Figure 1).

Employees with higher prestige, increased responsibilities, and a very high workload often have many job resources at their disposal (Bakker & Demerouti, 2017). Accordingly,

Proposition 4. *The correlation between job demands and resources will be positive in the managers' work engagement framework.*

3.6. Digital tasks

Creating and adopting new digital business models is a permanent task for managers that involves new job demands and new resources in a digital world. We discuss two digital tasks embedded in managers' work engagement framework in a digital world: digital adoption and digital business models. For instance, these digital tasks allow managers to understand how digital users and customers adapt their products and services.

3.6.1. Digital adoption tasks. Digital adoption occurs when a manager acquires managing technology and successfully carries out digital business objectives. Managers that manage digital adoption can a) understand the potential of digital resources, b) accept and utilize such resources, and c) deploy technology to optimize processes and grow innovation. The increased standardization of tasks replaces routine cognitive skills, and automation causes a decline in the active use of skills and an increase in monitoring tasks (Parker & Grote, 2020).

Managers need to collect data from different sources to enhance their task performance. However, most captured data are of value only when combined with other data in a specific context. Information silos vary widely across disciplines. The greatest challenge in many cases is to dismantle information silos and incorporate these islands of information.

Zhan and Tan (2020) propose an analytic framework for collecting extensive data to enhance performance that comprises five main stages: data capture and management. Stage two: data cleaning and integration. Stage three: data analytics. Stage four: competence set analysis–deduction graph. Stage five: information interpretation and decision–making.

Digital adoption is a crucial aspect of these five main stages. For instance, in Stage 1, organizations must determine the data sources to create as much value as possible.

Therefore, the company needs managers to assume tasks to be able to define the data to be captured and manage such data. In Stage 2, managers must classify and transfer data from different sources. Stage 3 must apply analytics and mining algorithms to identify competence–set information. Then, they use a deduction graph for competence–set analysis in Stage 4. Finally, in Stage 5, they generate a competence network and results for competence–set analysis and decision making.

Managers' vigor, dedication, and absorption reduce the negative influence of complex job demands, such as sustained attention and timely reaction and deployment and maintenance. As a result, engaged managers are probably more likely to accept, integrate, use and promote new digital technology in their companies (Demerouti, 2021).

2.6.2 Digital business model tasks. Technological innovation does not guarantee business success. Often, products and services can be easily copied, whereas business model innovation can provide more sustainable market success. Consequently, new product or service development efforts should be coupled with a business model that defines go–to–market and value–capturing strategies. Business models can change industries and drive exceptional growth (Johnson et al., 2008). Insight into these effects has caused business models to garner increasing attention in practice and research. The innovative business model of the digital economy and digital world is built on software and internet–based technologies such as BDAI.

The unprecedented development of information and communication technology (ICT) has led to a phenomenon known as digitalization. Business models are adopted, especially by young enterprises. In this scenario, classical business models funded predominantly on physical activities are disrupted and shifting toward digitalization. Therefore, digitalization affects an organization's business model and all segments of

society, including new relationships and interactions with organizations. Digitalization has consequences for all industries (Buyukozkan & Gocer, 2018).

The human factor is also vital to a firm's performance (Gunasekaran et al., 2017). Although many activities may be digitalized, talented professionals remain a strategic resource. The requirement for new human capabilities challenges an organization's development. For instance, how can firms support data scientists' formation? What is the role of the organization following job losses resulting from digitalization? Human capabilities are essential in helping and creating a business model in this new digital context (Sivathanu & Pillai, 2018).

Croll and Yoskovitz (2013) propose five tasks that managers should implement to build a digital business model: (1) create the acquisition channel, (2) define the selling tactic, (3) formulate the revenue source, (4) build the digital product type, and (5) agree with the form of delivery. These tasks are part of the digital business model tasks. Table 2 shows digital tasks, questions, and tactics.

Table 2
Linking digital business model tasks with the new job demands and resources

Digital tasks	Main questions	Tactics	Job demands	Job resources	Personal resources
Acquisition channel	How do the digital visitors, users, or customers determine the firm?	Paid advertising; search engine management; artificial virality app ecosystem	Sustained attention and timely reactions; maintenance and deployment	Big data, predictive analytics, and artificial intelligence; automation	Technological reflectiveness; ambidexterity
Selling tactic	How does the firm convince visitors, users, or customers to become paying customers?	Discounts free trial freemium	Sustained attention and timely reactions; maintenance and deployment	Big data, predictive analytics, and artificial intelligence; automation	Technological reflectiveness; ambidexterity
Revenue model	How does the firm extract money from its visitors, users, or customers?	Subscription charges advertising clicks	Maintenance and deployment	Big data, predictive analytics, and artificial intelligence	Ambidexterity
Product type	What does the firm offer in return for the revenue?	Software platform marketplace	Sustained attention and timely reactions	Automation	Technological reflectiveness
Delivery model	How does the product get to customers?	Digital delivery hosted service	Sustained attention and timely reactions	Automation	Technological reflectiveness

In a digital world, new business models and value creation are the mechanisms that allow new job demands and resources to emerge and, consequently, increase managers' work engagement and task performance. These new job demands and resources are part of a new-thinking business model focused on managers' work engagement. For instance, for the digital task (Table 1), BDAI not only promotes more information about customers (acquisition channel and selling tactic) but also, most importantly, increases the accuracy of this information (Buyukozkan & Gocer, 2018) thanks to the adoption of innovative technology (revenue framework). Consequently, BDAI entails smart connections between organizations and their customers. Additionally, customer integration continues to be a vital subject related to an organization's performance (product type and delivery framework)

because managers' work engagement involves the three dimensions of the construct: vigor, dedication, and absorption, especially concerning its cognitive dimensions: 1) vigor: energy and mental resistance; and 2) absorption: visual attention and concentration. Managers must use their energy, mental resistance, visual attention, and concentration to respond to these five digital demands.

This framework highlights the need for organizations to consider that managers' work engagement is a factor critical to success that needs to be managed and developed (Afshan & Motwani, 2021). Managers' work engagement increases task performance and generates more resources to face new job demands (cf. Figure 1). Managers in the digital world can create a better digital business model and adopt and promote digital technology for their companies when engaged. They have the right job and personal resources to respond to the new job demands identified in this paper. Companies must integrate work engagement into the strategy and consider their strategic planning.

Managers' work engagement is positively related to managers' task performance. This research argues two types of task performance: 1) digital adoption tasks and digital business model tasks. Consequently,

Proposition 5. *Managers' work engagement is positively related to performance in digital adoption and digital business model tasks.*

4. Discussion

This article has important theoretical implications for organizational behavior scholars and researchers interested in digitalization phenomena in organizations. Managers' work engagement increases task performance and generates more personal resources to face job

demands. Unlike research on work engagement, there is not much literature on managers' work engagement and new job demands.

This is a significant oversight, especially given the importance of managers in organizations. To further develop an understanding of managers' work engagement in the context of the digital world, we extended the JD–R theory to develop five research propositions supporting the extension of the JD–R framework to understanding managers' work engagement in a digital world.

Grounded in JD–R theory, the first contribution of this article is the building of new job demands (sustained attention and timely reaction, and maintenance and deployment), new job resources (big data and artificial intelligence, and automation), and new personal resources (technological reflectiveness and ambidexterity) related to the managers' digital tasks. Then, we embedded these new job demands and resources in the managers' work engagement framework. The second contribution is the proposal of direct links between job demands and resources. In most cases, the correlation between job demands and resources is negative. However, by focusing on the manager, we describe a new scenario where job demands are positively related to resources. Finally, the third contribution of this paper is to discuss two types of digital tasks. Managers' work engagement will be positively correlated with two types of task performance: digital adoption tasks and digital business model tasks.

4.1. Directions for future research

Adopting a managerial cognitive perspective to explain how managers deal with new job demands could be interesting. Drawing upon JD–R theory, we traced new elements based on which managerial cognition researchers can improve efficiency in the relationship between a firm's human capital and the digital operations dimension. The conceptual

framework presented here opens up several exciting avenues for further research. One essential direction is empirically testing our research propositions using a quantitative approach (e.g., surveys and scales for new demands and resources).

This empirical research extends JD–R theory, contributes to better management practice, and advances work engagement. First, it measures the cognitive aspects of managers' work engagement's vigor and absorption dimensions. Second, our analysis and discussion show how this new information can be used to establish new justifications and provide a deeper understanding of the relationship between work engagement and performance. Third, measuring work engagement via lab experiments will result in a more objective measure of the construct since we will make progress concerning the current limitations of the scale, avoiding the problems of social desirability and biases associated with the subjectivity of self-reporting.

Additionally exciting is how our framework incorporates the work by Bauer and McAdams (2004). The researchers collected growth stories from individuals and quantified these stories in various dimensions. Managers' work engagement stories could be collected and analyzed for evidence of self-insight, and adaptation to assess the degree of technological reflectiveness and ambidexterity. A qualitative approach will be helpful in this respect.

This paper also contributes to practice. In particular, it emphasizes the importance of managers increasing their level of work engagement. We suggest that companies and firms formulate new strategies to increase BDAI assimilation and automation. Additionally, the chief executive officer (CEO), the top management team (TMT), R&D, and human resources managers must understand the automation process. Development and training can encourage this ability and specific skill related to new job demands. New digital demands

put pressure on managers to acquire more personal resources. Adopting a managerial cognitive perspective to explain how a manager deals with these new demands could be interesting for further research.

The new personal resources and the cognitive limitations of managers influence how they exploit resources: invest and deplete (Dierickx & Cool, 1989). Nevertheless, from this cognitive perspective, managers' mental limitations also affect how they respond to new job demands, such as personal resources, and their cognitive constraints, such as misperceptions of feedback, misunderstanding, and difficulty understanding dynamic decisions. In this regard, it is essential how subjects perceive stimuli. Future research could focus on how a misperception of job resources might affect how employees face new job demands (difficulty understanding and perceiving new job resources). In such a line, JD–R theory could trace new elements based on which managerial cognition researchers can improve efficiency in the relationship between a firm's human capital and the digital operations dimension.

4.2. Managerial implications

This research identifies a link for managers to support an efficient, suitable combination of human resource features and opportunities offered by advancements in digital knowledge. It is also beneficial to practitioners' thoughts, generating insights into the decision–making process. This paper suggests several contingency factors that may predict manager well–being and behavior using the JD–R framework. For instance, a company needs to generate managers' work engagement to perform better. Engaged managers are more creative in promoting an innovative climate for other employees. Creative behavior is crucial for CEO, TMTs, R&D, and human resource managers. Companies need to address these issues via diverse strategies, such as talent management, training and development, and incentive

programs to handle manager work engagement in the workplace (cf. Asija & Ringov).

Companies must integrate work engagement into the strategy and consider their strategic planning. Top-down human resource strategies can be practical and involve all the organization's employees adopting new digital technologies. Moreover, this research can design new and better jobs considering new technologies embedded in a digital world.

5. Conclusion

Since its inception, the JD-R theory has inspired hundreds of studies and papers. JD-R framework provided evidence of the buffering role of various job and personal resources in the relationship between job demands, work engagement, and task performance. Grounded in Job demands-resources theory and the digital world context, this article offers a work engagement framework that considers the boundary conditions of managers' digital tasks. The first contribution is building new job demands, new job resources, and new personal resources related to the managers' digital duties. Then, we embedded these new job demands and resources in the managers' work engagement framework. The second contribution is the proposal of direct links between job demands and resources. Finally, the third contribution of this research is to discuss two types of digital tasks. In most cases, the correlation between job demands and resources is negative. Nevertheless, by focusing on the manager, this research describes a new scenario where job demands are positively related to resources. Managers' work engagement will be positively correlated with two types of task performance: digital adoption tasks and digital business model tasks.

Due to the introduction of new job demands and resources in this paper, managers, scholars, researchers, and policymakers may create new positive organizational realities. In this line, this work aims to inspire research to increase the opportunities to build manager well-being and achieve organizational functioning considering the challenging digital world

of the following years of the XXI century. We hope this research contributes to developing new theoretical and empirical work regarding managers' work engagement and digitalization.

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APPENDIX B:

DISCLAIMER:

THIS IS THE AUTHOR ACCEPTED MANUSCRIPT VERSION (28-OCT-2022).

JUYUMAYA, J., & TORRES, J. P. (2022). EFFECTS OF TRANSFORMATIONAL LEADERSHIP AND WORK ENGAGEMENT ON MANAGERS' CREATIVE PERFORMANCE. BALTIC JOURNAL OF MANAGEMENT, VOL. AHEAD-OF-PRINT NO. AHEAD-OF-PRINT. DOI: [10.1108/BJM-11-2021-0449](https://doi.org/10.1108/BJM-11-2021-0449)

Effects of transformational leadership and work engagement on managers' creative performance

Abstract

Purpose – To investigate the effect of transformational leadership on creative performance in managers and the mediation effect of work engagement. We also explore whether manager autonomy is a moderator of the model.

Design/methodology/approach – We captured information about transformational leadership, work engagement, creative performance, and autonomy using an experimental design and surveys among a sample of managers. We modeled the first-stage moderated mediation effect using Hayes' Process macro.

Findings – The results confirm that transformational leadership is positively related to creative performance in managers. This mediation effect is partially explained by work engagement. Interestingly, autonomy was a significant moderator of the mediation effect.

Originality/value – This paper closes a gap between transformational leadership and Job Demands-Resources theory by providing evidence on the effects of transformational leadership, work engagement, and autonomy on managers’ creative performance. We supplement existing empirical tests by adopting an experimental design to eliminate potential alternative explanations.

Practical implications – The findings suggest that learning to practice transformational leadership will positively move companies to increase managers’ work engagement and creative performance. These outcomes have been associated with higher productivity and long-term satisfaction, which are predictors of an organization’s effectiveness.

Keywords – Transformational leadership, work engagement, creative performance, autonomy, managers.

1. Introduction

Transformational leadership is crucial for organizations (Bass and Avolio, 1994; Koh *et al.*, 2019). Bass (1985) characterized transformational leadership as addressing and meeting followers’ higher psychological needs, motivating them to perform beyond expectations. Diverse research has investigated the mechanisms that underlie the effect of transformational leadership on business performance. Investigations have primarily focused on three types of mediators: followers’ attitudes, followers’ self-perceptions, and followers’ perceptions of their work. Although past research has significantly enhanced our understanding of transformational leadership, they abandon a central mechanism proposed by transformational leadership theory: the mediating effect of followers’ attitudes. Few studies have examined followers’ attitudes as mediators of transformational leadership relationships (e.g., Hetland *et al.*, 2011; Kovjanic *et al.*, 2013). Prior studies suggest that employees’ attitudes mediate the relationship between

transformational leadership and performance, and transformational leadership is related to employees' attitudes (e.g., work engagement).

Job Demands-Resources (JD-R) theory explains how individuals engage at work (Saari *et al.*, 2017). Two categories of job characteristics are identified: job demands and job resources. Job demands are the physical, psychological, or organizational features that require effort (Demerouti *et al.*, 2001). Job resources refer to the physical, psychological, or organizational aspects of the job that are functional to work goals and reduce job demands and the associated physiological and psychological costs or stimulate personal growth and development (Bakker and Demerouti, 2017).

This research integrates and extends the theorizing on transformational leadership and work engagement. We experimentally tested our hypotheses that work engagement mediates the relationship between transformational leadership and creative performance in managers. This research offers three contributions by gaining ground in analyzing work engagement as a mediator in the relationship between transformational leadership and creative performance.

First, we endeavor to extend the existing analyses by examining the key, yet untested, tenet of transformational leadership theory: transformational leaders foster managers' performance by satisfying their higher psychological attitudes. Although transformational leadership has been linked to work engagement, it seems too early to infer that the same mediating processes apply to creative performance because research suggests that work engagement is a relatively weak indicator of actual behavior (Mahmood *et al.*, 2019). Hence, this study expands current knowledge about how the relationship between transformational leadership and work engagement can predict creative performance, including autonomy as a boundary condition. Following the JD-R theory, this work also proves that conceptualizing transformational leadership as a job resource can benefit creative performance by facilitating

work engagement research. Our findings help scholars and practitioners identify organizational leadership practices to encourage managers to develop creative skills.

Second, we seek to effectively complement the existing empirical tests, which may have suffered from limitations associated with correlational and self-report-based studies. This study aims to eliminate potential alternative explanations, like common-method variance, and provide causality support by adopting an experimental 2×2 between-subjects design.

Third, this study focuses on analyzing the effect of leadership on managers' creativity because their decisions influence the firm's ability to pursue a balance between exploration and exploitation activities to achieve a sustainable competitive advantage. A manager is a person who manages the business affairs of an individual, institution, organization, or company, embraces the process, seeks stability and control, and quickly resolves problems (Zaleznik, 1981). Managers create organizational knowledge and explore alternative architectures to connect the disparate elements of the business strategy in a cohesive way (Torres *et al.*, 2015). Research on transformational leadership is leader-centered, but the consequences of leader decisions on top followers' creativity remain underexplored. The results suggest that when managers have Chief Executive Officers (CEOs) who are transformational leaders, they experience a higher level of work engagement resulting in a better creative performance.

2. Theory and hypotheses

2.1 The effect of transformational leadership

A leader is a person who motivates, commands, or organizes a group or an organization. Burns (1978) states that the essence of a leader's power is the extent to which the leader can satisfy the specific needs of the followers. A transformational leader is a person who seeks to meet

higher needs and engages the full potential of the follower. Bass and Avolio (1994) explain transformational leadership through four dimensions: (1) Charisma, which is when leaders animate followers; (2) Inspirational motivation, which is when the leader give followers meaning and challenge; (3) Intellectual stimulation, which is when the leader challenges followers to look for new ways to address problems; (4) Individualized consideration, which is when the leader pays special attention to each follower's needs. Leaders provide managers with mediator mechanisms to facilitate their intrinsic motivation to be creative (Deci *et al.*, 1999). Managers acquire knowledge and creativity skills by observing the work and skills of transformational leaders (Eisenbeiss and Boerner, 2013; Jaussi and Dionne, 2003). Managers whose leaders are transformational tend to have visions and goals similar to those of their leaders that enhance a manager's creativity (Qu *et al.*, 2015). Studies have shown that resources, such as team support and transformational leadership, can encourage people to develop creative solutions (Xanthopoulou *et al.*, 2009). Avolio *et al.* (2009) suggest that transformational leaders are charismatic people who can influence managers to go beyond their expectations. Managers can, as a result, exhibit a greater creative performance during their tasks. Therefore, we raise the following hypothesis:

H1. Transformational leadership is positively related to creative performance in managers.

Work engagement is a positive work-related state of mind characterized by vigor, dedication, and absorption (González-Roma *et al.*, 2006). Work engagement includes investing in cognitive, emotional, and behavioral efforts (Kahn, 1990). These efforts impact job satisfaction and various types of performance (Demerouti *et al.*, 2001). Work engagement is most likely when managers are confronted with significant job demands and have the resources to deal with them.

We argue that transformational leadership is a job resource because this intangible asset allows the employees and managers to achieve work goals, reduce hindrance job demands and the associated costs, and stimulate personal growth, learning, and development. Transformational leaders give more support, encouragement, and motivation than transactional leaders (Miao et al., 2012). For example, Fernet et al. (2015) show that transformational leadership can reduce cognitive, emotional, and physical demands and boost traditional resources, such as job recognition and quality of relationships. Breevaart et al. (2014) have also confirmed that transformational leadership is related to work engagement through supplementing job resources. When a leader showed more transformational leadership behaviors, followers reported more job resources (e.g., autonomy, feedback, growth opportunities, support) (Juyumaya, 2022). These bundles of resources will contribute to followers' engagement and task performance by increasing managers' motivation levels. Managers who perceive transformational leaders as a job resource are more likely to accept their ideas (Moss and Ritossa, 2007) and boost work engagement. Hence,

H2. Transformational leadership is positively related to the work engagement of managers.

Creative performance is required to innovate products, services, and processes that will produce substantial and lasting benefits for organizational growth (Tierney and Farmer, 2011). Creativity needs three conditions: expertise, creative thinking, and intrinsic task motivation (Amabile, 1997). While the first two factors determine an individual's ability to perform creatively, the latter is important because it predicts how managers will behave in their jobs. Engaged managers are open to new experiences and are motivated to invest the effort needed to achieve excellent performance. Previous studies have suggested that job resources, such as

autonomy, leader encouragement, and personal resources (for instance, self-efficacy and intrinsic motivation), are positively related to creative performance (Demerouti *et al.*, 2010).

A creative work environment enhances a manager's feelings of control and resiliency, intrinsically motivating them to tackle any challenging situation. When managers have higher levels of autonomy and a sense of ownership and control over their work, they experience a higher level of creativity (King *et al.*, 1996). Amabile (1998) argues that managers produce more creative work when they believe they have different choices in completing a task. A leader who is perceived to be positive can also encourage managers to develop creative behavior because positive leadership triggers self-confidence and decreases the fear of negative criticism, which can undermine their motivation to express new ideas. When firms develop formal structures, procedures, and processes that facilitate a mutual openness to new ideas and shared commitment, they increase the intrinsic motivations of managers toward their work.

Bass (1999) argues that every leader uses both transactional and transformational leadership. However, transformational leaders use charisma to influence managers to go above and beyond what is expected for the organization's greater good (Avolio *et al.*, 2009). Similarly, Bass (1985) suggested that managers are more likely to devote additional effort if they have a transformational leader who leads, motivates, and inspires trust. These characteristics suggest that transformational leaders offer job resources that boost work engagement (Breevaart *et al.*, 2016).

Schaufeli *et al.* (2006) argue that when managers face prolonged exposure to stressors from leaders, such as a permanent lack of support, they can experience feelings of being burned out or less engaged in their work. Managers consider these negative stimuli to be a lack of job resources available to perform their tasks that decreases employee well-being and performance (Demerouti *et al.*, 2001). JD-R theory postulates that more engaged managers will be more

vigorous, dedicated, and absorbed in their job tasks (Bakker and Albrecht, 2018). Hence, leaders play a central role in motivating or discouraging manager attitudes, such as higher energy levels, persistence, and dedication to completing tasks (Schaufeli *et al.*, 2006).

Transformational leaders can enhance the intrinsic motivation of followers by inspiring them and satisfying their basic psychological needs when facing job demands (Gagne, 2003). When jobs demand creative thinking, managers need leaders who strengthen their persistence when facing adversity, especially problems (Greguras *et al.*, 2007). Most studies on transformational leadership processes examine models that interconnect leaders' characteristics and performance but neglect the possibility of sequential mediation. However, Kovjanic *et al.* (2013) present a model showing that satisfaction with the needs for competence and relatedness mediate the relationship between transformational leadership and work engagement, which, in turn, is positively related to the quality and persistence of participants. Bass (1985) argues that transformational leaders motivate followers to achieve their assigned goals by inspiring and supporting them during the development of specific activities. Thus,

H3. The relationship between transformational leadership and creative performance is mediated by work engagement in managers.

2.2 The autonomy effect

Although we hypothesize that transformational leadership and work engagement lead to extraordinary creative performance, only some managers may find it easier to adopt new behaviors. Managers who can decide and control their work will experience strong work engagement (Bakker and Demerouti, 2017). Based on leader feedback, managers with greater autonomy can determine what information helps understand a novel situation and implement solutions. Managers with greater autonomy feel responsible for their decisions since their

initiative and judgment about doing the work can directly influence their performance (Bandura, 2002). In contrast, managers with lower levels of autonomy do not have much freedom, discretion, or intrinsic motivation to use information from leader feedback. Autonomy is a significant job resource that increases work engagement. Consequently,

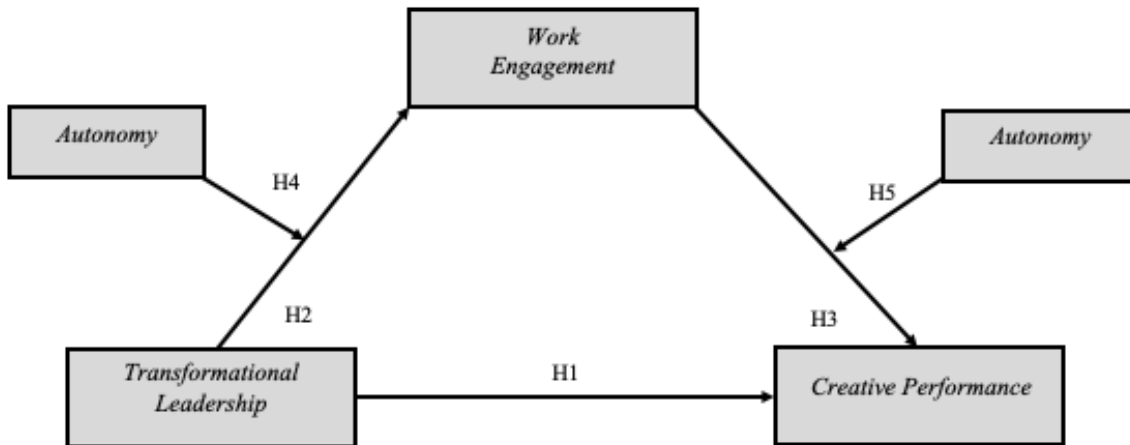
H4. Autonomy moderates the relationship between transformational leadership and work engagement, such that the effect is more substantial as the autonomy of managers increases.

Autonomy is frequently identified as one of the significant antecedents of creative performance, yet the discussion on how and why it affects innovative behavior is ongoing (Zhang and Bartol, 2010). Managers who possess job independence and freedom are forced to create solutions without constant supervision (Oldham and Hackman, 2010). Therefore, managers will reduce their work engagement if there is no transformational leader to motivate them, which negatively affects their subsequent creative performance. Furthermore, creativity research has found that individual attitudes and a high tolerance to uncertainty are associated with high levels of creative performance (Shalley and Gilson, 2004). So,

H5. The mediating role of work engagement in the relationship between transformational leadership and creative performance is moderated by autonomy, with the effect being more substantial as the autonomy of managers increases.

Figure 1 presents our model that proposes that work engagement is a sequential mediator. Additionally, autonomy is a moderator of the model.

FIGURE 1
Hypothesized Model



3. Method

3.1 Sample

We test the hypotheses by convenience sampling. To ensure a similar background, we recruited managers with a Master of Business Administration degree (MBA). We excluded the CEOs, top management teams, corporate managers, and firm founders because we wanted to test our conceptual model on managers (Andrade-Valbuena and Torres, 2018). We received university authorization to send MBA alumni questionnaires via email using Qualtrics software. We manually selected participants enrolled in the MBA program in the last three years, who managed at least one subordinate level and reported to a higher level.

Over a period of 30 days, we received 219 questionnaires from 262 selected participants (response rate of 84%). We excluded 5 participants because their responses to the questionnaire were incomplete, which resulted in 214 usable questionnaires. The sample consisted of 214 participants (54% female) whose average age was 33 years ($SD = 6.30$) and whose average work experience was ten years ($SD = 5.46$). At the time of the study, all the participants were

employed. We randomly assigned participants to four experimental conditions. This resulted in four groups, each with more than 50 participants: Group 1 = 58, Group 2 = 54, Group 3 = 52, and Group 4 = 50. This procedure satisfied the experimental design criteria (Podsakoff and Podsakoff, 2019).

3.2 Measures

We used validated scales published in prior research. Appendix A presents the list of measurement items. We used 5-point Likert scales (1 = disagree; 5 = agree) to rate the constructs. Two bilingual researchers translated the questionnaires from English into Spanish. We used the double-back translation suggested by Craig and Douglas (2005). We ran a pilot experiment with 55 MBA students from a Latin American university to validate the translation of the items and the experimental scripts into Spanish. Comparisons supported the conceptual equivalence of the items to the original versions. The internal consistency of all the scales exceeded .90.

Transformational leadership. It was measured using an 8-item scale from the Bass and Avolio (1995) Multifactor Leadership Questionnaire. Previous research has shown that the four dimensions are highly correlated (at .93 after correction for unreliability; cf. Judge and Piccolo, 2004). In this study, the average correlation coefficient among the items was .86. So, consistent with previous studies, we combined all the items into one factor (Walumbwa *et al.*, 2011).

Work engagement. We used a 9-item scale from the study by Schaufeli *et al.* (2006). As Schaufeli *et al.* (2006) recommended, we calculated the overall work engagement score.

Autonomy. The survey used a 3-item scale by Idaszak and Drasgow (1987). Consistent with previous research (Walumbwa *et al.*, 2011), we combined all the items into one factor.

Creative performance. We provided participants with a setting where they had to make decisions as the project leader of a fictitious company called BKC. We explained that the task

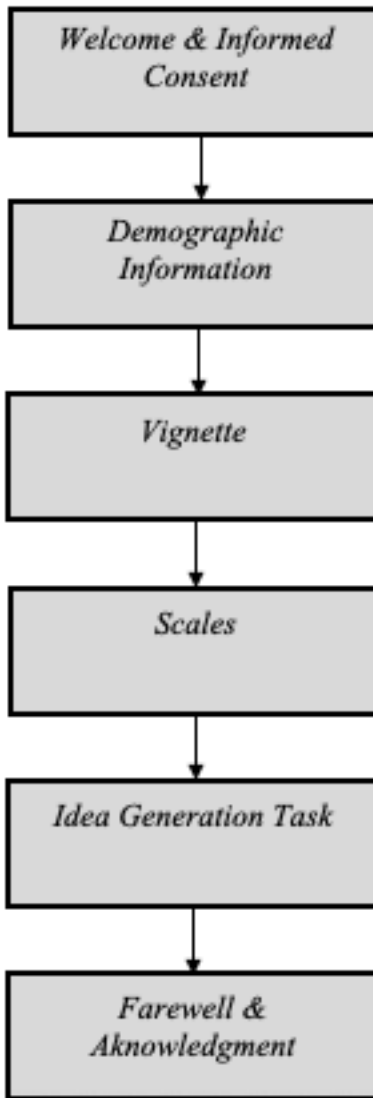
was to generate as many ideas as possible to improve BKC growth quickly. The participants wrote their ideas in a blank space. This space had no word limit, so creative performance could be measured in two ways: by quantity and by the quality of ideas. These indicators follow previous research (Jung and Avolio, 2000). Two trained research assistants assessed quantity and quality independently. Quantity was measured by one assistant rating the number of ideas on a 5-point scale (None = 1, one idea = 2; two ideas = 3; three ideas = 4; four or more ideas = 5). Quality was measured by the other assistant rating the innovativeness of each idea on a 5-point scale (None = 1, one or more ideas without development = 2; one or more ideas with development = 3; one or more ideas with further analysis = 4; one or more ideas with further analysis and creative solutions = 5). We obtained two different scores for each participant (quantity score and quality score). Finally, we calculated each participant's mean between these scores to create an overall creative performance score ($M = 2.75$, $SD = 1.74$).

Controls. This study included age, gender, and work experience because these control variables can influence creative performance (Walumbwa and Hartnell, 2011).

3.3 Procedures

We invited the participants to take part in an experiment by email. Using a database of our sample of managers, we sent an email with the link to access the online experiment. We used Qualtrics to conduct the experiment and automatically collected all the responses. Figure 2 shows the sequence of this experiment.

FIGURE 2
The Sequence of the Experiment



First, the participants had to agree or refuse to participate in the experiment (Berkowitz and Donnerstein, 1982). If the participant accepted the invitation, the experiment continued. The participant could abandon the online experiment at any time. The survey ended automatically when a participant refused to participate. We adhered to the high standards on the ethical aspects of Internet research involving people (Eysenbach and Wyatt, 2002). Second, the participants who agreed continued the survey, providing demographic information. Third,

the participants read the experiment instructions: “Imagine you are in the following situation: You are just starting a 3-month training program at a paper-producing company called BKC. Along with other managers, you will work on a project named PaperforPeople.” Next, the participants were randomly assigned to the experimental conditions. The participants read one of the four vignettes. No further information about BKC was provided after the vignettes.

Fourth, regardless of the previous randomization, all participants were asked to respond to the transformational leadership, autonomy, and work engagement scales. Fifth, all the participants were instructed that the CEO had asked them to generate as many ideas as possible about the future use of paper: “Finally, do you have any ideas to improve or grow BKC? Tell us!” The participants wrote their ideas in a blank space left for this purpose. The participants could not finish the online experiment if they did not write a statement or enter the word “No.” Finally, the participants could end the survey by clicking on “Finish the online experiment.” The survey sent an automated message of acknowledgment to the participants.

3.3.1 Priming transformational leadership and autonomy

A 2×2 design is an experimental design that lets researchers recognize the effects of two independent variables on a dependent variable (Podsakoff and Podsakoff, 2019). Managers were randomly assigned to the conditions of a 2 (leadership style: transformational leadership vs. non-transformational leadership) \times 2 (level of autonomy: autonomy vs. non-autonomy) between-subjects design. We primed leadership styles and autonomy levels. To prime transformational leadership, we modify the vignettes Felfe and Schyns (2006) developed based on Kirkpatrick and Locke’s scripts (1996). The transformational leader vignette includes the core elements of transformational leadership, like trust and recognition. In contrast, the non-transformational leadership vignette had core elements of non-transformational leadership, like command and procedures. On the other hand, to prime the level of autonomy, we used vignettes

based on Idaszak and Drasgow's (1987) scripts. The autonomy vignette included self-control aspects, whereas the non-autonomy vignette included dependence statements.

4. Results

4.1 Descriptive statistics

Table 1 shows the study variable correlations, means (M), standard deviations (SD), and internal consistencies. All the correlations were significant. The correlation between work engagement and autonomy was .82 ($p < .01$), and the correlation between work engagement and creative performance was .52 ($p < .01$). The following scores were significant: the M of transformational leadership = 3.24, the SD of transformational leadership = 1.53; the M of work engagement = 3.08, the SD of work engagement = 1.30; the M of autonomy = 2.72, the SD of autonomy = 1.68; the M of creative performance = 2.75, and the SD of creative performance = 1.74.

Internal consistency reliability was measured using Cronbach's α (cf. Table 1). These alpha scores are acceptable for the analysis to follow the criteria of Podsakoff and Podsakoff (2019). These results provided support for internal consistency reliability.

TABLE 1
Descriptive Statistics and Correlations

Variables	M	SD	Minimum	Maximum	1	2	3
1. Transformational Leadership	3.24	1.53	1.00	5.00	(0.98)		
2. Work Engagement	3.08	1.30	1.00	5.00	0.37**	(0.98)	
3. Autonomy	2.72	1.68	1.00	5.00	0.19**	0.82**	(0.97)
4. Creative Performance	2.75	1.74	1.00	5.00	0.33**	0.39**	0.52**

Notes: Alpha scores on parentheses and bold. ** $p < .01$.

4.2 Confirmatory factor analysis

We conducted a confirmatory factor analysis and tested the hypothesized three-factor model on transformational leadership, work engagement, and creative performance. The model fit the data well ($\chi^2 = 2236.23$; CFI = 0.97; SRMR = 0.04; RMSEA = 0.05), suggesting that

participants were able to distinguish our constructs. We also ran three alternative models merging pairs of constructs. None showed better fit indexes than the hypothesized model.

4.3 Manipulation check

This research analyzed variance (ANOVA) to compare the means between the four groups after the priming (treatments). We used the F test to reject the null hypothesis that the groups had the same mean. ANOVA results indicated the successful manipulation of transformational leadership ($M = 3.91$, $SD = 0.50$ versus M of non-transformational leadership = 2.16 , $SD = 0.60$, $F(1, 188) = 485.25$, $p < .001$), and autonomy ($M = 4.01$, $SD = 0.55$ versus M of non-autonomy = 1.18 , $SD = 0.50$, $F(1, 144) = 335.15$, $p < .001$).

4.4 Hypothesis testing

Hypotheses were tested in a 2×2 between-subjects design. We modeled a first-stage moderated partial mediation effect using Hayes' Process macro to test our hypotheses (Hayes, 2013). We used SPSS v.23 and Process macro v.2 16.23. Results using the participants' age, gender, and work experience were virtually identical to those shown in Table 2.

Following Cohen (1992), the minimum sample size for multiple regression should be 103 observations to detect R-square values of approximately 0.10, assuming a significance level of 5%. So, a sample size of 214 participants was adequate. We calculated a coefficient of determination, R-square, and adjusted the R-square of each construct, ranging from 0.10 to 0.25. We present regression results for each of our five hypotheses in Table 2.

TABLE 2
Regression Results of Testing Moderated and Mediation Effects

Independent Variables			Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	R ²	R ² Adj.	Dependent Variables					
			WE	CP	CP	WE	WE	CP
Transformational leadership	0.12	0.10	0.200** (.016)	0.498** (.036)	0.339** (.045)	0.199** (.015)	0.195** (.015)	0.363** (.045)
Work Engagement	0.19	0.18			1.292** (.092)			1.191** (.095)
Autonomy	0.21	0.20				0.019** (.002)	0.018** (.002)	0.026** (.006)
Transformational Leadership × Autonomy	0.25	0.24					0.006* (.001)	0.007 (.005)

Notes: The table shows the regression results for the six tested models. Standard errors are in parentheses. * $p < .05$; ** $p < .01$.

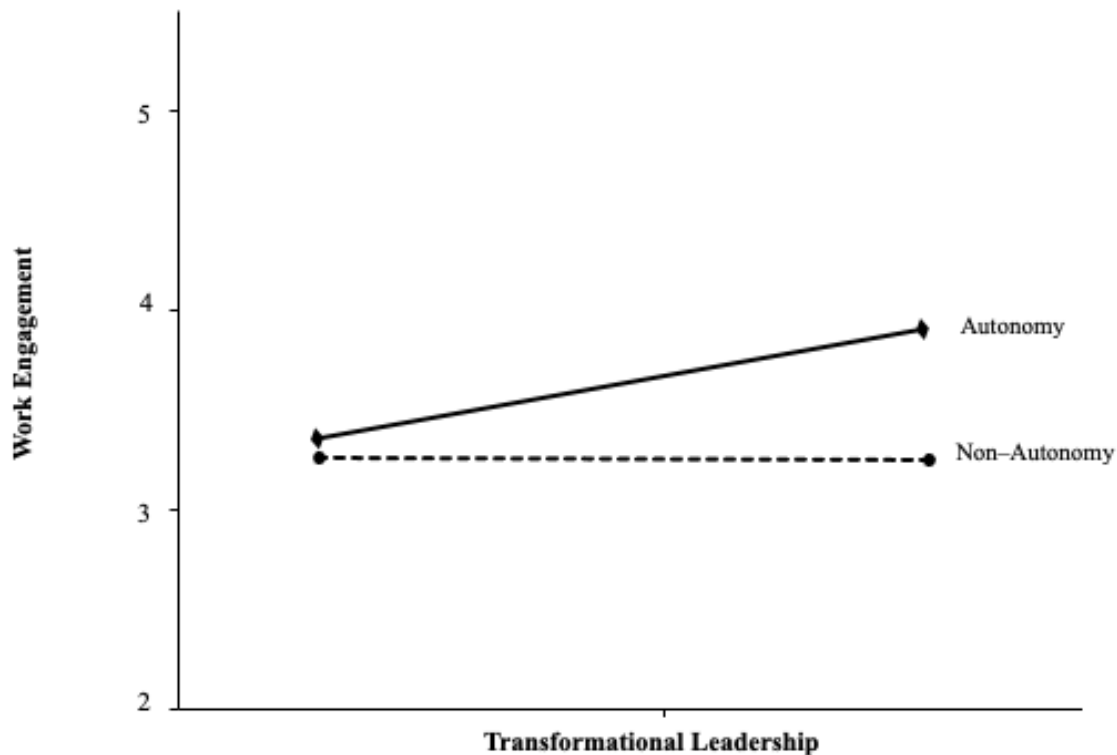
Hypothesis 1 predicted a linear and positive relationship between transformational leadership and creative performance. In contrast, Hypothesis 2 predicted a linear and positive relationship between transformational leadership and work engagement. Hypothesis 1 was supported for managers ($b = 0.498$, $SE = .046$, $p < .01$, model 2). Similarly, Hypothesis 2 was also supported ($b = 0.200$, $SE = .016$, $p < .01$, model 1).

Hypothesis 3 predicted a mediation effect of work engagement on transformational leadership and creative performance. To test the mediation effect of Hypothesis 3, we made the independent and mediation variables the predictors of the dependent variable (Model 3), we calculated regression coefficients and we estimated the mediation effect. The mediation effect test was significant (Estimate = 0.26, $SE = .03$, bootstrapped 95% CI: [0.22, 0.36]). Hypothesis 3 was supported.

Hypothesis 4 predicted a moderation effect of autonomy on the relationship between transformational leadership and work engagement in a way where the effect was more substantial as autonomy increased. As Table 2 shows (Model 5), the interaction effects were significantly different from zero for managers ($b = 0.006$, $SE = .001$, $p < .05$, Model 5). In Figure 3, the slope representing the relationship between transformational leadership and work engagement was positive for autonomy and different from the same slope for non-autonomy.

Managers presented a higher level of work engagement when autonomy and transformational leadership increased. In contrast, the work engagement level for non-autonomy managers appeared to be unaffected by transformational leadership. This effect supports our Hypothesis 4.

FIGURE 3
Moderating Effect of Autonomy



Hypothesis 5 predicted a moderated effect of autonomy on the mediation effect of work engagement on transformational leadership and creative performance. Our main results are presented in Table 3. Table 3 shows the estimated and bootstrapped internals of work engagement in the relationship between transformational leadership and creative performance for different levels of autonomy (+ 1SD, M, - 1SD). The mediation estimate was also significant at different levels of the moderator. The mediation estimate became stronger when autonomy was high, which was also confirmed through the index of moderated mediation (Estimate

= .0059, BootSE = .0027, 95% CI: [.0017; .0439]). This result provides evidence to support Hypothesis 5.

TABLE 3
Indirect Effects at Autonomy = Mean +/- 1 SD

Indirect Effect	Estimate	LLCI95%	ULCI95%
-1.00 SD	0.15	.037	.147
0.00 SD	0.12	.077	.171
1.00 SD	0.86	.094	.227

Notes: The table shows the bootstrapping procedure results using Hayes's Process macro to test the moderator variable's conditional effects (- 1 SD, mean, and + 1 SD). LLCI: Lower level 95% confidence interval. ULCI: Upper level 95% confidence interval. A bootstrapping procedure used 5,000 random subsamples to produce a normal distribution.

4.5 Post-hoc analysis

We used Harman's single-factor test (Aguirre-Urreta and Hu, 2019) to estimate the potential effects of common-method bias in our results. This test combined all items into one factor and examined the unrotated solution. The total variance explained by that factor was 40%, well below the cumulative variance limit (50%) suggested by Podsakoff *et al.* (2003). Accordingly, the common-method bias did not seem to present a significant challenge.

5. Discussion

5.1 Theoretical implications

This research advances recent studies on transformational leadership, work engagement, and creativity. We validated our hypotheses on the mediating role work engagement plays in managers' transformational leadership and creative performance. We also extended our results by showing how a manager's autonomy moderates the relationship between transformational leadership and work engagement. This latter relationship becomes more substantial as autonomy increases.

Following the JD-R theory, we postulate that conceptualizing transformational leadership as a job resource can benefit the merger of transformational leadership research and work engagement research. Transformational leadership is functional in attaining goals, reducing job

demands and the associated costs, and stimulating personal development. Job resources influence future work engagement, which, in turn, predicts organizational commitment. On the other hand, transformational leadership and autonomy can buffer the stressing impact of job demands.

Our results also reveal that transformational leadership predicts work engagement and that work engagement in turn leads to excellent creative performance in managers. We suggest that transformational leaders give more support, encouragement, and motivation than transactional leaders. Managers perceive these attributes as a job-resource bundle that facilitates work engagement. According to JD-R theory, engaged managers are more vigorous, dedicated, and absorbed in their tasks. These components increase managers' energy, persistence, inspiration, and concentration while performing tasks (Lazauskaite-Zabielske *et al.*, 2018). When managers face challenging tasks, they accumulate personal resources with the job resources available to identify a set of novel ideas. Additionally, the present findings seem consistent with creativity research that found that work engagement is associated with high levels of creative performance (Shalley and Gilson, 2004). Our results show that managers with many job resources available can cope better with their strains and achieve better creative performance.

The second contribution goes beyond the limitations associated with correlational and self-report-based field studies. This study eliminates potential alternative explanations and provides causality support through the use of an experimental design. The experimental design analyzes participants individually to isolate some actual working conditions in which managers can imitate ideas from leaders or subordinates.

Third, the findings of this study benefit researchers and practitioners in understanding leadership and its effects on managers. No previous studies have focused on managers that link

transformational leadership and work engagement. Previous research on transformational leadership has been leader-centered, while the role of top followers remains underexplored. We focused on managers because they are an organization's crucial human capital resource, and creative performance is essential for 21st-century firms (Gallup, 2020). Despite this progress, we still need to comprehend the effects that transformational leadership can be expected to have on creative performance. We found that managers developed more new ideas when they accumulated a more significant number of job resources. Although we do not analyze the accumulation of other job resources, our results support the view of Salanova *et al.* (2010) that work engagement may broaden people's thought-action repertoires by creating the urge to expand learning and goal fulfillment. Therefore, transformational leadership is a significant job resource for managers to improve their creative performance.

5.2 Practical implications

This research makes essential contributions to managerial practice. First, it suggests that learning to practice transformational leadership will positively push companies to increase managers' work engagement and creative performance. These outcomes have been associated with higher productivity and long-term satisfaction, which are predictors of an organization's effectiveness and business performance.

Second, the results suggest that organizations can benefit from implementing measures to increase work engagement because this can enhance creative performance. They indicate that initiatives focusing on managers' needs for job resources are particularly fruitful. Researchers and practitioners should consider measuring and analyzing, as separate but related factors, the constructs of transformational leadership, autonomy, work engagement, and creative performance to have a more accurate assessment of job-resource implications. Furthermore, organizations should consider the specific criterion of performance of interest before assessing

these key constructs. If creative performance is a concern, the constructs in this article should be appropriate. A similar argument applies to interventions under high job demands because transformational leadership and autonomy are more relevant in buffering the adverse effects of demands on specific behaviors. The third practical contribution is that transformational leadership is a concrete way to foster managers' job resources, work engagement, and creative performance. Hence, integrating the frameworks of transformational leadership and the JD-R model can provide valuable insights into leadership development.

5.3 Limitations and future research

The first limitation is that we did not control by the job industries and countries of the participants. International aspects of human resources might be interesting to analyze, including those working in developing and emerging economies. A second limitation relates to the controlled setting associated with our experimental study. Specifically, as in most leadership experiments, the time and form of the leader encounter were restricted. However, despite this restricted leadership experience, we found consistent effects of transformational leadership on work engagement and creative performance. Our results provide a more nuanced understanding of transformational leadership and creative performance. Elaborating on these insights and building a more extensive model could be an essential avenue for further studies. Additionally, future research should investigate the impact of other leadership behaviors on creative performance. Scholars can also study how leadership behaviors change daily and affect managers' work engagement and creative performance through their effects on daily job demands and resources.

6. Conclusions

This paper closes a gap between leadership theories and JD-R theory by providing empirical evidence on the effects of transformational leadership and work engagement on managers'

creative performance. We also explore whether autonomy is a significant moderator of the mediation model. This research is novel because it tests a new mediator and moderator variable in the relationship between transformational leadership and creative performance. It supplements existing empirical tests by adopting an experimental design to eliminate alternative explanations for our findings and to support causality. This paper promotes interventions based on positive organizational behavior that will produce positive individual results and create organizations that flourish from manager training and development.

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**Appendix A
Measures**

Construct	Items	Author
Work Engagement	WE1. At my work, I feel bursting with energy. WE2. At my job, I feel strong and vigorous. WE3. When I get up in the morning, I feel like going to work. WE4. I am enthusiastic about my job. WE5. My job inspires me. WE6. I am proud of the work that I do. WE7. I feel happy when I am working intensely. WE8. I am immersed in my work. WE9. I get carried away when I'm working.	Schaufeli et al. (2006)
Transformational Leadership	TFL1. My leader speaks optimistically about the future. TFL2. My leader tends to speak enthusiastically about what needs to be accomplished. TFL3. My leader builds a compelling vision of the future. TFL4. My leader expresses confidence that goals will be achieved. TFL5. My leader spends much of his time teaching and training. TFL6. My leader treats me as an individual and not just as a member of a group. TFL7. My leader believes that I have different needs, abilities, and aspirations than others. TFL8. My leader helps me develop my strengths.	Bass and Avolio (1995)
Autonomy	A1. The job gives me almost complete responsibility for deciding how and when the work is done. A2. The job gives me a considerable opportunity for independence and freedom in how I do the work. A3. The job gives me a chance to use my initiative and judgment in carrying out the work.	Idaszak and Drasgow (1987)

**Appendix B
Vignettes**

	Autonomy	Non – Autonomy
Transformational Leadership	<p><i>You have been informed that you have total autonomy and freedom to organize your work. The CEO, who will lead this project, makes a speech to welcome you and the other employees: today is the start of the PaperforPeople project. With this project, we can establish a milestone in the industry to protect ecological resources. This project is a real challenge for BKC and will require your complete dedication and effort. I chose you to participate in this project because you have the necessary qualifications, and I am convinced you will do your best. As you participate in this innovative company, you will gain valuable experience for your personal and professional careers. I will always be available if you need my help or advice. I will spend time training and coaching them to help them solve any problems they may encounter. It is of great importance to BKC and myself that PaperforPeople is successful. If each of you does your best, we will all be proud of what we have accomplished. BKC will further increase its high quality for our clients with this project. At BKC, we are committed to ensuring that our customers receive high-quality prints and bindings. This vision describes my long-term goals and ideals for BKC and is the direction we will be heading into the next century. From my first day in this business, I have been proud that BKC strives to offer a quality product; summing up, BKC is bound by quality! I know this task is quite tricky, but I think you can do it well. In my experience, employees like you do the jobs reasonably quickly. They can produce the high-quality papers that BKC is known for. I think you will do a superb job!</i></p>	<p><i>You have been informed that you do not have the autonomy and freedom to organize your work; you must remain attached to the company's procedures. The CEO, who will lead this project, makes a speech to welcome you and the other employees: today is the start of the PaperforPeople project. With this project, we can establish a milestone in the industry to protect ecological resources. This project is a real challenge for BKC and will require your total dedication and effort. I chose you to participate in this project because you have the necessary qualifications, and I am convinced you will do your best. As you participate in this innovative company, you will gain valuable experience for your personal and professional careers. I will always be available if you need my help or advice. I will spend time training and coaching them to help them solve any problems they may encounter. It is of great importance to BKC and myself that PaperforPeople is successful. If each of you does your best, we will all be proud of what we have accomplished. BKC will further increase its high quality for our clients with this project. At BKC, we are committed to ensuring that our customers receive high-quality prints and bindings. This vision describes my long-term goals and ideals for BKC and is the direction we will be heading into the next century. From my first day in this business, I have been proud that BKC strives to offer a quality product; summing up, BKC is bound by quality! I know this task is quite tricky, but I think you can do it well. In my experience, employees like you do the jobs reasonably quickly. They can produce the high-quality papers that BKC is known for. I think you will do a superb job!</i></p>
Non – Transformational Leadership	<p><i>You have been informed that you have total Autonomy and freedom to organize your work. The CEO, who will lead this project, makes a speech to welcome you and the other employees: Today is the start of the BKC PaperforPeople project. We have a tight deadline, and we must finish in 2 months. I hope they are ready and flexible regarding their work hours. Of course, we will pay for any extra time they need to work. If there are any questions or problems during this project, please ask me directly, and I will deal with them. If there is a delay, I will help you find a way to meet the deadline. Since we have no time to waste, I am doing my job to check that we are on schedule. I will regularly check to see if we meet our quality standards. We can only maintain the plan if we detect any deviation as soon as possible. I've put together a plan for what to do, the deadlines, and who is responsible for what. If I am satisfied with their performances, there will be bonuses. Before we begin, let me give you some technical background that will be important for the execution of the project: about 80% of our jobs are printed on high-quality coated paper, while the rest are printed on long-grain paper, which is similar to that used in most photocopiers. The paper roll manufacturing process involves cutting, sorting, counting, and packaging. Finally, orders are transported to customers. I count on you on this new project.</i></p>	<p><i>You have been informed that you do not have the Autonomy and freedom to organize your work; you must remain attached to the company's procedures. The CEO, who will lead this project, makes a speech to welcome you and the other employees: Today is the start of the BKC PaperforPeople project. We have a tight deadline, and we must finish in 2 months. I hope they are ready and flexible regarding their work hours. Of course, we will pay for any extra time they need to work. If there are any questions or problems during this project, please ask me directly, and I will deal with them. If there is a delay, I will help you find a way to meet the deadline. Since we have no time to waste, I am doing my job to check that we are on schedule. I will regularly check to see if we meet our quality standards. We can only maintain the plan if we detect any deviation as soon as possible. I've put together a plan for what to do, the deadlines, and who is responsible for what. If I am satisfied with their performances, there will be bonuses. Before we begin, let me give you some technical background that will be important for the execution of the project: about 80% of our jobs are printed on high-quality coated paper, while the rest are printed on long-grain paper, which is similar to that used in most photocopiers. The paper roll manufacturing process involves cutting, sorting, counting, and packaging. Finally, orders are transported to customers. I count on you on this new project.</i></p>

APPENDIX C:

DISCLAIMER:

THIS IS THE AUTHOR ACCEPTED MANUSCRIPT VERSION (88-AUG-2022).

JUYUMAYA, J. (2022). HOW PSYCHOLOGICAL EMPOWERMENT IMPACTS TASK PERFORMANCE: THE MEDIATION ROLE OF WORK ENGAGEMENT AND MODERATING ROLE OF AGE. FRONTIERS IN PSYCHOLOGY, 13:889936. DOI: [10.3389/fpsyg.2022.889936](https://doi.org/10.3389/fpsyg.2022.889936)

How psychological empowerment impacts task performance: The mediation role of work engagement and moderating role of age

ABSTRACT

This paper presents a mediation–moderated model of the relationship between psychological empowerment, work engagement, age, and task performance. I seek to provide a more nuanced understanding of the mediating role of work engagement in the positive effect of psychological empowerment on task performance. Further, I explore employee age as a moderating factor in this mediation. I used online surveys among a sample of Latin American textile industry employees to capture individual perceptions about psychological empowerment, work engagement, and task performance. I modeled a mediation–moderated model using Hayes’ Process macro. The results confirm that the positive impact of employee psychological empowerment on task performance is partially mediated by work engagement. In addition, age was a significant moderator of the mediation effect. This study expands knowledge about how the psychological empowerment–work engagement relationship can predict task performance, including age as a boundary condition. Following the Job

Demands–Resources theory, I also prove that conceptualizing psychological empowerment as a job resource can benefit the integration of psychological empowerment and the work engagement stream of research. Moreover, the findings may help human resources management researchers and practitioners acknowledge contextual differences in understanding the combined effects of psychological empowerment and work engagement. For instance, textile industry human resources managers can develop specific age–based human resource systems that empower and engages employees from emerging economies.

Keywords. Psychological empowerment, task performance, work engagement, age, mediation–moderated, textile industry

INTRODUCTION

In organizational psychology and human resources management (HRM), there has been a growing interest in studying the antecedents of task performance. In specific, HRM in textile industry companies are primarily focused on task performance (ILO, 2021). The concept of task performance is defined as the employee’s behavior in pursuing the objectives set in advance. This performance is notably affected by the individual strategy to achieve these objectives (Maslach, Schaufeli, and Leiter, 2001). This article expands current knowledge about how the psychological empowerment–work engagement relationship can predict task performance, including age as a boundary condition. Following the JD–R theory, I also prove that conceptualizing psychological empowerment as a job resource can benefit the integration of psychological empowerment and work engagement theories.

Psychological empowerment represents the motivational construct of an intrinsic task, including four cognitions that reveal a personal orientation: competence, meaning, self–determination, and impact, and demonstrates cognitive directions about their job role

(Spreitzer, 1995). Psychological empowerment and work engagement (Bakker and Albrecht, 2018; Xanthopoulou et al., 2009) have been related to individual positive results, such as task performance and well-being (Schaufeli and Bakker, 2003; Walumbwa et al., 2011). The job demands-resources (JD-R) theory is one of the most used theories to explain work engagement. Work engagement occurs when an employee has high job demands and resources to respond to these demands (Juyumaya, 2019). The JD-R model explains the employee's motivational and strain process.

Resources are work-related elements that help face job demands (Demerouti et al., 2001). Resources can be of two types: (1) Personal resources if they refer to the individual's self-perceptions of himself (e.g., self-esteem, self-efficacy, and optimism); and (2) Job resources if they are elements of the environment, physical, psychological, or organizational, which are available for the employee to face job demands (e.g., transformational leadership, autonomy, and feedback). The level of psychological empowerment of employees has been studied as an essential personal resource that increases the levels of work engagement (Zhang and Bartol, 2010). Nevertheless, researchers need to explore new mediators and moderators between these constructs and different types of job performance. Also, research needs to consider a wide range of samples (e.g., non-US samples, non-students' samples) and underexplored contexts (e.g., Latin America, textile industry). The study of work engagement moves away from the historical vision that has prevailed in the business world: the conception that a job is functional when the person performs their role and only dedicates themselves to it through a mechanized mode associated with the value chain. This is because work engagement theories study phenomena that had not previously been considered, such as vigor (energetic component), dedication (emotional component), and absorption (cognitive component) (Bakker and Demerouti, 2016).

This research explores the mediator role of work engagement in the relationship between psychological empowerment and task performance. Furthermore, I explore the role of employee age as a moderating factor in this relationship. In doing so, I seek to provide a more nuanced understanding of the mediating role of work engagement and the moderator role of age in the positive effect of psychological empowerment on task performance. Additionally, this research considers a poorly studied sample: Latin American textile industry employees. This is why this study diagnoses the levels of psychological empowerment, work engagement, and task performance of the employees in this industry, which is a valuable input for managerial decisions in HRM.

This article is structured as follows: first, this work develops the theoretical framework. Next, I explain the methodology. I modeled a first-stage mediation-moderated model using Hayes' Process macro. The results confirm that the positive impact of psychological empowerment on task performance is mediated by work engagement. Interestingly, age was a significant moderator of the mediation effect. Finally, the final sections discuss the results, outline theoretical and practical implications for HRM, and present the conclusions of this study.

LITERATURE REVIEW

Psychological empowerment

Psychological empowerment is a phenomenon addressed by the field of organizational psychology. At the individual level, psychological empowerment is the ability of the person to feel responsible and the protagonist of their own life. At a corporate level, it is the opportunity for employees to be more efficient in their operation and take on creative challenges in their work and daily tasks (Spreitzer, 1995). The activation of individuals' resources positively impacts the development of their functions at the individual, group, and

organizational levels, allowing for sustained improvements (Deci, Koestner, and Ryan, 1999; Schaufeli and Salanova, 2007).

According to Spreitzer (1995), psychological empowerment represents the motivational construct of an intrinsic task, including four cognitions that reveal a personal orientation: (1) Meaning, which refers to the alignment between one's work role and one's own beliefs, values, and standards; (2) Self-determination, is an individual's sense of autonomy or control concerning the initiation or regulation of one's actions; (3) Competence, refers to the belief in one's capability to perform work activities successfully; and (4) Impact, is the belief that one can make a difference in the managerial process; that one could influence operational outcomes in the work unit. The four dimensions are independent, distinct, related, and mutually reinforcing, qualities that capture a dynamic state or active orientation toward work.

Work engagement

Schaufeli and Bakker (2003) define work engagement as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption. Following JD-R theory, work engagement is the mental state that occurs when employees have high job demands and increased job and personal resources to respond to these job demands. Job demands are the physical, psychological, social, or organizational aspects that require sustained physical and psychological effort and are associated with specific physiological and psychological costs (Demerouti et al., 2001). Job resources refer to the physical, psychological, social, or organizational aspects of the job that are functional in achieving work goals, reducing job demands and the associated physiological and psychological costs, or stimulating personal growth, learning, and development (Bakker and Demerouti, 2016).

Previous research (e.g., Xanthopoulou et al., 2009; Walumbwa et al., 2011; Juyumaya, 2018) has shown that engaged employees will perform better than others. Work engagement should not be confused with concepts such as job satisfaction, organizational happiness, work addiction, and even its opposite, the mental state of exhaustion or sustained stress, known as burnout syndrome. Burnout is a feeling of failure and an exhausted and spent existence resulting from an overload due to the employee's demands of energy, personal resources, or spiritual strength (Maslach and Leiter, 2008; Bernd and Beuren, 2021).

Task Performance

Task performance is another construct that has received the most attention from researchers of HRM, organizational behavior, strategic management, and organizational psychology. Possibly, it is famous since the competitiveness and productivity of organizations are closely linked to the individual performance of their members (Greguras et al., 2007). Hence, identifying its determinants and consequences has been a priority for various scholars, practitioners, and researchers. The lack of consensus about task performance measurement has led to the appearance of numerous scales to evaluate it. The specialized literature on task performance postulates more than eighty instruments to measure individual performance at a general level and more than forty scales to assess performance in more specific contexts (Wells and Welty–Peachey, 2011).

However, most of the instruments developed to date fail to measure all the dimensions that make up individual performance. On the other hand, using different scales to measure the dimensions of task performance can cause some redundancy in the questions, affecting the instrument's application. It could even negatively impact the validity of the statistical analysis results due to increased correlations between the items (Murphy, 1990). Faced with the ambiguities caused by individual performance measurement, Koopmans et al. (2013)

developed a generic instrument to evaluate it. The instrument, identified with the name of the personal task performance scale, has been designed to measure the behaviors of employees rather than their effectiveness.

The first attempts to explore generic task performance focused heavily on task requirements, with research focusing on technical competence, role performance, and task-specific competence, among others (Viswesvaran and Ones, 2000). Generic task performance models use broad dimensions to delimit the construct. However, models developed for specific jobs and contexts are based on narrower and personalized dimensions to describe the elements of task performance. Task performance is an essential dimension of generic task performance. It is found in the construct's vast majority of explanatory models (e.g., Rodrigues and Rebelo, 2021).

Following Koopmans et al. (2013), task performance is composed of four dimensions: (1) Performance in the task; (2) Performance in context; (3) Counterproductive behaviors; and (4) Adaptive performance. These dimensions include the behaviors inherent to the technical tasks of the work position of the organization members. According to Koopmans et al. (2013), the performance of the task implies the performance of the specific or technical duties associated with the job. Therefore, it is related to the technical core of an organization and the activities directly or indirectly related to the transformation of organizational resources and capacities into appropriate products or services for economic exchange. This article analyzes the mediating effect of work engagement on the relationship between psychological empowerment and task performance.

The Age Effect

The relationships between psychological empowerment, work engagement, and task performance can be affected by demographic elements linked to individuals' attitudes,

values, and behaviors (Hofstede et al., 2010). Workforce aging and the need to work longer imply several challenges worldwide (Yeves et al., 2019). This paper proposes that the evolution of society, expressed in the emergence of different generational cohorts (e.g., baby boomers and centennials), might affect how employees experience psychological empowerment. For instance, the 21st century brought more individualism, competitiveness, and pressure to succeed. It increased the expectations of more horizontal relations and reduced power distance. In this context, the need for recognition was enhanced among younger employees, given the desire to excel among peers and establish closer relations with the leader (Didier and Luna, 2017). Then, I suggest that psychological empowerment on task performance will be more assertive in younger generations vs. older generations (baby boomers and generation X vs. millennials and centennials).

Previous research on social exchange theory has shown that reciprocity norms are more important among shortly tenured employees (Bal et al., 2013). As individuals shape their perceptions of the nature and dynamics of an exchange relationship, the reception of social benefits by the employer can boost a more favorable exchange expectation in younger employees. Similarly, as younger generations begin to understand and make sense of employment relationships through their interactions with organizational agents, psychological empowerment should differentially create more positive changes in them, in contrast to more experienced employees who have developed a more classical mindset of their employment relationship. In Latin America, this moderating effect could be more prevalent, as collectivism is inherently rooted in creating positive social exchanges based on reciprocity.

These collectivistic values could be learned by employees before their initial working experiences but are reinforced and confirmed when interacting with leaders. Moreover,

Atwater et al. (2009) suggested that feedback is less likely to be found from supervisors in cultures such as Latin American culture. It is easier to obtain feedback from peers. Therefore, it is more presumable that the effects of psychological empowerment are more meaningful in younger generations. On this basis, I propose a mediation–moderated model. Figure 1 shows the model and the following hypothesis,

Hypothesis: The mediating role of work engagement in the relationship between psychological empowerment and task performance is moderated by employee age, with the effect being more substantial for younger employees.

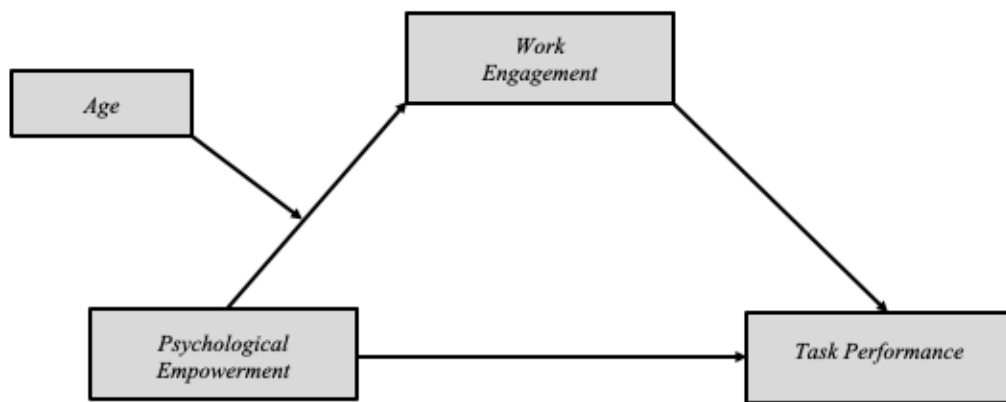


FIGURE 1. Proposed model.

METHOD

Data Collection and Sample

I designed a cross–sectional study and followed a quantitative approach using surveys. The online survey method was used for data collection. This method has multiple benefits, like a higher response rate compared to the manual distribution of a questionnaire (Rasool et al., 2021). I used Google Forms to conduct the experiment and automatically collected all the responses. This will allow the validation of the hypothesis through statistical analysis.

The study population was textile industry employees from Chile. The population was 655.257 employees in 2019 (SOL Foundation, 2022). Sample size = 196 (95% confidence).

Employees worked in different communes of the metropolitan region of Chile. The final sample consisted of 200 employees (n = 200; female = 80%). I note that “The Chilean Social Outbreak” and the “Coronavirus Pandemic” did not affect the process because the data collection was carried out between January and September 2019.

Measures

The methodology used is supported by a positivist epistemology, which promotes knowledge based on the formulation of hypotheses and empirical verification through the scientific method. This methodology requires data collection instruments that maintain the objective nature of the research. To this end, the present study used a survey that contained three Likert-type scales: (1) Psychological empowerment; (2) Work engagement; and (3) Task performance. Table 1 shows the items and authors of the used scales.

TABLE 1. Measures.

Construct	Items	Author
Psychological Empowerment (PE)	PE1. I am confident about my ability to do my job. PE2. The work that I do is important to me. PE3. I have significant autonomy in determining how I do my job. PE4. My impact on what happens in my department is large. PE5. My job activities are personally meaningful to me. PE6. I have a great deal of control over what happens in my department. PE7. I can decide on my own how to go about doing my own work. PE8. I have considerable opportunity for independence and freedom in how I do my job. PE9. I have mastered the skills necessary for my job. PE10. The work I do is meaningful to me. PE11. I have significant influence over what happens in my department. PE12. I am self-assured about my capabilities to perform my work activities.	Spreitzer (1995)
Work Engagement (WE)	WE1. At my work, I feel bursting with energy. WE2. At my job, I feel strong and vigorous. WE3. When I get up in the morning, I feel like going to work. WE4. I am enthusiastic about my job. WE5. My job inspires me. WE6. I am proud of the work that I do. WE7. I feel happy when I am working intensely. WE8. I am immersed in my work. WE9. I get carried away when I'm working.	Schaufeli et al. (2006)
Task Performance (TP)	TP1. How do you rate the quality of your own work in the past three months? TP2. Compared to last year, I judge the quality of my work in the past three months to be. TP3. How often was the quality of your work below what it should have been in the past three months? TP4. How do you rate the quantity of your own work in the past three months? TP5. Compared to last year, I judge the quantity of my work in the last three months to be. TP6. How often was the quantity of your work less than it should have been in the past three months? TP7. I managed to plan my work so that it was done on time. TP8. I worked towards the end result of my work. TP9. I kept in mind the results that I had to achieve in my work. TP10. I had trouble setting priorities in my work. TP11. I was able to separate main issues from side issues at work. TP12. I was able to perform my work well with minimal time and effort. TP13. It took me longer to complete my work tasks than intended.	Koopmans et al. (2013)

The applied survey consisted of a presentation of the study, informed consent that ensured the confidentiality of the data and anonymity of the respondent, socio-demographic

questions, and the three scales previously mentioned. The socio–demographic data included in this research instrument were age, gender, and years of work experience. All followed a 5–point Likert–type response format, from “Strongly Disagree” = 1 to “Strongly Agree” = 5.

Psychological empowerment. Empowerment scale (Spreitzer, 1995). Spreitzer’s psychological empowerment scale (1995) measures perceived control, perceptions of competencies, and internalization of organizational goals and objectives. This research uses the 12 items Spanish validated version of Rivera et al. (2020).

Work engagement. UWES–9 scale (Schaufeli, Bakker, and Salanova, 2006). This scale is available in two versions, including 17 items, and the abbreviated version, which includes nine items. I use the abbreviated version validated in Spanish by Juyumaya (2019).

Task performance. The Koopmans et al. (2013) task performance scale was used. The 13 items scale validated in Spanish by Gabini and Calzada (2015) was used.

Age. The study asked the age of each participant at the beginning of the survey. Then, I split the sample into two groups (high age/low age) to create a dummy variable.

Controls. In line with previous research (Walumbwa and Hartnell, 2011), we included participants’ age, gender, and work experience as control variables, because these variables can influence task performance.

Analysis Strategy

The analyses were carried out using the statistical package SPSS v.23 and the Process macro extension (Hayes, 2013). The analysis strategy aimed to corroborate the existence of a possible mediation–moderated between the variables selected for the study. The data interpretation of this research is based on model 7 proposed by Hayes (2013). The normality test used was Pearson’s Chi–square, which allowed us to justify a parametric study. No missing data was found in this survey.

RESULTS

Descriptive statistics, correlations, and Cronbach's alpha are available in Table 1. The correlations are positive and align with what has been reported. In the three variables used, the alpha exceeds the value of .80, which indicates that the scales were reliable.

TABLE 2. Descriptive statistics and correlations.

Variables	M	SD	Minimum	Maximum	1	2	3
1. Psychological Empowerment	3.69	0.77	1.00	5.00	(0.88)		
2. Work Engagement	4.12	0.70	1.00	5.00	0.36**	(0.98)	
3. Task Performance	3.43	0.64	1.00	5.00	0.22**	0.81**	(0.89)
4. Age	45.62	13.52	18	86	0.34**	0.38**	0.51**

Alpha scores on parentheses and bold. ** $p < .01$.

Confirmatory Factor Analysis

This research conducted a confirmatory factor analysis (CFA). I tested the hypothesized three-factor model with psychological empowerment, work engagement, and task performance. The model fitted well the data ($\chi^2[108] = 2330.21$; CFI = 0.98; SRMR = 0.05; RMSEA = 0.05), suggesting that participants were able to distinguish our key constructs. I also ran four alternative models merging pairs of constructs (psychological empowerment–work engagement; psychological empowerment–task performance; work engagement–task performance) and one model with a single-factor solution. Neither of these alternative models showed better fit indexes than the hypothesized model.

Mediation–Moderated Analysis

The main results of the mediation–moderated analysis are presented in Table 2. Table 2 shows the estimated and bootstrapped internals of work engagement (mediator) in the relationship between psychological empowerment and task performance for different levels of age (moderator) (+1SD, M, –1SD). I observe that the estimate of the mediation effect is significant and relatively constant at different levels of the moderator. The confidence interval of moderated mediation was different from zero (Estimate = .10, BootSE = .08, 95%

CI: [.19; .40]), suggesting that the mediation effect was moderated by employees' age (Hayes, 2013).

TABLE 3. Indirect effects at Age = M +/- 1 SD.

Indirect Effect	Estimate	LLCI95%	ULCI95%
-1.00 SD	0.85	.019	.145
0.00 SD	0.16	.190	.401
1.00 SD	0.18	.093	.024

The table shows the bootstrapping procedure results using Hayes's Process macro to test conditional effects (- 1 SD, M, and + 1 SD) for the moderator variable (Age). LLCI: Lower level 95% confidence interval. ULCI: Upper level 95% confidence interval. A bootstrapping procedure used 5,000 random subsamples to produce a normal distribution.

In Figure 2, the slope representing the relationship between psychological empowerment and work engagement is positive for young employees and different from the same slope for older employees. Younger employees (low age: SD = -1.00) have higher engagement levels as perceived psychological empowerment increases. In comparison, work engagement levels for older employees (high age: SD = 1.00) appear unaffected by the psychological empowerment effect supporting the study's hypothesis.

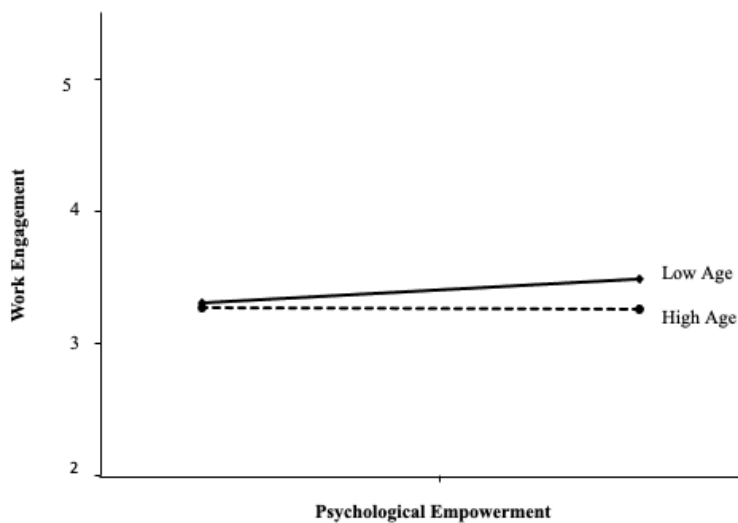


FIGURE 2. The moderating effect of age.

DISCUSSION

Thanks to the results presented, the hypothesis of this study was supported. It is concluded that if employees are empowered in their capacities (i.e., with high levels of psychological empowerment), they will perform better when fulfilling their tasks. Furthermore, suppose employees are engaged (i.e., with high levels of work engagement). In that case, they will have even more positive repercussions on task performance. Moreover, I found that employees' age moderates the mediation of psychological empowerment, work engagement, and task performance such that the mediation effect is more substantial for younger employees.

At the level of theoretical contribution, this study contributes to the theory of JD–R, which explains work engagement (Bakker, 2018). Psychological empowerment is a personal resource that helps respond to employees' job demands in the textile industry. Hence, this study provides empirical evidence to understand work engagement in emerging economies. Scholars engaging in aging and HRM must study how different generational cohorts of employees experience psychological empowerment. Following other studies (e.g., Yeves et al., 2019), this paper delivers empirical evidence that the emergence of different generational cohorts (e.g., baby boomers and centennials) might affect how employees experience psychological empowerment and work engagement, and task performance.

The results support that work engagement mediates the relationship between psychological empowerment and task performance. Psychological empowerment is a crucial resource for facing job demands. Engaged employees have the energy (i.e., vigor), positive feelings (i.e., dedication), and attention (i.e., absorption) to perform better in the tasks (Bakker and Demerouti, 2016). As I mention, task performance is crucial for all industries, but even more in the textile industry. The presented results support the idea of Schaufeli and

Salanova (2007) that engaged employees have more efficacy in their daily tasks. Engaged employees are happier at work, and their well-being and positive psychological state impact their task performance.

Practical Implications

An essential significance of this study is related to the possibilities that the HRM in the textile industry has to create opportunities for employees to increase their levels of psychological empowerment and work engagement. These results highlight the prominence of recognizing the capabilities and attributes of the employees of an organization because if you are outstanding, the employees acquire security far beyond the work, reaching a personal level, which can bring multiple benefits to the individual, even beyond the work dimension (Rappaport, 1981; Riger, 1993). For instance, 360° performance evaluations would be quite indicated in the textile industry. This type of evaluation encourages the employee to empower himself and improve their task performance based on feedback from his co-employees, supervisors, customers, or clients and their own self-assessment.

This study delivers empirical evidence to scholars interesting in the textile industry. Scientific papers focused on employees in the textile industry are scarce. For this reason, gathering factual data regarding employees in this industry is a methodologically relevant task. The textile industry has similar features concerning the workforce composition in all the world countries since it mainly comprises women (Fashionunited, 2020). In the present research, the percentage of female participants was 80%. I encourage future studies to analyze the role of gender in the relationship between HRM practices and task performance or other contingent relationships.

The findings of this study can help business and management researchers and practitioners acknowledge contextual differences in understanding the combined effects of

psychological empowerment and work engagement. Managers and practitioners may develop a specific age-based HRM system that empowers and engages employees. For example, the individually-driven work design process (i.e., job crafting) can better align the job with personal needs, goals, and skills (Wijngaards et al., 2022). Embedding strategies in people management practices that promote psychological empowerment and work engagement is a crucial source of competitive advantage based on developing individual capacities that are difficult to imitate. For instance, HRM areas can create organizational innovation strategies. These actions can build a positive corporate culture that benefits psychological empowerment and work engagement through supportive generational-based feedback (e.g., millennials mentoring baby boomers, and vice-versa) and, at the same time, influence sustainable organizational performance (Rasool et al., 2019).

Limitations and Future Research

Further research can study aspects related to the limitations of the present study. One limitation is the risk of common method variance due to using self-reported data. Future research can make an effort to solve this. Other limitations concern the study's sample. Scholars from a wide range of perspectives should study employees in the textile industry from other Latin American countries, conduct longitudinal studies, and conduct comparative analyses between culturally different countries. Additionally, future research could continue to delve into other job or personal resources that increase work engagement (Juyumaya and Torres, 2020). For example, the study of the impact of new technologies and work arrangements on task performance, focusing on textile industry employees, can be a source of exciting future directions.

CONCLUSIONS

This brief research report presents a mediation–moderated model that analyzes the role of work engagement as a mediator in the relationship between psychological empowerment and task performance in the textile industry. In this way, I postulate that psychological empowerment increases work engagement, which in turn has, as a consequence, a higher task performance of the employees of this industry. Additionally, an employee’s age moderates the mediation effect of work engagement in the relationship between psychological empowerment and task performance, such that the mediation effect is more substantial for younger employees.

This article provides empirical evidence to develop the psychological empowerment, work engagement, and aging literature. Moreover, because this study investigates a poorly studied sample, it provides inputs to further theoretical analysis. For managerial practice, this study helps to manage organizations based on evidence. I promote that HRM managers consider psychological empowerment and work engagement as essential employee results. Likewise, the generation factor must be addressed. Thus, companies and businesses can promote the quality of working life, improve task performance, and build thriver organizations.

CONFLICT OF INTEREST

The authors declare that the research was conducted without any commercial or financial relationships construed as a potential conflict of interest.

ETHICS STATEMENT

The patients/participants provided their written informed consent to participate in this study.

RESEARCH FUNDING

This research initiative was supported by the ANID 21190010 award granted to the author by the National Research and Development Agency (ANID) of Chile.

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APPENDIX D:

Scales

Statement: Piense en usted y señale en qué medida está de acuerdo o en desacuerdo con las siguientes afirmaciones: (1: Muy en desacuerdo, 2: En desacuerdo, 3: Ni de acuerdo ni en desacuerdo, 4: De acuerdo, 5: Muy de acuerdo)

ESPERANZA

1. En estos momentos me veo como alguien bastante exitoso(a) en el trabajo.
2. Actualmente, estoy alcanzando las metas que me he propuesto en el trabajo.
3. Puedo pensar en muchas formas de alcanzar mis metas de trabajo actuales.

AUTO-EFICACIA

4. Usualmente puedo manejar los problemas típicos de mi trabajo.
5. Me siento competente para enfrentar de manera efectiva el día a día en el trabajo.
6. Puedo manejar cualquier situación que se presente en el trabajo.

RESILIENCIA

7. Generalmente puedo manejar de una manera u otra las dificultades de mi trabajo.

8. Me recupero pronto y sigo adelante cuando tengo algún contratiempo en el trabajo.
9. Puedo superar momentos complicados en el trabajo.

OPTIMISMO

10. Habitualmente espero lo mejor cuando no hay claridad de lo que pasa en el trabajo.
11. Siempre veo el lado amable de las cosas cuando se trata del trabajo.
12. Soy optimista sobre mi futuro relacionado con el trabajo.

APPENDIX E:

Informed Consent

FONDECYT 2019 N° 11190146: “Apoyo a las de decisiones gerenciales, aprendizaje y pensamiento estratégico (Supporting individualial decisions, learning and strategic thinking)” .

Nombre del Investigador principal: Dr. Juan Pablo Torres Cepeda.

Patrocinante: Dr. Pedro Esteban Maldonado Arbogast.

Instituciones involucradas: Departamento de Administración, Facultad de Economía y Negocios, Universidad de Chile y Laboratorio de Neurosistemas, Departamento de Neurociencias, Facultad de Medicina, Universidad de Chile e Instituto de Neurociencia Biomédica (BNI).

Teléfonos: +56 9 56284332 +562 29783378 +56 9 91608330.

Invitación a participar: Lo estamos invitando a participar en el proyecto de investigación “Apoyo a las de decisiones gerenciales, aprendizaje y pensamiento estratégico”, que busca entender los mecanismos neuronales que realiza nuestro cerebro para tomar decisiones gerenciales. Para cumplir este objetivo hemos diseñado una tarea que nos permite explorar

cuáles son los mecanismos que nuestro cerebro ejecuta cuando percibimos información visual sobre decisiones estratégicas. Entender los procesos involucrados en la toma de decisiones, nos permitirá comprender una de las conductas más esenciales del ser humano e incluso generar procedimientos para poder guiar la toma de decisiones en base a sus limitaciones.

Objetivos: Esta investigación tiene por objetivo identificar los mecanismos que el cerebro realiza para tomar la decisión del tamaño adecuado de una orden de productos repetitivamente. El estudio incluirá a un número total de 40 participantes, de edades entre 28 y 60 años con experiencia laboral de al menos 5 años.

Procedimientos: Si Ud. acepta participar deberá acudir al Jobatorio de Neurosistemas, Facultad de Medicina de la Universidad de Chile ubicado en Avenida Independencia 1027, Pabellón H, subterráneo. Una vez en el Laboratorio de Neurosistemas será sometido, por un período de una hora y media, a los siguientes procedimientos: realizar una tarea de toma de decisiones frente a un computador en una sala totalmente aislada, en donde se tomará el registro de su actividad cerebral y de sus movimientos oculares, ambos registros se llevarán a cabo por técnicas no invasivas de electroencefalografía y de rastreo ocular respectivamente. Para el registro electroencefalográfico se le colocará una gorra con registro de electroencefalografía (abreviado como EEG). Después de colocar la gorra, se añadirán a la gorra uno a uno los 32 electrodos, como lo puede ver en la fotografía 1.



Fotografía 1. Equipo de registro electroencefalográfico.

Una vez que hayamos colocado los electrodos, le pediremos que coloque su mentón en la almohadilla del soporte de fijación que mostramos en la fotografía 2. El rastreo ocular consiste en grabar los movimientos de sus ojos mientras hace la tarea de toma de decisiones y se realiza por medio de una cámara que está debajo del monitor en donde realizará la tarea, el cual se muestra en la fotografía 2.



Fotografía 2. Equipo de registro de movimientos oculares.

La tarea que realizará consistirá en dos etapas: la primera Ud. deberá calificar, en una escala de 1 a 5 el nivel de orientación sobre gestión de recursos personales. Esto se realizará en una tablet que se le entregará mientras un asistente le coloca los electrodos. Esta encuesta tiene un duración de 8 minutos. En la segunda etapa, usted deberá elegir el tamaño de la orden que satisface una demanda específica tal que minimice los costos totales de gestionar el inventario. La información del inventario inicial, inventario final y costos de inventario será calculado automáticamente por el software que se mostrará en la pantalla. Cuando el inventario es positivo, el costo por unidad de inventario es \$0,5. Cuando usted tiene faltante, es decir, inventario negativo, debe satisfacer estas órdenes en los periodos siguientes. El costo de órdenes faltantes (inventario negativo) es de \$1 por unidad faltante. Usted tendrá que tomar 300 decisiones sobre cuál es el tamaño de la orden. Una vez que usted realiza una orden, el pedido llegará a su inventario con un retraso de 4 periodos. Ejemplo: Si la orden en la decisión 1 fue de 10 de productos, estos llegarán a su inventario en la decisión 4. Por lo

tanto, usted debe intentar de satisfacer la demanda considerando estos atrasos en los envíos de un proveedor ficticio.

Una vez que realice la 300 decisiones, el asistente del laboratorio, entregará nuevamente el tablet para llenar una segunda encuesta de 8 minutos. Posteriormente, le sacarán los electrodos y se procederá a lavar su cabello.

Riesgos: El registro de la actividad bioeléctrica cerebral (electroencefalografía) así como el del seguimiento ocular no ha mostrado efectos adversos para los sujetos en estudios previos. Además, la estimulación visual a la que Ud. estará expuesto durante la ejecución de la tarea por medio del monitor no ha demostrado tener efectos nocivos y no produce efectos diferentes a los que se obtienen al trabajar por el mismo periodo en un computador. Por lo anterior no esperamos tener ningún riesgo para el sujeto en estudio, siendo la única condición posible que el periodo de registro pudiera llegar a producir cansancio.

Costos: Los registros en estudio serán aportados por el Proyecto Fondecyt 11190146 y por el Laboratorio de Neurosistemas, Departamento de Neurociencia sin costo alguno para Ud. durante el desarrollo de este proyecto.

Beneficios: Hacemos de su conocimiento que su participación en este estudio no le brindará beneficios directos a Ud. Sin embargo, se espera que los resultados obtenidos nos permitirán entender mejor cómo es que el cerebro se las arregla para tomar decisiones que nos parecen más difíciles que otras.

Alternativas: Si Ud decide no participar en esta investigación, solo tiene que informarlo a los investigadores. Esto no significará ningún prejuicio para Ud.

Compensación: Usted recibirá una compensación sujeto a su desempeño en la tarea. Si su desempeño está en el percentil 25 inferior, se le pagará \$10.000 CLP, si su desempeño está entre el percentil 26 y 75, se le pagará \$15.000 CLP. Finalmente, si su desempeño está en el percentil 76 o superior, se le pagará \$25.000 CLP.

Confidencialidad: Toda la información derivada de su participación en este estudio será conservada en forma de estricta confidencialidad, lo que incluye el acceso de los investigadores o agencias supervisoras de la investigación. Cualquier publicación o comunicación científica de los resultados de la investigación será completamente anónima.

Voluntariedad: Su participación en esta investigación es totalmente voluntaria y se puede retirar en cualquier momento comunicándolo al investigador y a su médico tratante, sin que ello signifique modificaciones en el estudio y tratamiento habituales de su enfermedad. De igual manera su médico tratante o el investigador podrán determinar su retiro del estudio si consideran que esa decisión va en su beneficio.

Derechos del participante: Usted recibirá una copia íntegra y escrita de este documento firmado. Si usted requiere cualquier otra información sobre su participación en este estudio o bien conocer los resultados puede comunicarse con:

Investigador: Dr. Juan Pablo Torres, fono: +56 9 56284332 .

Autoridad de la Institución: Dr. Pedro Maldonado, fono: +56 9 92509379.

Otros Derechos del participante: En caso de duda sobre sus derechos debe comunicarse con el Presidente del “Comité de Ética de Investigación en Seres Humanos”, Dr. Leslier Valenzuela, Teléfono: +56 2 29783301. Email: cometica@fen.uchile.cl, cuya oficina se encuentra ubicada en la Facultad de Economía y Negocios, Universidad de Chile en Diagonal Paraguay 257, Comuna de Santiago Centro, Región Metropolitana.

Conclusión: Después de haber recibido y comprendido la información de este documento y de haber podido aclarar todas mis dudas, otorgo mi consentimiento para participar en el proyecto “Simulaciones mentales como mecanismo de deliberación en la toma de decisiones preferenciales”.

VITA

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EDUCATION

Ph.D. in Business Administration, University of Chile	2018 - 2022
M.A. in Industrial-Organizational Psychology, University of Valparaiso	2016 - 2017
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ACADEMIC EXPERIENCE

Postdoctoral Researcher, Millennium Nucleus on the Evolution of Work	2021 - 2022
Doctoral Researcher, Innovation Observatory, University of Chile	2020 - 2021
Adjunct Professor, Graduate Business School, University Mayor	2020 - 2021
Adjunct Professor, Business School, University Santo Tomas	2015 - 2020
Adjunct Professor, Business School, University Viña del Mar	2012 - 2020

RESEARCH AREA

Organizational behavior, work engagement, digital transformation, cognitive neuroscience, human-robot interaction.

REFEREED JOURNAL PUBLICATIONS

Juyumaya, J., & Torres, J. P. (2022). Effects of transformational leadership and work engagement on managers' creative performance. *Baltic Journal of Management*, Vol. ahead-of-print No. ahead-of-print. doi:[10.1108/BJM-11-2021-0449](https://doi.org/10.1108/BJM-11-2021-0449)

Juyumaya, J. (2022). How psychological empowerment impacts task performance: The mediation role of work engagement and moderating role of age. *Frontiers in Psychology*, 13:889936. doi: [10.3389/fpsyg.2022.889936](https://doi.org/10.3389/fpsyg.2022.889936)

Juyumaya, J., & Demicheli, G. (2022). Inclusive school in Chile: A study of change and organizational development in an academic community. *Multidisciplinary Business Review*, 15(1), 36-49. doi: [10.35692/07183992.15.1.5](https://doi.org/10.35692/07183992.15.1.5)

Juyumaya, J., Alvarado, N., & Rojas, C. (2021). Psychological empowerment and job performance in the Chilean textile industry: The mediation effect of work engagement. *Business Administration Studies*, 28(2), 97-109. doi: [10.5354/0719-0816.2021.61108](https://doi.org/10.5354/0719-0816.2021.61108)

Juyumaya, J., & Torres, J. P. (2020). Work engagement in a digital disruption era: New job demands and resources. *Academy of Management Proceedings*, 2020(1). doi: [abs/10.5465/AMBPP.2020.17251abstract](https://doi.org/abs/10.5465/AMBPP.2020.17251abstract)

Gibert, J., & **Juyumaya, J.** (2020). Perceptions of a peripheral scientific elite: Exploring relations between academia, industry, and state. *Sociological Studies*, 38(114), 795-827. doi: [10.24201/es.2020v38n114.1835](https://doi.org/10.24201/es.2020v38n114.1835)

Juyumaya, J. (2019). Utrecht work engagement scale in Chile: measurement, reliability, and validity. *Business Administration Studies*, 26(1), 35-50. doi: [10.5354/0719-0816.2019.55405](https://doi.org/10.5354/0719-0816.2019.55405)

Juyumaya, J. (2018). Work engagement, job satisfaction and job performance: The role of the organizational culture. *Business Administration Studies*, 25(1), 32-49. doi: [10.5354/0719-0816.2018.55392](https://doi.org/10.5354/0719-0816.2018.55392)

BOOKS AND BOOK CHAPTERS

Juyumaya, J. (2018). Work engagement: Researching employee engagement. Spanish Academic Eds. ISBN: 6139262496.

RESEARCH UNDER REVIEW

Juyumaya, J. & Torres, J. P. A managers' work engagement model in a digital era. *Frontiers in Psychology* (Round 1).

Juyumaya, J. Digital reflection: Understanding the employee interpretation of the digital world (target journal: *Revista Brasileira de Gestão de Negócios* (Round 1).

Egaña-del Sol, P., **Juyumaya, J.**, & Peña, M. Cognitive neuroscience and social skills for educational and job settings. *npj Science of Learning* (Round 1).

WORKING PAPERS

Juyumaya, J. & Torres, J. P. Task absorption analysis in the JD-R theory: An episodic perspective (target journal: *Academy of Management Journal*).

Juyumaya, J. & Bausch, M. Digital work characteristics and culture in Latin America. (target journal: *Journal of International Business Studies*).

Juyumaya, J. & Sanchez, M. P. Effects of autonomy in task performance: The mediation role of work engagement and moderating role of age (target journal: *Journal of Managerial Psychology*).

Juyumaya, J., Soto, V. Bargsted, M., Yeves J., & Ramírez-Vielma, R. A multifaceted investigation of the link between job demands, engagement, and task performance (target journal: *Journal of Applied Psychology*).

Egaña-del Sol, P., Soto, V., & **Juyumaya, J.** Micro-states EEG analysis of students in Chile (target journal: *Proceedings of the National Academy of Sciences*).

SELECTED CONFERENCE PAPERS

Annual Meeting of the Latin American School of Business Council (CLADEA)	2022
Business Association for Latin American Business Studies conference (BALAS)	2022
Annual Meeting of the Academy of Management (AOM)	2020
Annual Meeting of the Latin American School of Business Council (CLADEA)	2020

Business Association for Latin American Business Studies conference (BALAS)	2020
Annual Meeting of the Latin American School of Business Council (CLADEA)	2019
Doctoral College Conference, University of Surrey	2019
Chilean Congress of Schools and Faculties of Administration (ENEFA)	2019

GRANTS AND AWARDS

Doctorate Scholarship, National Agency of Research and Development (ANID)	2019 - 2022
Graduate Business School Scholarship, University of Chile	2018 - 2021
Human Resources Division Scholarship, AOM	2021
Best Doctoral Colloquium Presentation Award, BALAS	2020
Santander Researcher Mobility Award, Santander Universities	2019
Higher Education Management Certificate Scholarship, University Santo Tomas	2017

REVIEWER

Frontiers in Psychology	2022 - Present
Revista Brasileira de Gestão de Negócios	2021 - Present
Estudios de Administración	2019 - Present

MEMBERSHIPS

Academy of Management	2020 - Present
Chilean Society of Psychology and Organizational Behavior	2020 - Present

INDUSTRY EXPERIENCE

Social Engagement Company. Consultant	2018 - 2020
University of Valparaiso Business School. Knowledge Manager	2015 - 2016
Feedback Consulting Group. Researcher	2012 - 2013

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