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Challenges to Cope with Uncertainty in Work Settings: Psychological Mechanisms and Contextual Moderators

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Ph.D. in Psychology

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To my family: My father Ahmet Can, my mother Mücella, and my brother Barış, who have always been my greatest source of love, support, and inspiration.

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Resumo

No ambiente organizacional atual, no qual existem frequentemente rápidas mudanças, a incerteza desempenha um papel central na influência do desempenho dos colaboradores e na sua saúde. Esta tese inclui quatro estudos empíricos que aprofundaram a compreensão do comportamento organizacional em ambientes laborais caracterizados pela incerteza. O Estudo 1 incluiu uma revisão sistemática da literatura para refinar a compreensão do modelo VUCA (volatilidade, incerteza, complexidade e ambiguidade), definindo os seus componentes e explorando as suas inter-relações. Através de uma análise sistemática da literatura publicada entre 1999 e 2021, o estudo identificou definições sobrepostas e desenvolveu um mapa conceptual para futuras investigações e aplicações práticas. O Estudo 2 examinou o impacto do teletrabalho no desempenho adaptativo através de um inquérito transversal com 209 teletrabalhadores, investigando o papel mediador do afeto negativo e o papel moderador da eficácia da liderança. Os resultados revelaram que o teletrabalho influenciou o desempenho adaptativo através do afeto negativo, sendo a eficácia da liderança um moderador desta relação. O Estudo 3 explorou a relação entre a incerteza diária e o desempenho adaptativo através de um estudo diário multinível com 159 trabalhadores ao longo de dez dias úteis. Este estudo identificou o afeto negativo como mediador e a mindfulness como moderadora, mostrando que o impacto da incerteza diária no desempenho adaptativo foi mais forte para indivíduos com menores níveis de mindfulness. O Estudo 4 investigou os efeitos dos microeventos diários na saúde global dos colaboradores, com 243 participantes ao longo de cinco dias consecutivos. Integrando a Teoria dos Eventos Afetivos e o Modelo Integrativo de Tolerância à Incerteza, o estudo demonstrou que os microeventos diários influenciam a saúde global através da incerteza e do afeto diário. Coletivamente, estes estudos oferecem valiosas ideias para melhorar o desempenho e o bem-estar dos colaboradores em ambientes de trabalho dinâmicos.

Palavras-chave: Incerteza, VUCA, desempenho adaptativo, teletrabalho, microeventos, afeto, atenção plena, eficácia da liderança e saúde.

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Abstract

In today's rapidly changing organizational environment, uncertainty plays a central role in shaping employee performance and overall health. This thesis includes four empirical studies that deepen our understanding of organizational behavior in uncertain work environments. Study 1 conducted a systematic review to refine understanding of the VUCA (volatility, uncertainty, complexity, and ambiguity) framework by defining its components and exploring their interrelationships. Through an analysis of literature published between 1999 and 2021, the study identified overlapping definitions and developed a conceptual map for future research and practical applications. Study 2 examined the impact of telework on adaptive performance through a cross-sectional survey of 209 teleworkers, investigating the mediating role of negative affect and the moderating role of leadership effectiveness. The findings revealed that teleworking influenced adaptive performance through negative affect, with leadership effectiveness as a critical moderator. Study 3 explored the relationship between daily uncertainty and adaptive performance using a multilevel diary study with 159 office workers over ten working days. This study identified negative affect as a mediator and mindfulness as a moderator, showing the daily uncertainty's impact on adaptive performance was stronger for individuals with lower mindfulness levels. Study 4 investigated the effects of daily micro-events on employees' overall health with 243 employees over five consecutive days. Integrating Affective Events Theory and the Integrative Model of Uncertainty Tolerance, the study demonstrated that daily micro-events influence overall health through daily uncertainty and affect. Collectively, these studies offer valuable insights into enhancing employee performance and well-being in dynamic work environments.

Keywords: Uncertainty, VUCA, adaptive performance, telework, micro-events, affect, mindfulness, leadership effectiveness, and health.

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General Introduction

Background on Organizational Uncertainty

In recent years, organizations worldwide have faced the challenges posed by volatile, uncertain, complex, and ambiguous (VUCA) environments. Uncertainty, defined as "an individual's perceived inability to predict something accurately" (Milliken, 1987), has emerged as a central concept, affecting various aspects of organizational life, including decision-making, employee performance, and overall health. The impact of uncertainty is particularly pronounced in rapidly changing environments, such as the post-pandemic workplace, where organizations must continuously adapt to shifting conditions (D'Auria & De Smet, 2020).

Understanding and managing uncertainty is crucial for fostering leadership resilience, enhancing employee adaptability, and maintaining organizational effectiveness in the face of change (Bennett & Lemoine, 2014a). Research has highlighted that leaders play a pivotal role in shaping organizational responses to uncertainty by creating clarity, establishing trust, and enabling adaptability (Uhl-Bien & Arena, 2018). Additionally, frameworks for navigating VUCA environments emphasize the development of leadership literacies and adaptive capabilities to thrive amid disruption (Johansen, 2017).

Despite its significance, the understanding of organizational uncertainty remains fragmented, and organizational frameworks are still evolving. Existing research often focuses on individual elements of the VUCA framework, leading to inconsistent applications and limited integrative models (Sarkar, 2016; Mack et al., 2015). This thesis aims to address these gaps by exploring the dimensions of uncertainty and its effects on employees and organizational outcomes.

Research Problem and Objectives

The research problem centers on understanding how uncertainty influences organizational behavior, particularly in the context of employee adaptive performance and overall health. This project explores the role of uncertainty as a driver of workplace dynamics and examines how individuals respond to uncertain conditions.

The objectives of this thesis are:

- To clarify the conceptual foundations of organizational uncertainty, as explored in Chapter II, through a systematic review of the literature on VUCA and related concepts.
- To analyze how teleworkers perceive the effects of telework-related uncertainty on their adaptive performance, with a focus on the roles of negative affect as a mediator and leadership effectiveness as a moderator (Chapter III).
- To investigate how daily fluctuations in uncertainty impact employee performance and overall health, examining the role of negative affect and mindfulness in this relationship (Chapter IV).
- To explore the influence of daily micro-events on uncertainty perceptions and overall health, employing a parallel mediation model (Chapter V).

Structure of the Thesis

Besides the introduction and theoretical framework, this thesis integrated four chapters, each examining a different dimension of uncertainty and its impact on organizational behavior, followed by general discussion and conclusion.

The first study (Chapter II) focuses on the Systematic Review of Organizational Uncertainty. This chapter provides a systematic review of the literature on uncertainty from 1999 to 2021, clarifying the conceptual foundations of VUCA and its impact on organizations. It highlights common themes and distinctions in the definitions of uncertainty and its related concepts.

The second study (Chapter III) explores the Telework and Uncertainty. This chapter investigates how teleworkers perceive the impact of remote work-related uncertainty on adaptive performance, focusing on the roles of negative affect and leadership effectiveness. The study aims to uncover the psychological dynamics at play in remote work environments.

The third study (Chapter IV) examines the Daily Uncertainty and Adaptive Performance. This chapter explores the effects of daily fluctuations in uncertainty on employee performance and overall health. Using a multilevel diary study, the research examines how daily negative affect mediates the uncertainty-performance relationship and how mindfulness may moderate these effects.

The fourth study (Chapter V) investigates the Micro-Events and Overall Health. This chapter examines the influence of daily micro-events on overall health, focusing on how these events interact with perceptions of uncertainty. A parallel mediation approach is used to analyze the roles of daily uncertainty and affect in this relationship.

General Discussion and Conlusion

The final chapter (VI) summarizes the findings of the studies, discusses the practical implications for managing uncertainty in organizations, and suggests directions for future research.

Table 1. summarizes and specifies the specific research questions addressed in each empirical study, as well as the research design and main results.

Together, these studies aim to enhance the understanding of uncertainty in organizational contexts, contributing empirical findings and theoretical insights to the fields of organizational behavior and human resource development.

Studies presented in Chapters 2, 3, and 4 were already published in peer-reviewed outlets, and the last study (Chapter 5) was also submitted to another journal. Until now, Study 1 (Chapter 2) has already received citations; 36 (Web of Science), 55 (Scopus), and 134 (Google Scholar).

Table 1. Overview of the research questions, and designs

Chapter	Research Questions	Research Design
Chapter II (Clarifying the Conceptual Map of VUCA: A Systematic Review)	- How can we define the components of the VUCA framework? - What constructs contribute to the definition of VUCA? - What are the essential components necessary for the effective functioning of the VUCA acronym?	Systematic review of literature
Chapter III (Perceived Effects of Teleworking on Adaptive Performance: A Moderated Mediation Model of Leadership Effectiveness and Negative Affect)	- Do perceptions of telework impact adaptive performance through negative affect? - How does leadership effectiveness moderate the relationship between perceived telework effects and adaptive performance?	Cross-sectional study
Chapter IV (A Within-Individual Study on the Relationship between Daily Uncertainty and Daily Adaptive Performance: The Moderating Role of Daily Mindfulness)	- How does daily uncertainty predict daily adaptive performance? - Is the relationship between daily uncertainty and adaptive performance mediated by daily negative affect? - How does daily mindfulness moderate the association between daily uncertainty and adaptive performance?	Multilevel diary study
Chapter V (How Daily Micro-Events Influence Employees' Daily Overall Health: A Parallel Mediation Path through Daily Uncertainty and Daily Affect)	- How do daily micro-events influence employees' overall health through daily uncertainty and daily affect? - What are the mediating pathways involved in the relationship between daily micro-events and overall health? - How do daily uncertainty and daily affect interact to influence overall health outcomes?	Multilevel diary study

CHAPTER I

Theoretical Background

1.1. The Nature of Uncertainty in Contemporary Organizations

As Lovecraft (1927) aptly stated, *"The oldest and strongest emotion of mankind is fear, and the oldest and strongest kind of fear is fear of the unknown"* (pp. 2). Uncertainty has been a pervasive phenomenon since the dawn of human history. This statement encapsulates the deep-rooted nature of uncertainty in the human experience, extending into every facet of life, including organizational contexts. Uncertainty results from insufficient knowledge or understanding of a situation or event (Rosser, 2019). This lack of information can lead to cognitive states of doubt, anxiety, and even paralysis in decision-making (Crigger, 1996; Keren & Gerritsen, 1999).

In organizational settings, uncertainty often arises in novel or complex events where information is inconsistent, incomplete, or contradictory (Budner, 1962; Rosen et al., 2007). These situations create restlessness, stress, and discomfort, as noted by Carleton and colleagues (2007) and Ladouceur and colleagues (2000). The COVID-19 pandemic exemplifies this phenomenon, where uncertainty regarding the virus's behavior, treatment, and containment fueled widespread anxiety (Wu et al., 2021). As a result, organizations are challenged to develop strategies that address not only the operational but also the psychological implications of uncertainty.

1.1.1. Definitions and Typologies of Uncertainty

Uncertainty is defined as a lack of clarity and predictability regarding future events, emphasizing the cognitive challenges individuals face in uncertain environments (Milliken, 1987). Rosser (2019) described it as a consequence of insufficient knowledge about situations or events. Crigger (1996) expanded on this by framing uncertainty as the inability to interpret or explain encountered events, and Keren and Gerritsen (1999) defined it as doubt surrounding situations that may or may not occur. Similarly, Kasperson (2012) highlighted that uncertainty persists even when the direction of change is known, but outcomes remain unpredictable. Collectively, these perspectives emphasize the complexity of uncertainty, which arises from incomplete, inconsistent, or overwhelming information.

Budner (1962) identified uncertainty as a condition in which individuals struggle to organize or classify situations due to a lack of cues. Gifford and colleagues (1979) added that uncertainty is felt when individuals lack sufficient knowledge to forecast outcomes or discern which information is relevant. These definitions demonstrate the multifaceted nature of uncertainty, which is both a cognitive and emotional experience deeply rooted in human psychology (Table 1.1.).

1.1.2. Types of Uncertainty

Budner (1962) categorized uncertainty into three distinct types that underscore its diverse manifestations:

1. Novelty: Situations that are entirely new, with no available cues or reference points to guide understanding or decision-making.
2. Complexity: Scenarios are characterized by numerous, often conflicting, cues that create confusion and hinder interpretation.
3. Inconsistency: Instances where existing knowledge or expectations conflict with emerging realities, resulting in a state of cognitive dissonance.

Rosen and colleagues (2007) explained that uncertainty often stems from incomplete or inconsistent information, leaving individuals unable to effectively address situations. These forms of uncertainty are commonly accompanied by feelings of restlessness, stress, sadness, and discomfort, as highlighted by Carleton and colleagues (2007) and Ladouceur and colleagues (2000). According to Budner (1962), for a situation to be classified as uncertain, it must be perceived as new, confusing, and unsolvable.

1.1.3. Psychological Impacts of Uncertainty

The psychological effects of uncertainty can be profound, eliciting a range of negative emotional responses. Grenier and colleagues (2005) attributed this to the human tendency to seek stability and assurance, as structured environments provide a sense of control and predictability. When individuals confront uncertainty, they often encounter a mix of emotional challenges, such as stress, unease, and restlessness, as these situations challenge their innate desire for order.

The COVID-19 pandemic exemplifies how uncertainty can amplify anxiety and fear. During this time, individuals faced unprecedented ambiguity regarding health risks, containment measures, and long-term consequences. Wu and colleagues (2021) emphasized the pandemic's ambiguity, describing it as an invisible and unpredictable threat. Finset and colleagues (2020) and Liao and Wei (2011) similarly documented heightened psychological stress caused by the inability to predict or control the virus's spread. This highlights the pervasive and disruptive nature of uncertainty, especially when associated with unpredictable or invisible dangers.

1.1.4. Uncertainty in Organizations

Uncertainty is not limited to individual experiences but is also a pervasive issue within organizations. Lawrence and Lorsch (1967) argued that uncertainty is an inherent feature of organizations which operate in dynamic environments marked by continuous change. March (1981) emphasized that these changes are rarely arbitrary and can often generate stress, particularly when their effects on the organization are unclear (DiFonzo & Bordia, 1998). As a result, organizational theory identified uncertainty as a critical factor affecting performance and efficiency (Thompson, 1967; Short & Clarke, 1992).

Environmental uncertainty, a well-studied category, refers to external factors such as market volatility, regulatory changes, and technological disruptions. Duncan (1972), Lawrence and Lorsch (1967), and Milliken (1987) defined it as the inability to forecast external changes and their implications for decision-making. Executives often perceive environmental uncertainty when they cannot predict future changes in external factors, such as competitive turbulence or governmental regulation (Beckman et al., 2004). Internal uncertainty, in contrast, arises from within the organization and includes factors such as role ambiguity, unclear communication, and shifting leadership strategies (Beckman et al., 2004). The subjective nature of workplace uncertainty, describing it as a mental state influenced by individual perceptions of unpredictability and ignorance (Anderson et al., 2019).

According to Mirze (2002), the degree of uncertainty an organization experiences depends on two key variables: the number of external factors impacting the organization and the rate at which these factors change. Jackson (1989) noted that organizations face minimal uncertainty when external factors are stable and limited in number but encounter high uncertainty when these factors are numerous and dynamic.

Summarizing, uncertainty, as a cognitive and emotional state, affects both individuals and organizations in profound ways. Its manifestations range from novel and complex situations to discrepancies between expectations and reality, often accompanied by stress and discomfort. Within organizations, environmental and internal uncertainties pose significant challenges, rearing proactive strategies to mitigate their impact. By understanding the definitions, types, and effects of uncertainty, individuals and organizations can better navigate its complexities and transform it from a source of stress into an opportunity for growth and innovation.

Table 1.1. Definitons of uncertainty

Authors	Definition
Lovecraft (1927)	Uncertainty is the oldest and strongest emotion of mankind, arising from fear of the unknown.
Budner (1962)	Uncertainty arises in complex events encountered for the first time, lacking clues, or in cases of inconsistent information.
Duncan (1972); Milliken (1987)	Environmental uncertainty arises from an inability to foresee future changes in the external environment or understand the connections between its constituent parts.
March (1981); Lawrence and Lorsch (1967)	Uncertainty is an inherent feature of organizations, especially in the face of changing environments that cannot be fully controlled.
Jackson (1989)	Minimal uncertainty in organizations occurs when few external factors impact the business and those factors remain relatively steady. High uncertainty arises when many environmental influences change rapidly.
Carter (1990); Duncan (1972); Lang and Lockhart (1990); McMullen and Shepherd (2006); Milliken (1987)	Environmental uncertainty is often linked to factors like governmental regulation, competitive turbulence, and market volatility.
Crigger (1996)	Uncertainty is a cognitive state that occurs due to the inability to explain encountered events.
DiFonzo and Bordia (1998); Short and Clarke (1992); Thompson (1967)	Organizational uncertainty may hinder performance and efficiency, necessitating cautious management.
Keren and Gerritsen (1999)	Uncertainty is doubting about an event or situation that has not yet occurred or has occurred.
Jackson (1989); Mirze (2002)	Organizational uncertainty varies based on the quantity and rate of change of environmental factors impacting the organization.
Grenier and colleagues (2005)	Uncertainty is viewed negatively due to the human tendency to seek assurance and guarantee their future within structured environments.
Carleton and colleagues (2007); Ladouceur and colleagues (2000)	Uncertainty is associated with feelings of restlessness, sadness, stress, and discomfort.

Table 1.1. (Continued)

Authors	**Definition**
Rosen and colleagues (2007)	Uncertainty occurs due to incomplete information and a lack of possible information sufficient to solve the situation.
Kasperson (2012)	Uncertainty is the incapacity to forecast outcomes despite being aware of the change's direction.
Rosser (2019)	Uncertainty results from insufficient knowledge about a circumstance or event.
Kruglanski and colleagues (2021)	Uncertainty typically leads to the anticipation of negative outcomes, particularly evident during events like epidemics.
Wu and colleagues (2021)	COVID-19 presented an unprecedented level of uncertainty due to its unpredictable consequences, course, and impact on individuals and society.

1.1.5. Integrative Models of Uncertainty

In exploring the complexities of uncertainty, several integrative models have been developed to provide a comprehensive understanding of how individuals and organizations navigate unpredictable environments. These frameworks shed light on the psychological, emotional, and behavioral strategies that individuals and organizations adopt when confronted with uncertainty, offering valuable applications for fostering resilience and adaptability.

1.1.5.1. The Integrative Model of Uncertainty Tolerance (IMUT)

A significant contribution to this field is the Integrative Model of Uncertainty Tolerance (IMUT; Hillen et al., 2017), which emphasizes the individual differences in managing uncertainty based on levels of tolerance. Fischer and colleagues (2021) demonstrated that individuals with a higher tolerance for uncertainty are more adaptable and resilient when facing unpredictable situations, which is particularly critical in environments characterized by rapid change. This framework underscores the importance of cultivating uncertainty tolerance as a psychological resource to sustain performance and well-being in volatile contexts.

1.5.1.2. Conceptual Analysis of Uncertainty Tolerance

Hillen and colleagues (2017) extended the discussion by conducting a conceptual analysis of uncertainty tolerance within healthcare settings. Their integrative model connects uncertainty tolerance to coping mechanisms in uncertain health scenarios. They found that individuals' tolerance levels significantly influence decision-making, emotional well-being, and health outcomes. For example, individuals with lower uncertainty tolerance may struggle with heightened anxiety during ambiguous medical situations, potentially compromising their decisions. The study highlights the need for interventions and supportive environments that enhance uncertainty tolerance to improve overall care quality and individual outcomes.

1.5.1.3. Uncertainty Management Theory (UMT)

Adding another perspective, Uncertainty Management Theory (UMT; Afifi & Weiner, 2004) focuses on how individuals actively process and respond to uncertainty. These authors proposed that individuals employ cognitive and emotional strategies to manage uncertainty, balancing the need for information with the anxiety that uncertainty can provoke. This model emphasizes the

role of effective communication in mitigating the negative effects of uncertainty. By providing timely and accurate information, individuals and organizations can alleviate anxiety, improve decision-making, and foster a sense of control amidst uncertainty.

1.1.6. Organizational Strategies for Managing Uncertainty

The importance of managing uncertainty extends beyond individuals to the organizational level. Milliken (1987) explored the influence of environmental uncertainty on organizational behavior, highlighting the necessity for organizations to perceive and respond effectively to external changes. Sources of uncertainty, such as market fluctuations, regulatory changes, and technological advancements, require proactive strategies to navigate challenges successfully.

The integration of individual and organizational approaches to uncertainty management is particularly relevant in crisis situations. For instance, during the COVID-19 pandemic, organizations that promoted open communication and prioritized employee well-being demonstrated greater resilience. The importance of adaptive strategies, including fostering psychological safety and supporting employees' emotional needs during crises (Wu et al., 2021). Similarly, Liao and Wei (2011) highlighted the role of organizational support systems in helping employees cope with unexpected challenges, underscoring the value of a cohesive approach to uncertainty management.

1.1.7. Temporal and Systemic Dimensions of Uncertainty

Uncertainty is a dynamic phenomenon that evolves over time and interacts with systemic factors in organizational contexts (Milliken, 1987; Uhl-Bien & Arena, 2018). Temporal dimensions of uncertainty refer to how uncertainty fluctuates over short- and long-term horizons, while systemic dimensions highlight its integration within larger organizational frameworks.

1.1.7.1. Temporal Dimensions

Short-term uncertainty often arises from immediate operational disruptions, such as supply chain interruptions or sudden shifts in consumer demand. For example, during the COVID-19 pandemic, organizations faced short-term uncertainty about operational continuity due to lockdowns and fluctuating regulations (Wu et al., 2021). Long-term uncertainty, on the other hand, pertains to strategic decisions influenced by unpredictable market trends or geopolitical changes. Navigating

long-term uncertainty requires robust scenario planning, trend analysis, and investments in adaptability to prepare for multiple potential futures (Schoemaker, 1995).

1.1.7.2. Systemic Dimensions

Systemic uncertainty emerges when uncertainty permeates multiple levels of an organization, influencing technological, operational, and strategic functions simultaneously. For instance, a global corporation undergoing digital transformation must address systemic uncertainty as it integrates new technologies across geographically dispersed teams while navigating diverse regulatory requirements. Understanding systemic dimensions requires a holistic approach that considers the interdependencies between different organizational functions and external forces.

1.1.8. The COVID-19 Pandemic: A Catalyst for Uncertainty

The COVID-19 pandemic exemplifies the profound and pervasive uncertainty that can disrupt individuals, organizations, and societies at large. Detected in December 2019 in Wuhan, China, the SARS-CoV-2 virus quickly escalated into a global health crisis. The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020, marking it as one of the most severe public health emergencies of the 21st century (WHO, 2020). As of April 2023, the pandemic resulted in 763,740,140 confirmed cases and 6,908,554 deaths worldwide (WHO, 2023).

The pandemic introduced unprecedented uncertainty, affecting multiple dimensions of life. At the individual level, it disrupted daily routines, heightened stress, and exacerbated mental health issues such as anxiety and depression (Qiu et al., 2020; Torales et al., 2020). The unpredictable nature of the virus—its transmission, mutation, and treatment—left individuals unable to forecast outcomes, contributing to widespread psychological distress (Peng et al., 2010; Wu et al., 2005). For instance, the fear of contagion and the inability to predict the pandemic's trajectory amplified feelings of vulnerability and helplessness.

On an organizational level, the pandemic highlighted the fragility of existing systems and the critical need for adaptive strategies. Organizations faced uncertainty about workforce stability, operational continuity, and economic viability. Measures such as lockdowns, quarantine directives, and travel restrictions further complicated decision-making processes (Kniffin et al., 2021). These interventions, while necessary to curb the spread of the virus, disrupted traditional work

environments, accelerating the adoption of teleworking and reshaping organizational structures (Cascio & Montealegre, 2016).

The pandemic exemplified environmental uncertainty as defined by Duncan (1972)—a lack of adequate knowledge about external events and activities—and the inability to predict their implications for decision-making. For example, businesses struggled to anticipate the economic fallout of extended lockdowns, or the operational challenges posed by supply chain disruptions. These uncertainties underscored the need for resilience and agility in navigating volatile conditions.

Moreover, the pandemic accentuated the interplay between uncertainty and well-being. Research indicated that heightened uncertainty during COVID-19 adversely impacted mental health, with individuals reporting increased restlessness, sadness, and stress (Finset et al., 2020; Wu et al., 2021). These findings align with studies on uncertainty, which associate it with negative affect and diminished psychological stability (Carleton, 2016). The pandemic further revealed the critical role of organizational support in mitigating these effects, emphasizing the importance of clear communication and robust employee assistance programs.

In the context of the VUCA framework, COVID-19 highlighted the "U"—uncertainty—by challenging traditional planning and forecasting mechanisms. Organizations were compelled to adapt quickly to new realities, including remote work arrangements, changing consumer behaviors, and evolving public health guidelines (Kniffin et al., 2021). The pandemic also emphasized the importance of fostering adaptive performance and uncertainty tolerance as individuals and teams navigated the complexities of a rapidly changing environment (Fischer et al., 2021).

Overall, the COVID-19 pandemic served as a poignant case study of uncertainty, illustrating its multifaceted impacts on individuals, organizations, and societal systems. By examining the pandemic's challenges, we gained valuable insights into the importance of resilience, adaptability, and proactive uncertainty management in addressing future crises.

1.1.8.1. Interaction of Uncertainty with Organizational Challenges

Uncertainty interacts with various organizational challenges, including technological, operational, and strategic domains. Each interaction underscores the need for tailored strategies to address uncertainty effectively.

Rapid technological advancements, such as artificial intelligence and blockchain, introduce uncertainty by disrupting established business models and creating new competitive landscapes. Organizations often face uncertainty regarding the adoption, scalability, and implications of emerging technologies. To address these challenges, leaders must invest in continuous learning and foster innovation through partnerships with technology providers and research institutions (Bawany, 2016).

Operational uncertainty arises from disruptions in processes, such as supply chain management or workforce dynamics. For instance, the shift to remote work during the pandemic highlighted operational uncertainties in maintaining productivity, ensuring cybersecurity, and fostering employee engagement. Organizations must adopt flexible workflows, invest in digital infrastructure, and prioritize communication to mitigate these uncertainties (Oakman et al., 2020).

Strategic uncertainty involves long-term planning in unpredictable environments. Globalization, climate change, and economic volatility create strategic challenges for organizations attempting to expand into new markets or redefine their value propositions. Scenario planning and stakeholder engagement are essential tools for navigating strategic uncertainty, enabling organizations to align their goals with evolving external realities (Drucker, 1994).

1.2. Uncertainty in the VUCA Framework

Uncertainty is a key component of the VUCA framework, which encapsulates the challenges of modern organizational environments: Volatility, Uncertainty, Complexity, and Ambiguity. While VUCA elements are distinct, they often overlap, creating intricate scenarios where organizations must simultaneously address rapid change, unpredictability, interconnectedness, and lack of clarity (Bennett & Lemoine, 2014b).

In the VUCA context, uncertainty specifically highlights the unpredictability of external and internal factors, making it difficult for organizations to anticipate future states or outcomes. For example, the global shift toward remote work during the COVID-19 pandemic underscored uncertainty in organizational practices, requiring leaders to adopt flexible strategies and prioritize employee well-being (Oakman et al., 2020).

1.2.1. The Components of VUCA

The VUCA framework—Volatility, Uncertainty, Complexity, and Ambiguity—articulates the profound challenges faced by organizations in a world characterized by rapid technological change, globalization, and shifting market dynamics, reflecting the unpredictable nature of modern organizational environments (Bennett & Lemoine, 2014a; Johansen, 2007; Sullivan, 2012a).

1.2.1.1. Volatility

Volatility refers to the rapid, significant, and often unpredictable changes in an environment. It describes situations where instability and turbulence dominate, making it difficult for organizations to maintain stability and long-term planning. Volatility is defined as "relatively unstable change" and reflects the challenges organizations face in environments where rapid shifts disrupt operations and decision-making (Bennett & Lemoine, 2014a, p. 313). Unlike other VUCA elements, volatility does not inherently involve ambiguity or uncertainty; rather, it emphasizes the speed and magnitude of change (Selsky & McCann, 2008).

A classic example of volatility is the technological sector, where advancements such as artificial intelligence (AI), machine learning, and blockchain regularly disrupt industries. Organizations in this space must adapt rapidly to new technologies or risk obsolescence. For instance, the widespread adoption of AI has transformed industries like healthcare and finance, creating both opportunities and challenges. Companies must navigate this volatile landscape by re-skilling employees, redesigning workflows, and integrating advanced tools to stay competitive (Prensky, 2014). Similarly, the COVID-19 pandemic exemplified volatility, forcing organizations to adopt remote work models and pivot to digital operations almost overnight (Oakman et al., 2020).

Managing volatility requires organizations to prioritize agility and preparedness through strategies such as resource stockpiling, workforce training, and scalable infrastructures that support operational flexibility (Janssen & Voort, 2020). Leaders play a critical role by inspiring confidence and maintaining alignment during periods of instability (Kotter, 2012).

In addition to operational adjustments, predictive analytics and scenario planning enable organizations to anticipate disruptions and prepare contingency plans. Effective communication is crucial to keep stakeholders informed and engaged, turning volatility into an opportunity for innovation and resilience (Heifetz et al., 2009).

1.2.1.2. Uncertainty

Uncertainty highlights the challenges associated with the absence of clear and reliable information about future events or outcomes. It is characterized by a lack of predictability, where organizations struggle to anticipate changes or understand the relationships between causes and effects. Milliken (1987) defined uncertainty as "an individual's perceived inability to predict something accurately" (p. 136). Unlike volatility, which focuses on rapid but discernible changes, uncertainty reflects situations where the information needed for decision-making is incomplete or unclear (Guterman & King, 2014; Michel, 2016).

Uncertainty often arises in global markets, where organizations face unpredictable regulatory changes, shifting consumer preferences, and evolving competitive landscapes. For example, the globalization of trade has introduced significant uncertainty for businesses navigating diverse regulatory environments and fluctuating currency rates. Similarly, the COVID-19 pandemic created unprecedented uncertainty as organizations struggled to predict supply chain disruptions, workforce availability, and customer demand (Oakman et al., 2020). These conditions underscored the importance of adaptability and resilience in managing uncertainty.

To address uncertainty, organizations must focus on strategies that enhance foresight and clarity. Environmental scanning and continuous trend analysis are essential tools, enabling organizations to monitor weak signals of change and prepare proactively (Heifetz et al., 2009). Scenario planning allows leaders to envision multiple potential futures and develop contingency plans to respond to a range of possible outcomes (Schoemaker, 1995).

Effective teamwork and innovative problem-solving are essential for navigating uncertainty in complex environments. Leveraging the collective wisdom of diverse teams enables organizations to explore innovative solutions and mitigate risks. Reverse mentoring programs, where junior employees share insights with senior leaders, can provide fresh perspectives that complement traditional expertise (Chao, 2020). Iterative testing and experimentation further support decision-making by allowing organizations to refine strategies based on real-world feedback (Kolb, 1984).

Ultimately, uncertainty challenges organizations to develop adaptability, resilience, and a proactive approach to learning from failure. These qualities enable organizations to turn uncertainty into opportunities for growth and innovation, fostering confidence in unpredictable environments.

1.2.1.3. Complexity

Complexity refers to the interconnectedness of multiple factors within a system, where individual elements influence one another in unpredictable ways. Unlike volatility and uncertainty, complexity emphasizes the intricate relationships and dependencies that exist within organizational environments. Complexity often arises in globalized business contexts, where organizations must navigate diverse regulatory landscapes, cultural differences, and economic conditions (Kilduff & Tsai, 2003; Michel, 2016).

For example, multinational corporations managing supply chains across continents face significant complexity. These organizations must balance local compliance requirements, shifting trade policies, and fluctuating market conditions. In the healthcare sector, complexity is evident in the interdependence of medical technologies, regulatory standards, and patient needs, which create intricate scenarios that require careful coordination (Bennett & Lemoine, 2014b).

To address complexity, organizations must adopt systems thinking, which involves viewing their operations as interconnected networks rather than isolated units (Senge, 1990). Leaders must consider how different factors interact and anticipate the ripple effects of their decisions. By streamlining processes and focusing on key priorities, organizations can manage complexity more effectively (Fischer, 2017).

Social network analysis provides additional insights into complexity by mapping relationships within and beyond organizational boundaries. This tool enables leaders to identify key influencers, streamline communication flows, and optimize resource allocation (Wasserman & Faust, 1994).

Complexity also necessitates the development of new skills and capabilities. Leaders must cultivate adaptability, creativity, and non-linear thinking to address the gray areas and competing priorities that characterize complex environments (Cooke, 2013).

1.2.1.4. Ambiguity

Ambiguity describes situations where relationships between causes and effects are unclear, or where multiple interpretations of a situation exist. It often arises in contexts where precedents are lacking, making it difficult to predict outcomes or establish clear courses of action. Ambiguity reflects the "blurriness" of facts and the potential for misinterpretation, creating confusion and hindering decision-making (Guterman & King, 2014; Sullivan, 2012b).

Ambiguity is particularly prevalent in the early stages of technological adoption or market entry. For instance, the introduction of blockchain technology created significant ambiguity as organizations debated its potential applications and implications. Similarly, launching a new product in an untested market involves ambiguity, as consumer preferences and competitive dynamics remain uncertain (Pulakos et al., 2000).

To navigate ambiguity, organizations must prioritize experiential learning, prototyping, and testing to reduce unknowns. Collaboration across diverse teams can provide fresh perspectives, clarifying complex issues and uncovering hidden opportunities (Heifetz et al., 2009). Leaders in ambiguous environments must foster psychological safety, encouraging employees to experiment, share ideas, and learn from failures (Yukl, 2013). Additionally, organizations can develop new terminology and frameworks to guide decision-making in ambiguous contexts, such as "co-opetition" (Prensky, 2014).

Ambiguity underscores the need for adaptability, resilience, and a commitment to continuous learning. By embracing the unknown and experimenting with novel approaches, organizations can transform ambiguity into a driver of innovation and strategic advantage.

1.2.2. Navigating the VUCA World: Bridging Theory and Practice

The VUCA framework encapsulates the dynamic and unpredictable conditions brought about by rapid technological advancements, globalization, and transformative events such as the COVID-19 pandemic. As Sullivan (2013) aptly observed, VUCA is now the "new normal" across industries, requiring a fundamental shift in management and operational strategies to ensure organizational resilience and adaptability.

Empirical studies offer valuable insights into the practical implications of navigating a VUCA-driven landscape (e.g., Liu et al., 2023; Primecz, 2024). For instance, telework, a critical response to the challenges posed by the pandemic, has revealed significant impacts on productivity, employee engagement, and work-life balance (Yang et al., 2021). Research highlighted the importance of organizational support and flexibility in mitigating the potential downsides of remote work while fostering employee well-being and performance (Oakman et al., 2020).

Complementing the discourse on telework is the growing body of research on adaptive performance, which examines how individuals and teams respond effectively to rapid and unpredictable changes. Studies by Jundt and colleagues (2015) underscored the role of leadership

support, training programs, and environmental stability in enhancing adaptability. Organizations increasingly recognize that fostering agility among employees is a critical strategy for coping with volatility and uncertainty.

Daily workplace dynamics further enrich our understanding of the VUCA context. Diary studies, such as those conducted by Ohly and colleagues (2010), provided granular insights into how micro-events shape employee stress management, task performance, and overall well-being. These studies revealed that small, seemingly insignificant events can significantly influence adaptive behaviors and workplace resilience, underscoring the importance of addressing both large-scale disruptions and everyday experiences.

Leadership effectiveness is another cornerstone of navigating VUCA challenges. Effective leaders act as stabilizing forces within volatile and uncertain contexts, mitigating the negative effects of stress and fostering resilience among employees (Avolio et al., 2009). Leadership strategies that promote open communication, emotional intelligence, and a focus on collective goals are instrumental in building team cohesion and adaptability. Additionally, recent research emphasized the value of mindfulness in leadership and organizational practices. Good and colleagues (2016) and Liu and colleagues (2020) highlighted how mindfulness fosters adaptability, innovation, and stronger interpersonal relationships within high-uncertainty environments. These findings underscored the importance of integrating mindfulness practices into organizational culture to enhance both individual and collective resilience.

By bridging these empirical insights with the theoretical underpinnings of the VUCA framework, organizations can adopt targeted strategies that enable them to transform challenges into opportunities. Bennett and Lemoine (2014a) stressed the importance of recognizing and addressing VUCA elements in strategic planning, allowing organizations to build robust structures and ensure sustained success. This involves fostering a culture of continuous learning and innovation to navigate long-term complexity and ambiguity effectively.

Practical strategies derived from research on telework, adaptive performance, leadership effectiveness, and mindfulness provide actionable insights into how organizations can maintain performance and well-being in the face of volatility and uncertainty. By integrating these strategies into their operational frameworks, organizations can enhance their adaptability, resilience, and competitiveness in an ever-changing world.

In summary, the first study of this thesis, through a systematic review, contextualized the empirical findings and theoretical discussions that follow. With this approach, we connected the theoretical underpinnings of VUCA with practical, real-world applications, ultimately enhancing our understanding of specific factors such as telework.

1.3. Uncertainty and Key Organizational Outcomes

1.3.1. Adaptive Performance

In today's fast-paced, unpredictable, and volatile work environments, adaptation has emerged as a critical requirement for both organizations and employees. Adaptive performance translates the capacity to adjust and respond effectively to the evolving demands of the workplace, encompassing cognitive, emotional, and behavioral dimensions (Pulakos et al., 2000). This capability is particularly vital in the face of uncertainty, which can stem from economic, technological, or organizational changes. For instance, Pulakos and colleagues (2000) emphasized the importance of adaptive performance in addressing these changes by highlighting its role in managing ambiguity, learning new tasks, and navigating unpredictable situations. Similarly, Griffin and Hesketh (2003) underlined adaptive performance as a critical competency for individuals and organizations striving to thrive in dynamic environments.

The concept of adaptive performance is further reinforced by the increasing recognition that traditional performance dimensions, such as task and contextual performance, are insufficient in capturing the demands of modern workplaces. As noted by Charbonnier-Voirin and Roussel (2012), the rise of environmental uncertainty and rapid technological advancements necessitates a performance framework that reflects flexibility and responsiveness. This perspective aligns with organizational theories emphasizing that resilience and adaptability are fundamental to achieving sustainable success in volatile conditions (LePine et al., 2000; Ployhart & Bliese, 2006).

By integrating these ideas, adaptive performance emerges as a construct that not only addresses the immediate needs of uncertain work environments but also contributes to long-term organizational growth and individual development.

1.3.1.1. Performance: A Foundational Concept

Organizations are social systems established to achieve collective goals that individuals cannot accomplish alone. Maintaining the continuity and effectiveness of these systems relies heavily on the performance of their members (Suliman, 2001). Performance has been widely examined and defined across various fields. For instance, Cordero (1989) described performance as the balance between effectiveness—measuring outputs against targets—and efficiency—ensuring optimal use of resources. Similarly, Neely and colleagues (1995) conceptualized performance as the efficiency and effectiveness of purposeful action, while Schuler (1995) emphasized the role of employees' efforts in determining overall performance.

Further contributions to the performance literature have highlighted its multidimensional nature. Rolstadas (1998) characterized performance as a complex relationship between factors such as quality, productivity, innovation, and profitability. Hoffmann (1999) framed it as the extent to which actions contribute to organizational objectives, while Hauber (2002) extended this to include the roles of organizational units, employees, and processes. Lastly, the European Foundation for Quality Management (2003) underscored that performance is the degree of success achieved by an individual, team, or organization in meeting objectives.

Thus, performance encompasses achieving goals, optimizing resource usage, and responding to dynamic environments. It is increasingly recognized as a construct that goes beyond traditional definitions to include the ability to adapt and thrive in uncertain and volatile conditions (Borman & Motowidlo, 1993; Campbell, 1990; Salas et al., 2015; Sonnentag, 2018).

1.3.1.2. Job Performance and Its Evolution

Historically, job performance has been viewed through two primary dimensions: task performance and contextual performance (Han & Williams, 2008; Shoss et al., 2012). Task performance focuses on fulfilling job-specific duties and achieving explicit goals (e.g., perform formally defined tasks), while contextual performance encompasses behaviors that promote collaboration, organizational culture, and a positive work environment (e.g., helping a colleague). However, these dimensions, while foundational, have proven insufficient in capturing the adaptability required in modern workplaces.

Environmental uncertainty, rapid technological advancements, and evolving organizational priorities have necessitated a broader perspective on performance (Charbonnier-Voirin & Roussel,

2012). In response, researchers introduced adaptive performance, a concept reflecting the ability to respond effectively to change and uncertainty (Griffin & Hesketh, 2003). Adaptive performance has since gained prominence as a critical dimension of job performance, essential for success in volatile and complex environments.

1.3.1.3. The Role of Adaptive Performance in Uncertainty

Uncertainty, characterized by unpredictable changes in organizational, economic, or technological contexts, has become a defining feature of contemporary work environments (Baard et al., 2014; Calarco, 2016). This uncertainty necessitates a workforce capable of continuous learning, flexibility, and resilience. Adaptive performance addresses these needs, emphasizing an individual's ability to navigate and thrive amidst ambiguity and change (Ployhart & Bliese, 2006; Pulakos et al., 2000).

Adaptive performance is particularly relevant in uncertain environments because it facilitates effective responses to dynamic challenges, such as shifting job roles, new technologies, and evolving market demands (Allen et al., 2011; Hesketh & Neal, 1999). Employees who demonstrate adaptive performance (e.g., adapt and learn how to use a new software) are better equipped to manage the cognitive, emotional, and behavioral demands of uncertainty, contributing to organizational success and sustainability (LePine et al., 2000; Van den Heuvel et al., 2013).

1.3.1.4. Adaptive Performance Beyond the Workplace

While adaptive performance is often examined in organizational contexts, its implications extend to broader life domains. The cognitive, emotional, and behavioral adjustments required to manage uncertainty are applicable to diverse challenges, from personal development to societal interactions (Pulakos et al., 2002). This holistic perspective underscores the value of adaptability as an essential skill in navigating a world increasingly defined by volatility, uncertainty, complexity, and ambiguity (Bennett & Lemoine, 2014).

1.3.2. Health

Health, as a critical outcome of uncertainty, is a multifaceted construct that encompasses physical, mental, and social dimensions. It transcends the traditional understanding of health as merely the absence of disease, instead reflecting a state of holistic well-being. The World Health Organization

(WHO) takes a broad view of health, defining it as a state that integrates physical, mental, and social well-being, rather than simply the absence of illness or disability (WHO, 2021). This interpretation emphasizes a holistic approach, viewing health as a resource that supports daily living and highlights the significance of social, personal, and physical capabilities.

Increasingly, subjective perceptions of health have gained recognition as a crucial element of well-being (Diener et al., 2018). These perceptions significantly influence individual health outcomes and broader societal health trends. In the context of organizational behavior, health is affected not only by long-term factors such as lifestyle choices and chronic conditions but also by short-term influences like daily micro-events—small, everyday occurrences that impact well-being (Ilies et al., 2015). This section explores health through three interrelated dimensions: overall health, mental health, and vitality. Together, these dimensions provide a comprehensive framework for understanding individual well-being and highlight the significant roles of daily micro-events, affect, and uncertainty as mediators in shaping health outcomes.

1.3.2.1. Overall Health

Overall health refers to an individual's general perception of their health status and serves as an encompassing measure of well-being. Typically assessed through a single self-reported question, it allows individuals to rate their health on a scale from "very bad" to "excellent" (Idler & Benyamini, 1997). Despite its simplicity, this measure has proven to be a robust predictor of critical health outcomes, including mortality, morbidity, and healthcare utilization.

Studies have demonstrated that self-rated health is strongly correlated with objective health indicators, such as the presence of chronic conditions, functional limitations, and biological markers (Jylhä, 2009; Mossey & Shapiro, 1982). Importantly, self-rated health captures a wide range of factors, including physical symptoms, mental health, and social well-being, making it a valuable holistic measure.

The predictive power of self-rated health extends beyond physical health to encompass psychological and social dimensions. For example, individuals who rate their health positively often demonstrate higher levels of psychological resilience, optimism, and social support—factors that collectively contribute to better health outcomes (Benyamini et al., 2003). This suggests that self-rated health reflects not only an individual's physical condition but also their social and emotional resources for coping with health challenges.

Daily micro-events play a pivotal role in shaping overall health. Research indicates that negative micro-events, or daily hassles, are associated with stress and adverse health outcomes (DeLongis et al., 1988). Conversely, positive micro-events, or daily uplifts, can enhance well-being and serve as a buffer against the detrimental effects of stress (Gable et al., 2000). These micro-events impact overall health directly and indirectly through their influence on daily uncertainty and affect, both of which mediate the relationship between micro-events and health outcomes (Junça-Silva & Caetano, 2023; Junça-Silva & Silva, 2024).

1.3.2.2. Mental Health

Mental health, a cornerstone of overall well-being, encompasses emotional, psychological, and social aspects that influence how individuals think, feel, and behave. Good mental health is characterized by emotional balance, resilience to distress, and the ability to enjoy life and maintain fulfilling relationships (WHO, 2018). It significantly affects not only day-to-day functioning but also long-term outcomes such as life satisfaction and physical health.

The recognition of positive mental health as more than the absence of mental illness represents a paradigm shift in health research. This approach focuses on flourishing and thriving, emphasizing the presence of positive emotions and psychological well-being. Research highlights the numerous benefits of positive mental health, including lower stress levels, reduced risk of chronic diseases, and higher life satisfaction (Keyes, 2005). Positive emotions, such as happiness and contentment, are particularly influential, promoting health-enhancing behaviors and greater resilience (Fredrickson & Joiner, 2002).

Mental health also profoundly affects other dimensions of health, such as physical health and vitality. Chronic stress and negative emotional states weaken the immune system, increase susceptibility to illness, and exacerbate chronic conditions (Cohen et al., 2007). Conversely, positive mental health buffers against these effects, fostering a state of overall well-being (Keyes, 2007).

Daily micro-events have a direct impact on mental health. Negative events, such as workplace stressors, can lead to anxiety, depression, and emotional exhaustion (Bolger et al., 1989). Positive events, such as supportive social interactions, enhance mood, reduce stress, and promote mental health (Folkman & Moskowitz, 2000). Affect plays a central role in linking micro-events to mental health outcomes. Positive affect, marked by feelings of joy and enthusiasm, contributes to better

mental health, while negative affect, characterized by sadness or anger, exacerbates mental health problems (Watson et al., 1988). Moreover, recent studies showed that daily micro-events significantly influence mental health, with negative micro-events leading to negative affect and deteriorated mental health, while positive events improve emotional well-being (Junça-Silva & Caetano, 2024; Junça-Silva & Silva, 2024).

Additionally, daily uncertainty significantly mediates the relationship between micro-events and mental health. High uncertainty often leads to increased stress and anxiety, negatively affecting mental health (Greco & Roger, 2003). Conversely, a sense of predictability fosters emotional stability, reducing stress and supporting mental well-being (Carleton, 2016).

1.3.2.3. Vitality

Vitality, the sense of being energized and lively, is a critical dimension of health, reflecting physical and mental engagement essential for well-being (Ryan & Frederick, 1997). High vitality indicates a balanced state where individuals feel physically energized and mentally alert. It is closely linked to health behaviors, such as regular physical activity, a nutritious diet, and social interactions—all of which contribute to improved health outcomes (Stewart et al., 1989).

Vitality also intersects with psychological constructs like self-determination and motivation. Individuals who engage in activities aligned with their values and interests experience higher vitality, which in turn enhances their overall well-being (Ryan & Frederick, 1997). High vitality is not only indicative of current well-being but also a predictor of future health. Studies showed that individuals with high vitality are less likely to develop chronic conditions and are more likely to maintain a high quality of life (Ware et al., 1993).

Daily micro-events significantly influence vitality. Negative micro-events, such as daily hassles, drain energy and reduce vitality, contributing to fatigue and burnout (Schaufeli & Bakker, 2004). On the other hand, positive micro-events invigorate individuals, enhancing their vitality and encouraging active engagement in life (Gable et al., 2000). The role of affect in shaping vitality is particularly noteworthy. Positive affect enhances vitality by promoting enthusiasm and engagement, while negative affect is associated with lethargy and fatigue (Watson et al., 1988). Daily uncertainty further impacts vitality, with high uncertainty draining energy and stability fostering a sense of liveliness (Carleton, 2016; Greco & Roger, 2003).

Summarizing, health, as a multidimensional construct, encompasses overall health, mental health, and vitality—each offering unique insights into well-being while reflecting broader societal and psychological contexts. These dimensions not only capture the current state of health but also serve as powerful predictors of future outcomes. Daily micro-events, through their influence on uncertainty and affect, play a pivotal role in shaping these health dimensions. Understanding these dynamic interactions is essential for developing interventions aimed at improving health and well-being, enabling individuals to thrive both physically and mentally.

1.4. The Role of Telework as a Contextual Factor

1.4.1. The Evolution and Definition of Telework

Since the 1970s, the global economy has faced numerous challenges, including economic crises, globalization pressures, and changing production demands. These challenges have compelled organizations to adopt innovative business strategies, such as flexible work arrangements. Telework, first conceptualized by Jack Nilles in response to the 1970s oil crisis, initially aimed to reduce energy consumption and commuting times by leveraging information and communication technologies (ICTs) (Nilles et al., 1976). Over time, the scope of telework expanded to address broader objectives such as enhancing work-life balance, reducing stress, and improving productivity for both employees and organizations (ILO, 2016; Maxwell et al., 2007).

Telework was defined as work conducted at a location physically separate from the traditional office, facilitated by ICTs that enable communication and task completion (Di Martino & Wirth, 1990; Eurofound & ILO, 2017). This flexibility allows employees and employers to decide when and where work is performed, adapting to individual and organizational needs. The evolution of high-speed internet and portable devices has further popularized telework, transforming it into a common employment model in several industries (Messenger & Gschwind, 2016). Its relevance extends beyond logistical convenience, positioning telework as a critical strategy for managing uncertainty in dynamic environments (Felstead & Henseke, 2017).

1.4.2. The Role of Telework in Managing Uncertainty

Telework's flexibility and adaptability make it particularly valuable during periods of uncertainty. Crises such as the COVID-19 pandemic have underscored telework's importance as a tool for

maintaining business continuity while safeguarding employee health. During the pandemic, telework allowed many organizations to minimize disruptions and enabled employees to navigate psychological challenges associated with the crisis, such as anxiety and fear of contagion (Rajkumar, 2020; Taylor et al., 2020).

The uncertainty brought on by the pandemic extended beyond health concerns, encompassing economic instability, job security, and the sustainability of work-life balance. Telework offered a buffer against these uncertainties by allowing employees to work in safer, controlled environments while providing organizations with a mechanism to continue operations. This dual function highlights telework's role as both a reactive and proactive strategy for addressing uncertainty (Becker et al., 2022; Contreras et al., 2020).

Moreover, telework mitigates workplace-related uncertainties by reducing employees' exposure to stressors such as long commutes, rigid schedules, and office distractions (Bailey & Kurland, 2002). However, it also introduces new uncertainties, such as challenges in establishing work-life boundaries and maintaining team cohesion (Gajendran & Harrison, 2007). Organizations must navigate these complexities to maximize the benefits of telework while minimizing its drawbacks. The VUCA (Volatility, Uncertainty, Complexity, Ambiguity) framework reinforces the need for adaptive strategies like telework to foster resilience in uncertain environments (Bennett & Lemoine, 2014a).

1.4.3. Telework's Advantages for Employees

Telework offers numerous benefits to employees, fundamentally reshaping how work is performed and perceived. While the following points highlight some of the most notable advantages, they are not exhaustive and may vary based on individual circumstances and workplace policies. A primary advantage is financial savings. By eliminating the need for daily commuting, employees save on transportation costs, including fuel, public transport fares, and vehicle maintenance. Additionally, telework reduces expenditures on clothing and meals, as employees can prepare food at home and dress less formally (Davis, 2021; Davis & Pothen, 2022). These savings also align with broader environmental goals, as reduced commuting contributes to lower carbon emissions (Messenger, 2019).

Another key advantage of teleworking is the time saved from not commuting. This reclaimed time can be used for personal interests, family responsibilities, or leisure, promoting a healthier

work-life balance. The ability to manage work hours flexibly allows employees to address both professional and personal commitments more effectively, reducing work-family conflict (Lund et al., 2021).

Telework also enhances inclusivity by enabling individuals with disabilities or geographical constraints to participate in the workforce. This flexibility democratizes job opportunities, ensuring that skilled individuals are not excluded due to physical or locational barriers (Felstead et al., 2021). Furthermore, research by Wang and colleagues (2021) highlighted how autonomy in telework settings improves employee well-being by minimizing workplace stressors, leading to higher satisfaction and productivity. However, these benefits are not universal. Employees may require additional support, such as training in time management and technology use, to fully leverage telework's potential. Organizations can play a pivotal role in addressing these challenges by providing structured guidelines and promoting a culture that values work-life balance (Table 1.2.).

Table 1.2. Advantages of Telework for Employees

Category	**Advantages**
Cost Reduction	Savings on commuting, food, and clothing expenses
Work-Life Balance	Enhanced personal and family time, reduced work-family conflict
Flexibility	Autonomy in scheduling, adaptability to personal needs
Inclusivity	Increased opportunities for individuals with disabilities and remote workers
Well-being	Reduced workplace stress, improved job satisfaction

1.4.4. Telework's Advantages for Organizations

For organizations, telework offers substantial financial benefits by reducing the need for physical office space and associated costs such as electricity, heating, and office supplies (Gray et al., 1993). These savings can be redirected toward strategic priorities or technological investments to enhance telework infrastructure (Chen & Karahanna, 2021). While these points highlight key financial advantages of teleworking, they do not encompass all potential benefits organizations may

experience, which can vary depending on industry, organizational size, and telework implementation strategies.

Telework also increases organizational flexibility, enabling businesses to adapt to changing market demands and workforce needs. Employees working remotely are often more motivated and productive, as they face fewer distractions and can structure their tasks efficiently (Bailey & Kurland, 2002). This productivity gain may be complemented by lower turnover and absenteeism rates, as employees experience improved work satisfaction and reduced stress (Bloom et al., 2015). Moreover, telework allows organizations to access a broader talent pool, as geographical barriers are minimized. Skilled professionals from diverse locations can contribute to organizational goals, fostering innovation and adaptability in a competitive landscape (Messenger & Gschwind, 2016). Please see table 1.3.

Table 1.3. Advantages of Telework for Organizations

Category	**Advantages**
Financial Benefits	Reduced costs for office space and utilities
Organizational Flexibility	Enhanced adaptability, increased employee motivation
Productivity	Improved employee efficiency, reduced turnover and absenteeism
Talent Access	Broader geographical reach for hiring skilled employees

1.4.5. Telework's Disadvantages for Employees

Despite its advantages, telework poses significant challenges for employees. The following points illustrate some of these disadvantages, though this list is not comprehensive. One of the most common difficulties is the blending of work and personal life (Clark, 2000). Without clear boundaries, employees may struggle to disengage from work, leading to stress and burnout. Household distractions, such as family responsibilities or noisy environments, can further disrupt productivity (Grant et al., 2019).

Social isolation is another drawback. Working remotely often reduces opportunities for interpersonal interactions, leading to feelings of loneliness and disconnection from colleagues (Kniffin et al., 2021). This lack of connection can diminish team cohesion and employee engagement (Sarker et al., 2022). Moreover, telework can impose additional costs on employees,

such as higher utility bills and expenses for home office equipment (Tavares, 2017). These costs may offset some of the financial savings associated with telework, highlighting the need for organizations to provide stipends or resources to support remote work (Miller, 2014). Table 1.4. summarized some disadvantages of telework for employees.

Table 1.4. Disadvantages of Telework for Employees

Category	**Disadvantages**
Work-Life Separation	Challenges in maintaining boundaries, household distractions
Social Isolation	Feelings of loneliness and reduced team interaction
Additional Costs	Higher utility and home office expenses

1.4.6. Telework's Disadvantages for Organizations

For organizations, telework introduces challenges in monitoring employee performance (Contreras et al., 2020). Traditional supervision methods are less effective in remote settings, requiring organizations to shift their focus from micromanagement to output-based evaluations (Larson et al., 2020). This shift demands trust in employee self-discipline and time management (Choo et al., 2005). Moreover, research indicated that difficulties in monitoring performance and fostering accountability can negatively impact productivity in remote settings (Bloom et al., 2015; Grant et al., 2013). While these challenges highlight some key disadvantages of telework, they are not exhaustive, as organizations may encounter additional hurdles depending on their specific structure and industry.

Additionally, the reliance on technology for telework creates vulnerabilities. Technical issues, such as inadequate internet connections or cybersecurity risks, can disrupt operations and compromise data security (Pérez et al., 2002). Organizations must invest in robust technological infrastructure to mitigate these risks.

Lastly, the absence of physical workplace interactions can hinder team dynamics and innovation. Building a strong organizational culture in a remote environment requires deliberate efforts, such as virtual team-building activities and regular communication (Guthrie, 1997). Table 1.5. outlines several disadvantages of telework for organizations.

Table 1.5. Disadvantages of Telework for Organizations

Category	Disadvantages
Performance Monitoring	Challenges in supervision, reliance on self-discipline
Productivity	Reduced productivity due to challenges in accountability
Technological Reliance	Vulnerability to technical issues and cybersecurity risks
Team Dynamics	Reduced collaboration and challenges in fostering organizational culture

It is important to note that telework is not a one-size-fits-all solution. Certain industries, such as manufacturing, healthcare, and retail, may find it challenging to adopt telework due to the nature of their operations, which often require physical presence (Bailey & Kurland, 2002). Similarly, within the same organization, not all functions or roles are suited to remote work. For instance, roles that depend heavily on specialized equipment, face-to-face interaction, or collaborative on-site tasks may face significant limitations (Allen et al., 2015). Recognizing these distinctions is crucial to implementing telework effectively and ensuring it aligns with the specific needs and capabilities of the organization.

In summary, telework represents a transformative shift in employment models, offering both opportunities and challenges. Its advantages, such as cost savings, improved flexibility, and inclusivity, make it a compelling option for individuals and organizations alike. However, the associated challenges—ranging from social isolation to monitoring difficulties—highlight the need for strategic interventions. As organizations navigate an increasingly volatile and uncertain world, telework may serve as a vital tool for enhancing resilience and adaptability.

In the broader context of uncertainty, telework not only may provide immediate solutions during crises but also lays the groundwork for long-term organizational sustainability. The continued evolution of telework practices, supported by advancements in technology and management strategies, will shape the future of work. By addressing its challenges and leveraging its strengths, telework can foster a more inclusive, productive, and resilient workforce capable of thriving in dynamic environments.

At the heart of these dynamics lies the emotional and psychological experiences of employees. Telework introduces new uncertainties that elicit complex affective responses, influencing how individuals perceive and adapt to their changing work conditions. To fully understand the impact of telework on organizational outcomes, it is essential to examine the role of affect—encompassing both positive and negative emotional states—as a critical mediator in navigating uncertainty.

1.5. Psychological Mechanism and Moderators in Uncertainty Contexts

1.5.1. The Role of Affect as a Mediator

Uncertainty creates complex emotional responses (e.g., fear) that influence individuals' cognition, behavior, and well-being (Hillen et al., 2017). Emotion, as a central human response to external stimuli, plays a critical role in shaping how individuals interpret and adapt to uncertain situations (Lazarus, 1991; Scherer, 2001). Beyond transient emotional reactions, affect emerges as a broader construct encompassing enduring emotional states, both positive and negative, which mediate the effects of uncertainty on workplace outcomes. This section first explores the role of emotion in responding to uncertainty and then delves into affect, with a particular focus on negative affect, as a key mediator in the relationship between uncertainty and employee outcomes.

1.5.1.1. Emotion and Its Role in Uncertainty

Emotions are intense and short-lived reactions triggered by specific stimuli or events (Frijda, 1994). In the context of uncertainty, emotions are often heightened as individuals attempt to navigate ambiguous or unpredictable scenarios. Emotions such as anxiety, fear, and frustration are commonly associated with uncertainty, reflecting the perception of potential threats to stability or resources (Lazarus, 1991). Conversely, emotions like hope and curiosity can emerge when uncertainty is viewed as an opportunity for growth or exploration (Fredrickson, 2001).

Emotions influence decision-making and behavior by acting as an interpretive lens through which individuals evaluate their circumstances (Damasio, 1994). For instance:

- *Fear* in uncertain environments may trigger avoidance behaviors, such as withdrawing from challenging tasks or disengaging from collaborative efforts (Weiss & Cropanzano, 1996).
- *Frustration* may lead to conflicts with colleagues or a decline in problem-solving abilities (Martinez-Inigo et al., 2007).

- *Hope* may encourage proactive strategies, such as seeking information or taking calculated risks to manage ambiguity (George, 1996).

Uncertainty often provokes a dynamic interplay of positive and negative emotions. While negative emotions tend to dominate, particularly in highly ambiguous situations, positive emotions can offer counterbalancing effects, fostering resilience and adaptability. These transient emotional responses set the stage for more enduring affective states, which play a sustained role in shaping how individuals cope with and adapt to uncertainty.

1.5.1.2. Affect: A Broader Emotional Framework

Affect refers to a wide range of emotional experiences, encompassing both transient emotions and more enduring mood states (George, 1996; Russell, 2003; Watson & Tellegen, 1985; Yang et al., 2020). Unlike discrete emotions, affect represents a broader and more continuous dimension of emotional responses, which can be classified as positive affect or negative affect.

1. Positive Affect: This dimension reflects the experience of pleasurable emotions such as enthusiasm, joy, and optimism. Positive affect enhances individuals' cognitive flexibility and broadens their thought-action repertoires, enabling them to approach uncertainty with creativity and resilience (Fredrickson, 2001). For instance, employees with high positive affect may view ambiguous job demands as opportunities to innovate and grow.
2. Negative Affect: In contrast, negative affect captures the experience of unpleasant emotions, including anxiety, sadness, and frustration. It narrows cognitive focus and amplifies perceptions of threats, making it more challenging to adapt to uncertainty effectively (Russell, 2003; Watson & Clark, 1984). Negative affect is particularly relevant in uncertain environments, where ambiguity often triggers fear of failure, loss of control, or diminished self-efficacy.

Affect serves as a mediator by influencing how individuals appraise and respond to uncertain situations. While positive affect can buffer the adverse effects of ambiguity, negative affect typically dominates in situations of prolonged or heightened uncertainty, shaping employees' emotional, cognitive, and behavioral outcomes (Fredrickson, 2001; George & Zhou, 2002).

1.5.1.3. Negative Affect as a Mediator in Uncertainty

Negative affect (NA) is a central construct in understanding how individuals respond to uncertainty. It refers to a predisposition to experience unpleasant emotional states, which are often exacerbated in ambiguous or unpredictable scenarios (Watson & Clark, 1984). NA mediates the relationship between uncertainty and workplace outcomes by intensifying emotional and psychological stressors (Men & Yue, 2022).

1. Heightened Emotional Reactivity: Negative affect amplifies individuals' emotional sensitivity to uncertain situations, increasing the likelihood of experiencing anxiety, frustration, or anger (Britt et al., 2001). For example, an employee unsure about job security may ruminate on potential threats, leading to chronic stress.
2. Cognitive Impairments: NA narrows attentional focus and reduces cognitive flexibility, impairing decision-making and problem-solving abilities (Fredrickson, 2001). Employees with high NA may struggle to adapt to evolving job demands or manage ambiguous instructions effectively.
3. Behavioral Consequences: Negative affect fosters avoidance behaviors, such as procrastination or withdrawal from challenging tasks, which can hinder performance and collaboration. It may also lead to interpersonal conflicts, as frustration and irritability spill over into team dynamics (Robbins & Judge, 2013).
4. Impact on Adaptive Performance: In the context of teleworking or other dynamic work arrangements, NA mediates the relationship between perceived job demands and adaptive performance (Bakker & Demerouti, 2017). Employees experiencing high NA may find it more difficult to adjust to changing expectations, leading to reduced effectiveness in their roles (Wright et al., 2007).

1.5.2. The Circumplex Model of Affect

The Circumplex Model of Affect (Russell, 2003; Watson & Tellegen, 1985) provides a valuable framework for understanding the multidimensional nature of affect. It categorizes emotions along two dimensions:

1. Valence: Positive versus negative emotional states.
2. Arousal: High versus low levels of activation or intensity.

This model illustrates how different affective states interact and influence behavior. For instance:

- High-arousal negative affect (e.g., anxiety) may dominate in highly uncertain environments, intensifying stress and impairing performance.
- Low-arousal positive affect (e.g., calmness) can help regulate emotional responses, fostering greater stability in ambiguous situations.

The model also highlights the coexistence of mixed emotions, such as feeling both anxious and hopeful during an organizational change. Understanding these affective states provides insight into the complex ways individuals respond to uncertainty. Building on this, Warr and colleagues (2014) introduce the EGNOP framework, which categorizes emotions into four quadrants based on valence and arousal, focusing on workplace-specific emotional experiences such as enjoyment, guilt, neutrality, and anxiety. As shown in Figure 1.1., this framework complements the Circumplex Model by providing practical insights into how specific emotional states influence behavior and decision-making in organizational contexts, particularly under dynamic and uncertain conditions.

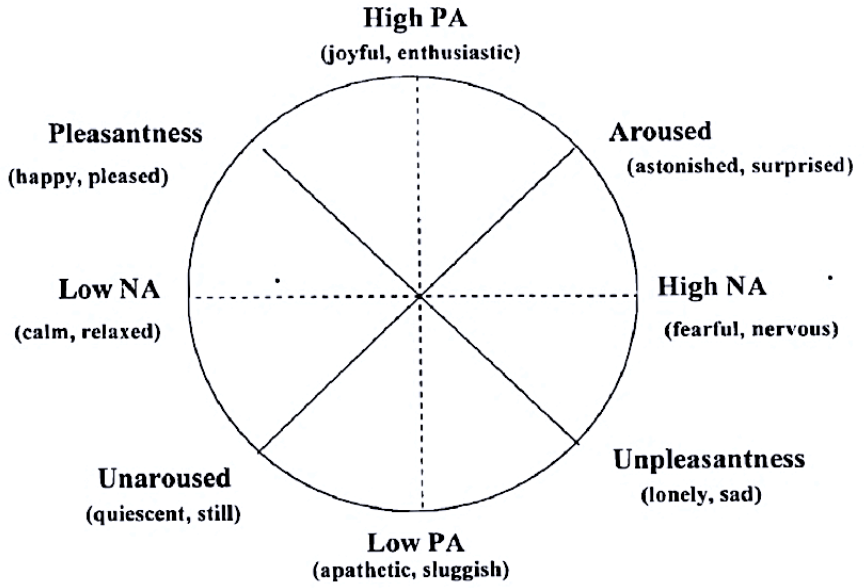


Figure 1.1. The Circumplex Model of Affect (Watson & Tellegen, 1985)

In summary, emotion and affect play pivotal roles in shaping how individuals navigate uncertainty in the workplace. While emotions are immediate and transient reactions, affect encompasses enduring emotional states that mediate the relationship between uncertainty and workplace outcomes. Among these, negative affect emerges as a critical factor, intensifying

emotional reactivity, impairing cognitive functioning, and driving avoidance behaviors. Its central role underscores the importance of addressing the affective dimensions of uncertainty to better understand and support employees' adaptive responses in dynamic and unpredictable work environments.

However, the ways in which individuals experience and manage these emotional and affective responses are not solely intrinsic. External factors, such as perceived leadership effectiveness, can significantly influence how employees interpret uncertainty and regulate their affective states. Leadership has the potential to either exacerbate the negative effects of uncertainty or provide a stabilizing force that mitigates its impact. Understanding the role of leadership in moderating these dynamics is essential for fostering resilience and adaptability in uncertain organizational contexts.

1.6. The Role of Leadership Effectiveness as a Moderator

1.6.1. Historical Context of Leadership Research

Leadership effectiveness has been a focal point of research for decades, evolving through multiple theoretical paradigms. Early leadership theories, such as the "Great Man" theory (Carlyle, 1841), posited that leaders are born with inherent traits that predispose them to greatness. Over time, this perspective gave way to more dynamic models emphasizing the interplay between leaders, followers, and contextual factors (Antonakis & Day, 2017; Dinh et al., 2014). Transformational and transactional leadership theories highlighted the relational aspects of leadership, such as vision, motivation, and the ability to foster trust, which are critical during periods of uncertainty (Bass, 1990).

Recent integrative approaches, such as those discussed by Dinh and colleagues (2014) and Yukl (2013) underscored the complexity of leadership as a process. These models integrate cognitive, emotional, and social dimensions, aligning with the multifaceted challenges leaders face in modern organizations. Effective leadership today is not merely about individual traits but involves the ability to navigate uncertainty, align organizational goals, and inspire collective action.

1.6.2. Leadership Effectiveness in the Face of Uncertainty

In contemporary organizational contexts, leadership effectiveness plays a pivotal role in managing uncertainty driven challenges by providing clarity, stability, and direction. Research has shown that during uncertain times, employees look to leaders for guidance and emotional support, making leadership effectiveness an essential buffer against the adverse effects of ambiguity (Cicero et al., 2010a; Liu et al., 2019; Zaccaro & Klimoski, 200).

Effective leaders reduce the negative impacts of uncertainty by fostering trust, promoting transparent communication, and creating a psychologically safe work environment. Such leaders encourage resilience and adaptability among employees, enabling them to navigate complex and unpredictable situations without compromising their performance (Goleman, 1998; Wright & Cropanzano, 2000).

1.6.3. Defining Leadership Effectiveness

Leadership effectiveness is broadly defined as the ability of a leader to inspire and guide followers toward achieving organizational goals, fostering productivity, and enhancing employee well-being (Northouse, 2018; Yukl, 2013). Effective leaders create a shared vision and align their teams with organizational objectives, often making personal sacrifices to build trust and loyalty (Avolio & Locke, 2002; Yammarino & Bass, 1990). Such leaders are perceived as fair, inspiring, and emotionally intelligent, which are critical traits in managing uncertainty and fostering a positive organizational climate (Bar-On, 2006).

Leadership effectiveness is also characterized by the ability to motivate employees, resolve conflicts, and maintain a cohesive team (Yukl, 2013). These qualities are particularly important in uncertain environments where employees may experience heightened stress and anxiety (Hargrove, 2018). By addressing these emotional needs, leaders not only enhance individual well-being but also contribute to organizational resilience (Ceri-Booms et al., 2017).

1.6.4. Leadership Effectiveness and Employee Outcomes

The link between leadership effectiveness and employee outcomes is well-documented. Effective leaders are associated with higher levels of job satisfaction, organizational commitment, and overall productivity (Ceri-Booms et al., 2017; Madanchian et al., 2017). They foster a positive emotional climate that mitigates the negative effects of stress and uncertainty, enabling employees

to maintain high levels of engagement and performance (Wright & Cropanzano, 2000; Bakker & Demerouti, 2007).

Moreover, leadership effectiveness significantly impacts team cohesion and collaboration. Research has demonstrated that effective leaders excel at aligning team efforts with organizational goals, fostering a sense of shared purpose and identity (Knippenberg et al., 2004). This alignment enhances motivation and cooperation, creating a work environment that thrives even in uncertain conditions.

1.6.5. Moderating Role of Leadership Effectiveness

Leadership effectiveness serves as a critical moderator in the relationship between uncertainty and employee outcomes. In uncertain environments, employees often face resource depletion, emotional strain, and performance challenges. Drawing on the Conservation of Resources (COR) theory, effective leaders act as resource providers, offering emotional support, clear communication, and constructive feedback, which help employees manage the stress associated with uncertainty (Halbesleben et al., 2014; Hobfoll, 1989).

Research by Judge and Piccolo (2004) highlighted that effective leaders mitigate the adverse effects of uncertainty by fostering psychological safety and reducing ambiguity. This moderating effect is especially significant in remote work contexts, where employees may feel isolated and unsupported (Edmondson, 1999). Leaders perceived as effective play a crucial role in maintaining team morale, ensuring that employees remain engaged and productive despite physical distance (Avolio & Bass, 2004; Yukl, 2013).

This theoretical framework is exemplified in one of the thesis studies, *"Perceived Effects of Teleworking on Adaptive Performance: A Moderated Mediation Model of Leadership Effectiveness and Negative Affect."* The study applied COR theory to examine how teleworking perceptions influence adaptive performance through the mediating role of negative affect, with leadership effectiveness serving as a moderator. The findings revealed that while teleworking can trigger negative emotional responses due to uncertainty and resource depletion, effective leadership mitigates these effects. Leaders who are perceived as effective provide essential resources, such as emotional support and clear direction, reducing negative affect and enhancing adaptive performance. Conversely, when leaders are perceived as less effective, the indirect effect

of teleworking perceptions on adaptive performance through negative affect becomes more pronounced.

1.7. The Role of Mindfulness as Moderator

Mindfulness has become an increasingly prominent concept in psychological research and organizational practice, offering a wealth of insights into how individuals manage their thoughts, emotions, and behaviors in the face of challenges. Its origins lie in ancient Eastern traditions, particularly Buddhist teachings, where mindfulness serves as a path to spiritual enlightenment, ethical living, and emotional balance. Over the past several decades, Western psychology has adapted and expanded this concept, applying it as a practical tool for enhancing mental health, emotional regulation, and workplace performance (Baer, 2003; Kabat-Zinn, 1990; Langer, 1989).

1.7.1. Eastern Perspective on Mindfulness

Mindfulness, as it originated in Eastern traditions, is deeply rooted in meditation practices that aim to cultivate present-moment awareness, non-judgmental acceptance, and compassion. The Pali term *sati* encapsulates this essence, emphasizing heightened awareness of thoughts, emotions, and sensations without attachment or aversion (Germer, 2013). This form of mindfulness is often described as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally," as defined by Kabat-Zinn (2003, p. 145). This intentional and non-judgmental focus is transformative, fostering emotional stability, self-awareness, and clarity.

The Buddhist approach to mindfulness places significant emphasis on internal attitudes and virtues, such as compassion, patience, and detachment from ego-driven desires. This perspective frames mindfulness as a tool to transcend reactive patterns of thought and behavior, promoting a serene and balanced state of mind (Moore & Gardner, 2014). These attitudes form the foundation of mindfulness practices and are integral to developing emotional regulation and resilience in daily life.

Research has consistently demonstrated the psychological benefits of this form of mindfulness. It has been shown to reduce stress, enhance emotional regulation, and improve overall well-being (Keng et al., 2011; Sinha & Brown, 2014). By fostering an attitude of acceptance and openness, mindfulness helps individuals navigate challenges with a sense of calm and control, even in complex or uncertain situations.

1.7.2. The Seven Attitudinal Components of Mindfulness

Kabat-Zinn (1990) outlined seven core attitudinal components of mindfulness, which collectively nurture a holistic and compassionate approach to life's experiences:

1. Non-Judging: This principle involves observing thoughts, emotions, and sensations without labeling them as good or bad. By maintaining an unbiased perspective, individuals can deepen their awareness and enhance emotional regulation, reducing anxiety and promoting clarity (Keng et al., 2011). For example, a professional experiencing stress during a meeting might recognize their emotions without self-criticism, enabling them to respond calmly.
2. Patience: Patience fosters a sense of tranquility by encouraging individuals to accept the natural flow of thoughts and feelings without rushing to resolve them. This principle is linked to greater resilience and psychological well-being (Sinha & Brown, 2014). For instance, an employee awaiting feedback on a project might use patience to manage their anxiety and maintain focus on other tasks.
3. Beginner's Mind: Adopting a beginner's mind means approaching each experience with curiosity and openness, treating it as new and unique. This mindset challenges habitual patterns, fostering creativity and innovative problem-solving (Brown & Ryan, 2003). For example, a seasoned team leader might explore fresh approaches to addressing recurring issues, rather than relying on past solutions.
4. Trust: Trust encourages individuals to rely on their intuition and internal values, particularly when navigating uncertainties. This principle promotes confidence and resilience, enabling better decision-making (Siegel, 2007). For example, a manager making a critical decision might reflect on past experiences and trust their judgment instead of solely relying on external opinions.
5. Non-Striving: Non-striving focuses on accepting the present moment as it is, rather than fixating on specific outcomes. This principle reduces stress and fosters contentment by shifting attention to the process rather than the result (Brown & Ryan, 2003). For instance, a professional might focus on the joy of engaging in a task rather than stressing about its completion.
6. Acceptance: Acceptance involves acknowledging life's experiences without resistance or unrealistic expectations. This attitude promotes emotional healing and growth (Hayes et al.,

2006). For example, a team member struggling with workload pressures might practice acceptance by seeking support and prioritizing tasks effectively.

7. Letting Go: Letting go encourages individuals to release attachments to past grievances or future anxieties, enabling a focus on the present moment (Neff, 2003). For example, a professional preparing for an important presentation might let go of self-doubt and channel their energy into delivering their best performance.

These seven components provide a comprehensive framework for practicing mindfulness in daily life, fostering emotional balance, creativity, and resilience.

1.7.3. Western Adaptation: Langer's Socio-Cognitive Perspective

While mindfulness in the Eastern tradition emphasizes meditation and spiritual awakening, the Western conceptualization of mindfulness takes a distinctly cognitive and practical approach. A key contributor to this development was Ellen Langer, who redefined mindfulness as a dynamic and context-sensitive cognitive process. Her socio-cognitive perspective views mindfulness as an active engagement with the present moment, characterized by openness to new information, heightened awareness of one's environment, and cognitive flexibility (Langer, 1989; 1997b).

Unlike the meditative focus of traditional Eastern practices, Langer's mindfulness does not require formal meditation. Instead, it is seen as a flexible and adaptive state of mind, where individuals consciously engage with their surroundings and recognize novel patterns or perspectives. This approach has become particularly relevant in organizational contexts, where employees face complex, uncertain, and rapidly changing environments.

1.7.4. The Distinction Between Mindfulness and Mindlessness

Langer's framework draws a clear distinction between mindfulness and mindlessness, the latter being a state of cognitive autopilot characterized by habitual, rigid behaviors and a lack of awareness. Mindlessness leads individuals to rely on routine responses, often overlooking opportunities for innovation or adaptation. In contrast, mindfulness involves active engagement, where individuals notice changes, seek out new information, and challenge ingrained assumptions (Langer, 1997a).

For example, in a fast-paced workplace, a mindless employee may continue to follow outdated processes, whereas a mindful one might identify inefficiencies and propose creative solutions. This

distinction underscores the critical role of mindfulness in fostering adaptability and resilience in modern organizational settings.

1.7.5. Key Dimensions of Langer's Mindfulness

Langer's socio-cognitive approach to mindfulness emphasizes several foundational dimensions—novelty seeking, novelty production, engagement, and flexibility—which provide valuable insights into how attention, perception, and decision-making manifest in mindful behaviors. These dimensions hold particular significance in organizational settings:

1. Novelty Seeking: Individuals who are mindful tend to actively seek novel experiences and pay close attention to the subtle dynamics of their surroundings. This deliberate focus on the present moment, akin to attention, enables them to recognize emerging opportunities and respond adaptively to changing conditions (Langer, 1989; Dane, 2011).
2. Novelty Production: Beyond the pursuit of new experiences, mindfulness encourages the reinterpretation of existing knowledge in novel ways, fostering innovative solutions. This capacity for reexamining assumptions and exploring fresh perspectives reflects the perceptual openness central to critical thinking and creative problem-solving (Brown & Ryan, 2003).
3. Engagement: Mindfulness supports a high degree of engagement, wherein individuals approach tasks with focused attention and an openness to diverse viewpoints. This engaged stance facilitates informed decision-making processes, characterized by the ability to evaluate multiple alternatives and arrive at thoughtful conclusions (Langer, 1997; Levinthal & Rerup, 2006).

1.7.6. Mindfulness Applications in Organizational Contexts

The socio-cognitive perspective of mindfulness has significant implications for workplace dynamics, particularly in fostering adaptability, creativity, and resilience. Research has shown that mindfulness enhances emotional regulation, cognitive engagement, and interpersonal relationships, all of which are critical for navigating the demands of modern organizations (Glomb et al., 2011; Shapiro et al., 2006). These outcomes highlight mindfulness as a powerful tool for managing uncertainty and complexity.

Mindfulness has been shown to improve emotional regulation, allowing individuals to manage stress and maintain composure in high-pressure situations (Hölzel, 2011). Langer's framework suggests that mindful employees are better equipped to respond to stressors with clarity and calmness, reducing the likelihood of burnout (Glomb et al., 2011). For instance, in a crisis, a mindful manager might evaluate the situation objectively and take decisive action, while remaining empathetic to the needs of their team.

Cognitive flexibility, a cornerstone of Langer's mindfulness approach, enables individuals to adapt their thinking and behavior in response to changing circumstances. This adaptability is crucial in dynamic workplaces, where employees must frequently reassess priorities and explore creative approaches. Studies have demonstrated that mindfulness fosters innovation by encouraging employees to challenge existing norms and consider alternative solutions (Levinthal & Rerup, 2006; Trent et al., 2016). For example, an employee facing a sudden shift in project requirements might leverage mindfulness to explore new strategies, leading to more effective outcomes. This proactive mindset not only enhances individual performance but also contributes to organizational success.

Mindfulness also plays a vital role in improving interpersonal dynamics within organizations. By fostering empathy, emotional intelligence, and active listening, mindfulness strengthens collaboration and communication among team members (Shapiro et al., 2006). Langer (2000) highlighted that mindful employees are more attuned to the needs and perspectives of their colleagues, facilitating smoother teamwork and conflict resolution.

In addition, mindfulness can enhance leadership effectiveness. Leaders who practice mindfulness are more likely to inspire trust and loyalty, as their heightened awareness allows them to address challenges with sensitivity and authenticity (Davidson et al., 2003). This leadership quality is particularly valuable in uncertain environments, where employees look to their leaders for guidance and stability.

In summary, Langer's socio-cognitive mindfulness theory has profound implications for organizational settings, particularly in navigating uncertainty. Mindful employees are better equipped to manage stress, adapt to dynamic environments, and collaborate effectively with colleagues (Glomb et al., 2011; Shapiro et al., 2006). This adaptability is critical in workplaces where volatility and complexity are common, as mindfulness promotes cognitive flexibility and resilience.

Research has demonstrated that mindful individuals exhibit enhanced emotional regulation and problem-solving abilities, which are essential for managing the challenges of modern organizational life (Good et al., 2016). For example, a mindful team leader might foster innovation by encouraging diverse perspectives and remaining open to unconventional solutions.

1.7.7. Navigating Uncertainty with Mindfulness

According to the integrative model of uncertainty tolerance, individual traits like mindfulness influence how people perceive and respond to ambiguity (Hillen et al., 2017). Mindful individuals are more likely to approach uncertainty with curiosity and openness, viewing it as an opportunity for growth rather than a threat.

This ability to embrace uncertainty aligns with Langer's emphasis on contextual awareness and adaptability. By remaining present and attentive, mindful employees can identify opportunities amidst ambiguity and make informed decisions that drive positive outcomes (Donald et al., 2020).

The connection between mindfulness and uncertainty can also be understood through Affective Events Theory (AET) and cognitive appraisal theory. AET posits that workplace events trigger emotional responses that influence attitudes and behaviors, while cognitive appraisal theory suggests that individuals evaluate events as either threats or challenges based on their perceived resources to cope (Lazarus, 1991; Weiss & Cropanzano, 1996). Mindfulness enhances individuals' ability to appraise situations adaptively, mitigating the impact of negative affect and fostering a balanced perspective on workplace events. For example, research has shown that mindfulness reduces the emotional reactivity associated with daily hassles, enabling individuals to regulate their responses and maintain well-being (Williams, 2008). This dynamic is particularly relevant in environments characterized by high uncertainty, where employees must continually adapt to shifting demands and expectations.

The thesis study titled *"A Within-Individual Study on the Relationship between Daily Uncertainty and Daily Adaptive Performance: The Moderating Role of Daily Mindfulness"* explored mindfulness as a critical factor in managing uncertainty. Using a multilevel diary approach, this research demonstrated that mindfulness moderates the relationship between uncertainty and adaptive performance, buffering the negative effects of uncertainty by reducing emotional reactivity and enhancing cognitive flexibility.

This connection underscores the practical significance of mindfulness in organizational contexts, highlighting its potential to foster resilience, adaptability, and well-being. By integrating mindfulness into workplace practices, organizations can support employees in managing uncertainty, achieving higher performance, and maintaining emotional balance.

1.8. The Influence of Daily Micro-Events on Uncertainty and Affect

1.8.1. Introduction to Micro-Events: Daily Uplifts and Hassles

Daily micro-events are minor yet impactful occurrences that punctuate employees' workdays, shaping their emotional experiences, well-being, and performance (Junça-Silva et al., 2017; Ohly et al., 2010). These events are broadly categorized into daily uplifts and daily hassles, representing the positive and negative dimensions of everyday experiences (Weiss & Cropanzano, 1996).

Daily uplifts are small, positive occurrences that enhance well-being and foster positive emotions (Kanner et al., 1981). Examples include receiving a compliment, completing a task successfully, achieving a minor goal, or sharing a pleasant interaction with a colleague. These events contribute to building resilience, improving mood, and increasing overall life and job satisfaction (Cropanzano & Dasborough, 2015). In contrast, daily hassles are minor irritations or stressors that disrupt routine activities and contribute to emotional strain (Kanner et al., 1981). Examples include dealing with slow technology, resolving interpersonal conflicts, or managing unforeseen challenges. These negative experiences can accumulate over time, leading to heightened stress, decreased performance, and negative emotional states (Chacko & Conway, 2019; Junça-Silva & Caetano, 2023; Junça-Silva et al., 2020).

The dual nature of micro-events highlights their profound influence on workplace dynamics. Daily uplifts act as buffers against stress, promoting emotional stability and reinforcing confidence. Conversely, daily hassles amplify feelings of uncertainty, undermining employees' emotional well-being and task performance. This dichotomy underscores the need to investigate how such events interact with key workplace constructs, particularly uncertainty and affect.

1.8.2. Uncertainty as a Mediating Mechanism of Micro-Events

Uncertainty plays a pivotal role in determining the impact of daily micro-events on employees' affective and cognitive processes. Rooted in Affective Events Theory (AET; Weiss & Cropanzano,

1996), the relationship between daily micro-events and workplace outcomes is mediated through emotional and cognitive evaluations of uncertainty. Micro-events influence how employees perceive their work environment, triggering emotional responses that shape their perceptions of certainty or ambiguity regarding tasks, relationships, and organizational goals.

Negative micro-events, such as missed deadlines or conflicts, exacerbate uncertainty by introducing ambiguity into relationships, tasks, and goals. This uncertainty heightens stress and fosters negative affect, reducing employees' capacity to manage their responsibilities effectively (Chen & Hong, 2010; Vischer, 2007). Conversely, positive micro-events, such as receiving recognition or achieving progress in a task, counteract uncertainty by fostering clarity and confidence, thereby promoting positive emotional states (Junça-Silva et al., 2023).

1.8.3. Affective Events Theory: Theoretical Foundations

Affective Events Theory (AET), proposed by Weiss and Cropanzano (1996), provides a robust framework for understanding the relationship between workplace events, emotional reactions, and their outcomes. According to AET, workplace events, such as daily uplifts and hassles, directly influence employees' affective states, which, in turn, shape attitudes and behaviors.

AET distinguishes between affect-driven behaviors (e.g., spontaneous emotional responses such as helping or retaliating) and judgment-driven behaviors (e.g., deliberate actions based on evaluations, such as quitting or improving performance). This dual pathway emphasizes that emotional experiences at work are dynamic and multifaceted, influencing immediate reactions and long-term attitudes such as job satisfaction and organizational commitment.

As illustrated in Figure 1.2., AET underscores how daily micro-events evoke emotional responses that shape workplace outcomes. Positive micro-events induce positive emotions like joy and gratitude, which enhance satisfaction and resilience. Negative micro-events evoke emotions such as anger or frustration, which increase uncertainty and diminish well-being. These emotional states act as intermediaries between micro-events and behaviors, directly influencing affect-driven reactions and indirectly shaping judgment-driven decisions.

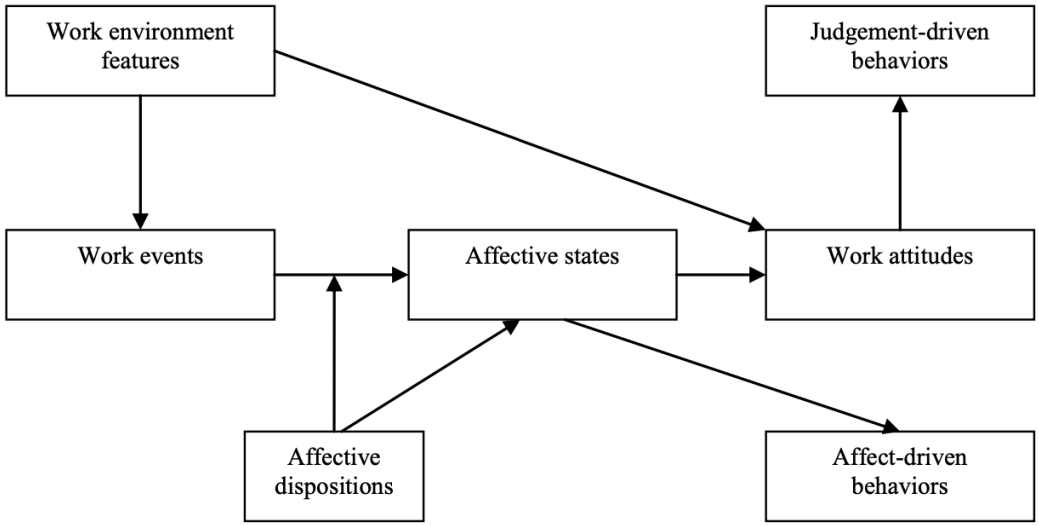


Figure 1.2 The Affective Events Theory Framework (Weiss & Cropanzano, 1996)

1.8.4. Cognitive Appraisal and Emotional Responses to Micro-Events

The cognitive appraisal theory (Lazarus, 1991) further elucidates how employees interpret micro-events and their impact on uncertainty and affect. Employees evaluate daily events based on their perceived significance to personal and professional goals. Positive micro-events are appraised as congruent with these goals, fostering positive affective states that enhance clarity, stability, and confidence. Negative micro-events, on the other hand, are appraised as incongruent, increasing ambiguity and triggering negative emotional states.

This appraisal process is integral to understanding how micro-events influence employees' perceptions of their work environment. Positive affect generated by uplifts reduces uncertainty by promoting a sense of control and predictability. In contrast, negative affect resulting from hassles exacerbates uncertainty, creating additional challenges in decision-making and performance.

1.8.5. Integrating the Role of Uncertainty Tolerance

The Integrative Model of Uncertainty Tolerance (IMUT) complements AET by introducing individual differences in how employees respond to uncertainty. Employees with higher tolerance for uncertainty are better equipped to manage the unpredictability associated with daily hassles, maintaining stable affective states and performance. Conversely, those with lower uncertainty

tolerance are more likely to experience heightened stress and impaired performance in response to negative micro-events.

Integrating IMUT with AET provides a nuanced understanding of the interplay between micro-events, uncertainty, and affect. It highlights how individual characteristics modulate emotional and cognitive responses, offering valuable insights for organizations seeking to foster resilience and adaptability in their workforce.

The study titled *"How Daily Micro-Events Influence Employees' Daily Overall Health: A Parallel Mediation Path through Daily Uncertainty and Daily Affect"* builded on these theoretical foundations to examine the intricate dynamics between micro-events, uncertainty, and affect. Employing a multilevel diary methodology, this research collected data from 243 employees over five workdays, resulting in 1,215 observations. The findings of the study underscored the mediating role of uncertainty and affect in the relationship between daily micro-events and overall health. Positive micro-events were found to reduce uncertainty, enhancing positive affect and improving health outcomes. Conversely, negative micro-events heightened uncertainty, eliciting negative affect and deteriorating health outcomes. These results extend AET by incorporating uncertainty as a mediating mechanism and highlight the moderating role of individual differences through IMUT. By elucidating the interplay between daily micro-events, uncertainty, and affect, this study advances theoretical frameworks and offers practical implications for promoting employee well-being and health.

In conclusion, this exploration of daily micro-events, uncertainty, and affect reveals their profound influence on employees' emotional and cognitive experiences. By integrating the dual pathways of AET and the individual differences highlighted in IMUT, this study has demonstrated the complex mechanisms through which uplifts and hassles shape workplace dynamics. These findings provide a foundation for understanding how organizations can foster healthier, more productive work environments by addressing uncertainty and enhancing positive emotional experiences. The next section presents an "Overview of the Thesis" synthesizing the findings across all studies and highlights their contributions to organizational psychology, and outlines future research directions.

1.9. Aim and Overview of the Thesis

This thesis explored the complexities organizations encounter in today's volatile, uncertain, complex, and ambiguous environments. The empirical studies in this thesis aimed to explore the multifaceted role of uncertainty in organizational contexts, addressing its psychological mechanisms, contextual moderators, and impacts on employee outcomes. Each study builded on the theoretical foundation of uncertainty and its dimensions, advancing our understanding of how employees and organizations navigate this pervasive challenge.

1.9.1. Study 1: A Systematic Review of the VUCA Framework

This study clarified the conceptual foundation of the VUCA framework, with a particular focus on uncertainty as one of its core components. By systematically reviewing existing literature, it identified theoretical gaps and established a comprehensive conceptual map that highlighted the interplay between volatility, uncertainty, complexity, and ambiguity. This study provided a theoretical foundation for understanding how uncertainty interacts with other organizational challenges, setting the stage for subsequent empirical investigations. Contribution: It offers the first systematic review that conceptualizes the VUCA framework in-depth, enhancing theoretical precision and providing validated definitions for uncertainty-related constructs. To date, it has been cited 36 times in Web of Science, 55 times in Scopus, and 134 times in Google Scholar.

1.9.2. Study 2: Telework, Leadership, and Adaptive Performance

This study examined the uncertainties inherent in teleworking contexts, including role ambiguity and technological dependencies. It explored how leadership effectiveness moderates the relationship between telework-related uncertainty and adaptive performance, with negative affect as a mediating mechanism. The findings underscored the importance of clear leadership communication and support in mitigating the negative effects of telework-induced uncertainty. Contribution: It extends the Conservation of Resources (COR) theory to telework contexts, identifying leadership as a key buffer against uncertainty's negative impacts on performance.

1.9.3. Study 3: Daily Uncertainty and Adaptive Performance

This within-person study investigated how daily fluctuations in uncertainty influence adaptive performance. It also examined mindfulness as a critical individual factor moderating this relationship and reducing the adverse effects of uncertainty. By using diary methodologies, this study uncovered the dynamic nature of uncertainty and its psychological effects on a day-to-day basis.

Contribution: It expands the Integrative Model of Uncertainty Tolerance (IMUT) by demonstrating how mindfulness serves as a resource for managing uncertainty, advancing our understanding of individual-level adaptation.

1.9.4. Study 4: Micro-Events, Uncertainty, and Employee Health

This study explored how daily micro-events, such as workplace hassles and uplifts, influenced overall health through uncertainty and affect as mediators. By examining temporal dynamics, it revealed how uncertainty accumulates over time, impacting employees' physical and psychological well-being.

Contribution: It advances Affective Events Theory (AET) by incorporating uncertainty and demonstrating how it mediates the relationship between daily events and health outcomes, offering insights into the temporal nature of uncertainty effects.

1.9.5. Interconnections Among Studies

Together, these studies provide a multidimensional perspective on organizational uncertainty:

- Study 1 lays the conceptual groundwork by clarifying uncertainty's role within the VUCA framework.
- Study 2 addresses contextual factors, highlighting how leadership mitigates uncertainty's impact in telework environments.
- Study 3 examines individual factors, focusing on mindfulness as a resource for managing uncertainty.
- Study 4 integrates daily-level dynamics, emphasizing the cumulative effects of micro-events and uncertainty on health.

Together, these studies contribute to a comprehensive understanding of uncertainty's psychological, contextual, and temporal dimensions, offering theoretical advancements and

practical strategies for navigating uncertainty in modern organizations. The following chapters present each study in detail, beginning with the systematic review of the VUCA framework in Chapter 2.

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CHAPTER II

Clarifying the Conceptual Map of VUCA: a Systematic Review[1]

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2.1. Abstract

Purpose – Over the last few decades, the environment for organisations has been frequently described using the acronym VUCA: a volatile, uncertain, complex, and ambiguous environment. Despite the popularity of this acronym, it is not unusual to find some overlap concerning the meaning of those terms, as well as poor definitions of each in the literature. Consequently, the main aim of this paper was to conduct a systematic literature review to obtain a conceptual map of the components of VUCA and their relationships and to highlight some avenues for future research.

Design/methodology/approach – The authors conducted a systematic review of various databases between 1999 and 2021. A total of 833 papers were identified and 26 of them met the inclusion criteria for the current study.

Findings – The subsequent analysis revealed several overlaps and relationships between the four terms. Based on this analysis, we propose a conceptual map that could serve as a basis for future research and practice.

Research limitations – Due to the exploratory nature of the study and the scarce number of empirical studies, the impact that the use of the VUCA framework has had on businesses could not be addressed.

Originality – By clarifying the different components of VUCA and specifying the relationships between them with a comprehensive conceptual map, this paper may contribute to more rigorous empirical research, as well as help managers and executives more effectively deal with turbulent environments.

Keywords: VUCA; volatility; uncertainty; complexity; ambiguity.

2.2. Introduction

Change in the business world is not new; what is new is the acceleration of change and innovation that organisations have had to face almost constantly. As a result, this has increased the levels of unpredictability and complexity, including unforeseen problems and vulnerability which require new strategies and skills (e.g., Child and Rodrigues, 2011).

This poses new challenges to strategic management that tries to respond effectively to such a dynamic environment. Several theoretical frameworks have emerged in recent decades and can be useful to help organisations effectively interact with larger systems to survive and achieve their goals (e.g., Allen et al., 2011; Boisot and Mckelvey, 2010; Scott and Davis, 2006). For instance, organisations can be seen as complex adaptive systems (CAS), an approach based on physics and biological systems. This framework enunciates several major processes like adaptation, emergence, self-organisation, and cooperation involved in the CAS interaction with their environments and can generate helpful insights to understand and navigate an unpredictable or "chaotic" world (e.g., Allen et al., 2011). However, despite organisational dynamics and adaptation benefits from self-organising phenomena and emergent processes, most organisations do not exist as complete self-organising systems, like biological beings. For instance, business purposes and goals require directing efforts and resources according to (hierarchical) strategic decisions. Implementing these decisions compels superordinate coordination of the diverse organisation parts to achieve specific goals (e.g., profit), in parallel or above the general adaptive survival purpose. Even if some parts of the organisation might operate autonomously as self-organising sub-systems, specific strategic decision making requires a (bounded) interpretation of fast-changing phenomena, frequently unforeseen, to interact with their environments and try to achieve the intended targets. Nowadays, it is in the interface with the larger environmental system that, too frequently, the strategic management must decodify and make sense of volatile, uncertain, complex, and ambiguous data and information to assure organisational success.

This problem emerged and was addressed a few decades ago in the context of a traditional hierarchical organisation, and since then has been treated by practitioners and scholars under the umbrella of the acronym VUCA (volatility, uncertainty, complexity, and ambiguity).

The acronym was coined by the U.S. Army War College in the late 1990s. It is a military-derived acronym to describe the "multipolar new world order" after the end of the Cold War era. It was later applied to the business environment to describe chaotic, unstable, and rapidly changing

work settings (Lawrence, 2013, p. 3). Since the birth of the acronym VUCA it has also been used to describe the contemporary strategic environment (e.g., Johansen and Euchner, 2013), as it encompasses technological changes, global economic conditions, unstable financial markets, and consumer behaviour. In the business world, VUCA gained more salience after the 2008 global financial crisis and refers to the unstable and chaotic business, economic, and physical environment that everyone faces every day (Sullivan, 2012). Since 2020, the Covid-19 pandemic has increased its relevance in describing the main facets of the environment for most organisations.

Volatile environments are places where many things change rapidly, but there is no predictable trend or repeatable pattern (Sullivan, 2012). *Uncertainty* can be defined as "a term used to describe a situation characterised by a lack of knowledge, not as to cause an effect but rather about whether a certain event is significant enough to constitute a meaningful cause" (Bennett and Lemoine, 2014, p. 314). Volatile and uncertain situations differ from one another. Although change is more likely in volatile conditions, it may occur rapidly and in varying magnitudes. Nevertheless, there may be no inherent change in an uncertain situation (Bennett and Lemoine, 2014, p. 314). A *complex* situation is characterised by many interconnected parts, making it difficult to understand the reasons and factors in a problem (Sullivan, 2012). When a situation is complex, it might not necessarily be volatile or uncertain. *Ambiguous* situations can be defined as one in which the causes and the "who, what, where, when, how, and why" behind the causes and events are difficult to identify (Sullivan, 2012). Ambiguity is also about the reality's haziness and the ambiguous interpretations of many situations. Ambiguity is not equal to volatility, however; there is no reason to expect a rapid, unpredictable, or unstable change in ambiguity. This also differs from complexity. There are not many moving or unstable parts here either. There is simply a lack of information about what will happen next, and this lack of information is different from uncertainty. In an uncertain situation, a person may have an idea of what causes the uncertainty.

In recent years, organisations have faced large and unexpected events, such as financial crises, the Covid-19 pandemic, climate change, and war, with a large impact on the world at several economic and societal levels, and the acronym VUCA has been frequently used by scholars and practitioners to try to understand such environmental dynamics (e.g., Bennett and Lemoine, 2014; Codreanu, 2016; Du and Chen, 2018). However, it is not unusual to find some overlap regarding the meaning of its components, as well as poor definitions of each one and the relationships between them, which may undermine the accuracy of the VUCA acronym to categorise and

interpret the information from the environment, as well as its usefulness to adaptive decisions and actions at the strategic and operational levels of the organisation. To better understand what people are saying when they are talking about VUCA and to apply it more effectively in business, it is important to know the specific meanings of its components. Therefore, we conducted a systematic review with the main aim of clarifying the definitions of the elements of the acronym VUCA. As a key contribution to the literature, this paper clarifies the different features of VUCA by comprehensively mapping the constructs involved.

2.3. Research Methodology: A Systematic Review of the VUCA Literature

A methodological and objective way to develop information more profoundly about a particular subject is by conducting a systematic literature review (Briner and Denyer, 2012). Literature reviews adhere to a strict set of criteria and use a procedure that is transparent, repeatable, and scientific (Tranfield *et al*., 2003), increases internal validity, and achieves transparency using an auditable procedure (Booth *et al*., 2012). Conducting a systematic literature review allowed us to obtain robust findings through an evidence-informed approach based on rigor in terms of selection criteria, analyses, and reporting (Denyer and Tranfield, 2009). We undertook this systematic literature evaluation to improve methodological rigor, replicability, and communication about the fragmented body of research on VUCA. Denyer and Tranfield (2009) suggested five steps for conducting systematic reviews, which were followed in the paper (Figure 2.1.).

2.3.1. Question Formulation

The systematic review's initial stage was to identify the study's scope (Booth *et al*., 2012; Rothman *et al*., 2019), as well as to minimise ambiguity by defining and framing the review question (Rousseau *et al*., 2008), as mentioned previously. A conceptual definition of VUCA was sought specifically by studying the existing literature and creating a thorough framework via a concept map. So, the aim is to answer the following review question: to inform research and practice, how might the constructs of the acronym VUCA be defined?

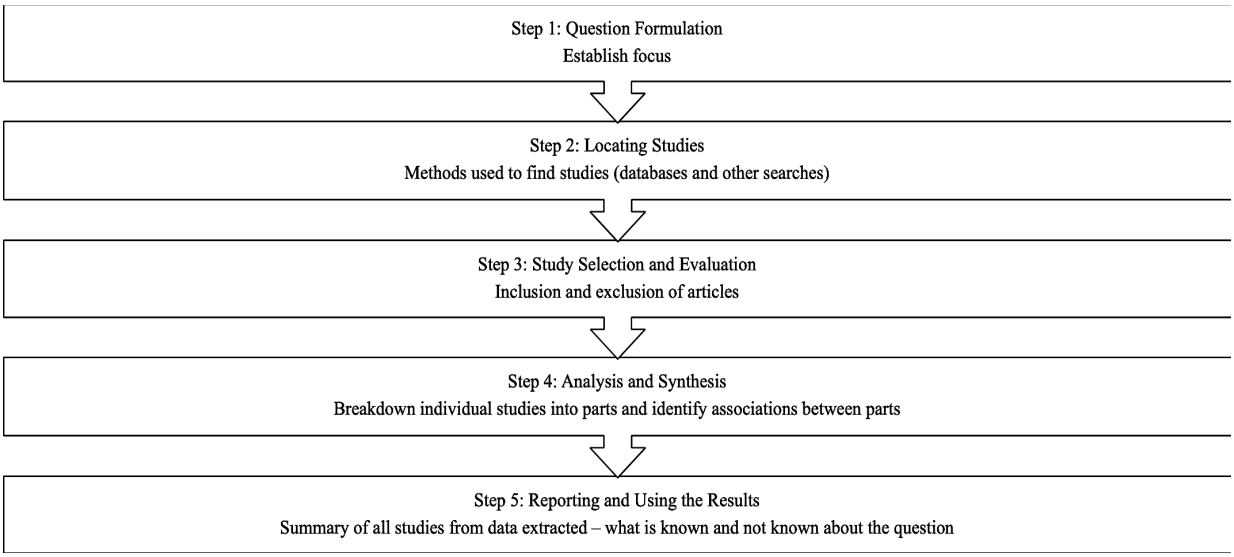


Figure 2.1. Steps for Conducting a Systematic Literature Review (Adapted from Denyer and Tranfield, 2009)

2.3.2. Locating Studies

This phase entailed scanning relevant papers and selecting and evaluating relevant contributions to the original query (Denyer and Tranfield, 2009). To reduce bias and cover a wide range of sources, several web databases were examined. The literature review was done using EBSCO (Academic Search Complete and Business Source Complete), Emerald, Science Direct, ABI/Inform Global, Web of Knowledge, and Wiley Online, among other library databases. Similar researchers have used these datasets since they are large and freely available at academic institutions (Tukamuhabwa *et al*., 2015). "Volatility," "uncertainty," "complexity," and "ambiguity" were chosen as search criteria. These terms were used to create search strings that included a Boolean connector: "AND" (Table 2.1.). The investigations were to be located between 1999 and 2021. This process resulted in the identification of a total of 833 potentially relevant studies available up to January 2021. However, most of them were practitioner papers, not scientific papers. VUCA is a buzzword and has been frequently used by managers in practitioner papers and journals. This may explain the rarity of scientific papers about VUCA. As a result, after reading the abstracts of these studies, 643 were excluded from a further review step because of their duplication, irrelevancy, or failure to include all components of VUCA and the criteria of interest for this study. After excluding these papers, 190 studies remained to review for inclusion

in this review. The introduction and the conclusion of these papers were read to determine their relevance, after which 164 papers were excluded, and 33 papers remained for the next step of screening. Full document screening was applied to all remaining papers and 26 papers were chosen for this study.

Table 2.1. Inclusion Criteria for the Systematic Literature Review of VUCA

Inclusion Criteria	**Rationale**
Published in peer-reviewed journals	Peer-reviewed journals were considered to be of higher quality than non-peer-reviewed articles.
Selection of papers published 1999 – 2021	The year 1999 was selected as a starting point due to the emergence date of studies on VUCA.
Elements of VUCA were addressed within the context of work domains as this is one of the focuses of the paper	The aim of the review was to analyse and map the different features of VUCA to improve conceptual clarity and understanding.
Published in the English language	English was the dominant language in the field.
Inclusion of all the components of VUCA	The focus was on the acronym, so the four components (volatility, uncertainty, complexity, and ambiguity) should be considered.
Different types of articles considered (e.g., empirical, literature review, conceptual)	The focus of the study was to evaluate and synthesise the various constructs inherent to the acronym VUCA.

2.3.3. Study Selection and Evaluation

To ensure that this procedure was transparent, we employed explicit selection criteria to assess the relevance of studies to our research issue (Booth *et al*., 2012). The first screening, which involved reading the titles and abstracts of each item selected, was done using a list of inclusion criteria (Table 1). At this point, 833 papers had been screened. Articles that failed to match the inclusion requirements were irrelevant to the issue, and duplicates were eliminated. The remaining 186 publications were identified as possible candidates for evaluation. The preliminary list was further examined in the second screening by reading the introduction and conclusion of each paper to determine their relevance. This screening resulted in the exclusion of 163 papers due to their lack of relevance to the topic.

Following the two screenings, a total of 33 papers were selected for complete document screening. Each paper was thoroughly reviewed and examined considering the research question. Quality criteria were also used to ensure that the paper's rationale, methodology, execution, methodological rigor, and addition to knowledge were all in line with the objective of this study (Miles and Huberman, 1994). The two screenings resulted in a total of 26 papers undergoing full document screening. Each paper was read in its entirety and analysed concerning the research question. Further, quality criteria were applied to check the alignment of the paper's rationale regarding the topic, methods and execution, methodological rigor, and contribution to knowledge (Miles and Huberman, 1994).

We only selected papers published in peer-reviewed journals based on the Scimago database. The final review included a total of 26 papers.

2.3.4. Criteria for Inclusion

For a study to be included in this paper, there were some inclusion criteria to meet. First, the study had to include all the components of VUCA: volatility, uncertainty, complexity, and ambiguity. Second, various types of papers (conceptual, empirical, literature review, etc.) were considered. Third, only papers that were published between 1999 and 2021 were chosen. Fourth, the components of VUCA were addressed within the context of work domains. Lastly, the language of the papers was English.

2.3.5. Analysis and Synthesis

The purpose of this step was to examine and synthesise the 26 papers chosen in order to obtain new knowledge and insights about the topic that could not be gained by reading each article separately (Denyer and Tranfield, 2009). Each study was broken down into the different features of VUCA, and the analysis was completed by inserting a summary of each of the 26 papers into a Microsoft Excel spreadsheet. The data collected offered a tabulation of all the research papers included in the study, as well as a detailed description of VUCA, which aided in the classification of themes and synthesis. The synthesis was carried out by making connections between the structures that make up the acronym VUCA.

There were several ways used to synthesise the outcomes of the systematic literature review, including aggregation, integration, interpretation, and explanation (Rousseau *et al*., 2008). Due to

the varied nature of the papers reviewed, we adopted an integrative technique. The study discovered 39 critical elements that appear to describe VUCA after analysing and synthesising the literature. Nine constructs emerged concerning Volatility and ten for Uncertainty. Eight constructs were found to underlie Complexity and twelve constructs characterise Ambiguity.

The conceptual and operational definitions of each VUCA component were reviewed using MAXQDA, a qualitative data analysis software.

2.3.6. Reporting and Using the Results

This stage summarised the findings from all the studies chosen, their relationships, and what is known about VUCA (Denyer and Tranfield, 2009). The synthesis that followed was an informed evaluation of the scientific data about the study question, as well as the gaps discovered during the review process (Rousseau *et al*., 2008). The findings on the current state of VUCA studies, as well as the conclusions relating to the three sub-questions, are presented in the following section.

2.4. Results

To comprehensively answer the first sub-question, the definitions of VUCA were examined. Then, to answer sub-question two, we investigated the fundamental aspects that define each VUCA dimension. Finally, by including the VUCA components identified in this analysis, a holistic model was presented to improve conceptual clarity. A concept-mapping framework was used to show the model, which visually illustrated the links between the components.

2.4.1. Descriptive Analysis

According to the criteria, the first paper found to address the acronym VUCA was developed by Bodenhausen and Peery in 2009. Figure 2.2. shows that most VUCA papers were published between 2017 and 2021, providing evidence for the recently growing body of literature and the importance of VUCA in organisational settings.

The papers were published in high-ranked journals covering areas such as business, management, and accounting (Table 2.2.). The range of the journals' research themes within those broad categories reflects the topic's multidisciplinary nature and the growing interest it is receiving from diverse research communities.

Table 2.2. Number of Articles Published in Academic Journals

Journal	Number of papers published
Journal of Global Mobility	1
Medical Writing	1
Business Horizons	1
Social and Personality Psychology Compass	1
Corporate Communications: An International Journal	1
Arch Pathol Lab Med	1
SIAM Journal Control Optimization	1
Foresight	1
Technological Forecasting & Social Change	1
The TQM Journal	1
Transforming Government: People, Process and Policy	2
European Journal of Innovation Management	1
KIIT Journal of Management.	1
Journal of Open Innovation Technological Market and Complexity	1
Effective Executive	1
International Journal of Public Leadership	1
European Journal of Futures Research	1
Development and Learning in Organizations	1
ASBM Journal of Management	1
Training Journal	2
Organization Development Review	1
European Journal of Teacher Education	1
Vaccines	1
International Journal of Production Research	1

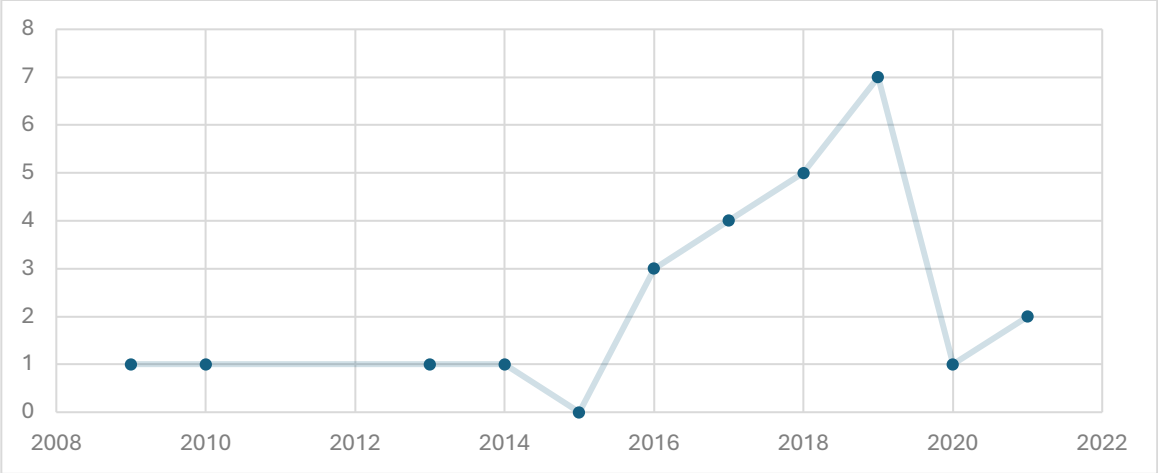


Figure 2.2. Number of Papers on VUCA 1999–2021

2.4.2. Analysis of the Definitions of VUCA

Change has been considered one of the fundamental attributes of VUCA environments (Saleh and Watson, 2017). The acronym VUCA appears to offer a way to understand the dynamic and constant change that characterises the world nowadays (Hernandez-Santibanez and Mastrolia, 2019). Table 2.3. illustrates the diversity of the definitions of VUCA in the studies selected from the literature review. The analysis of the definitions identified several constructs underlying the acronym VUCA, which were analysed, synthesised, and interpreted in the following sections. The results clarified how each component overlaps with and diverges from the others.

Table 2.3. Definitions of VUCA

Authors	Volatility	Uncertainty	Complexity	Ambiguity
Andrade et al. (2021)	Volatility: a volatile business environment is one that has extreme and rapid fluctuations.	Uncertainty: an uncertain business environment is one in which there is no knowledge about situa- tions or events, especially about their causes and their effects on relationships. This results in an unpre- dictable future, which affects the long-term growth of this organisation.	Complexity: a complex environment arises naturally with rapid industrialisation, due to the need to inter- connect sectors, networks, and procedures in the organisation.	Ambiguity: in an ambiguous environment there is confusion about a situation or event and there is a diversity of potential results, so the result cannot be clearly described.
April and Chimenya (2019)	Volatility denotes a situation or challenge that is unstable and unpredictable, but not necessarily involving a complex structure or lack of knowledge (Bennett and Lemoine, 2014), and is characterized by the nature, speed, volume, magnitude and dynamics of change of a situation that may be unpredictable (Horney et al., 2010; and Raghuramapatruni and Kosuri, 2017).	Uncertainty refers to situations that are characterized by lack of knowledge of whether an event is significant enough to have a meaningful cause (Bennett and Lemoine, 2014). Milliken (1990) defines uncertainty as "an individual's perceived inability to predict something accurately".	Complexity refers to a situation or challenge that is characterized by many interconnected parts and variables—complex situations involve confounding issues and the chaos associated with such issues (Raghuramapatruni and Kosuri, 2017).	According to Curley et al. (1986, p. 230), Ambiguity "is characterized as uncertainty about the probabilities with which outcomes occur." Dequech (2000, p. 45) seems to agree with the definition, and defines ambiguity as referring "to a situation in which there is uncertainty about probabilities and this uncertainty is due to lack of information."

Table 2.3. (Continued)				
Authors	**Volatility**	**Uncertainty**	**Complexity**	**Ambiguity**
				According to Weick (1995), ambiguity refers to situations in which more than one interpretation exists. This is closely related to the definition offered by Bennett and Lemoine (2014) who believe that ambiguity is characterized by doubt over the nature of cause-and-effect relationships.
Bader et al., (2019)	Volatility refers to the nature, magnitude and speed of change that occurs within a company's internal and external environments.	Uncertainty refers to the extent to which one can confidently predict the future. In other words, even though the basic cause and effect of a situation is known, there is a lack of information about the outcome and also the mechanisms of change are unknown and often unpredictable.	Complexity refers to the number of factors that one needs to take into account, their variety and the relationships among them.	Ambiguity is manifested by a lack of clarity and the difficulty in understanding exactly what the situation is. This means that causal relationships are not completely clear and professionals of global mobility cannot rely on past experiences.
Bello and Campbell (2019)		Uncertainty means that we know cause and effect, but don't have other information (Bennett & Lemoine, 2014).		

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
Bennett and Lemoine (2014)	1) Relatively unstable change; information is available, and the situation is understandable, but change is frequent and sometimes, unpredictable. 2) ‘‘Volatility provides profit opportunity.’’ (Warwick-Ching, 2013).	1) A lack of knowledge as to whether an event will have meaningful ramifications; cause and effect are understood, but it is unknown whether an event will create significant change. 2) ‘‘Uncertainty is opportunity.’’ (Hemingway & Marquart, 2013).	1) Many interconnected parts forming an elaborate network of information and procedures; often multiform and convoluted, but not necessarily involving change. 2) ‘‘Simplifying IT complexity [is] a major opportunity.’’ (Boston Consulting Group, 2013, as cited in Bennett & Lemoine, 2014).	1) A lack of knowledge as to ‘the basic rules of the game’; cause and effect are not understood and there is no precedent for making predictions as to what to expect. 2) ‘‘Ambiguity equals opportunity.’’ (Amerasia Consulting Group, 2013, as cited in Bennett & Lemoine, 2014).
Billiones, (2019)	Volatility comes from constant and rapid change.	Uncertainty comes from the unpredictable nature of modern life.	Complexity is seen in the multiple interconnected confounding issues we are faced with each day.	Ambiguity is evident in today’s mixed reality – a convergence of physical and virtual worlds.
Bodenhausen and Peery (2009)	Volatility (a dynamically changing social context)	1) Uncertainty exists when relevant information is unavailable and thus unknown. 2) Uncertainty (missing information)	Complexity (multiple, potentially relevant dimensions).	1) Ambiguity exists when relevant information is available, but the meaning of it is unclear. 2) Ambiguity (multiple possible interpretations of the information available).
Clayton (2016)	Volatility implies rapid change and instability of the current situation.	Uncertainty results from poor knowledge of our situation and,	Complexity arises from the multiplicity of	Ambiguity arises when we cannot make sense of

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
		particularly, of what may happen.	interconnections between often-simple systems.	inter-relationships, meaning, or motivations.
Gandhi (2017)	In a more volatile world, periods of stability can seem like a thing of the past. Instead we have more instability, wider fluctuations and often very rapid and unexpected change.	With so much volatility, not only is the future unlikely to be much like the past, but the present is often very different too.	Uncertainty is amplified still further by complexity.	Unknown unknowns' abound in complex, uncertain and volatile environments, and so ambiguity increases.
Geysi et al., (2019)	The "volatile" nature of the world is reflected by the increasing speed and extreme nature of change, and the greater unpredictability of its causes.	The lack of ability to forecast the long term or to predict the potential effects of events is called uncertainty. Uncertainty necessitates preparedness for the unexpected.		
Hadar et al., (2020)	Volatility (the nature, speed, volume magnitude and dynamics of change)	Uncertainty (the lack of predictability of issues and events)	Complexity (the confounding of issues and surrounding factors)	Ambiguity (the haziness of reality and the mixed meaning of conditions)
Hartley (2018)	Volatility concerns the nature, speed, volume and magnitude of change, which may change rapidly and suddenly.	Uncertainty concerns the difficulties of predicting what may happen and what may be the effects of that change on organisations and individuals.	Complexity addresses the inter-relatedness of dynamics and processes across a whole system, with emergent properties, not only those which are planned (Uhl-Bien et al., 2007).	Ambiguity concerns the difficulties of coming to a clear view or clear meaning of events, with instead a variety of interpretations and sense-making (Denis et al., 1996; Baran and Scott, 2010).
Heinonen et al. (2017)	'volatility' describes the increased dynamics in	'uncertainty' indicates a fundamental condition	'complexity' implies that there is a multitude of	'ambiguity' describes the difficulties to understand

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
	many fields characterized by "changing directions of change", by a high frequency of ups and downs, by more rapid disruptions of trends.	hat decision makers have met in all ages.	qualitatively different factors or elements that interact in many different ways.	and interpret novel, emergent or simply unusual phenomena, to make sense of them, to draw conclusions.
Hernandez and Allen (2013)	‘‘[t]he nature and dynamics of change, and the nature and speed of change forces and change catalysts”	‘‘[t]he lack of predictability, the prospects for surprise, and the sense of awareness and understanding of issues and events’’	‘‘[t]he multiplex of force, the confounding of issues[,] and the chaos and confusion that surround an organization’’	‘‘[t]he haziness of reality, the potential for misreads, and the mixed meanings of conditions; cause-and-effect confusion.’
Hernandez-Santibanez and Mastrolia (2019)	The notion of volatility is at the heart of mathematical finance, where unstable properties of financial products, such as prices, are modeled through the presence of noise in their dynamics.	Uncertainty is the lack of knowledge for an active agent, due to information asymmetries between him/her and the other parts involved.	Complexity holds when several interconnected entities interact, leading to issues whose solutions are not obvious at first sight.	
Horstmeyer (2019)	Volatility is reflected in the increasing size, nature, and amount of change as well as the accelerating pace of organizational change.	Uncertainty refers to the inability to predict issues and events.	Complexity refers to the general state of interacting forces and chaos at play in the organization.	Ambiguity concerns difficulty in teasing out issues, the haziness of reality, and the multiple possible interpretations of the conditions affecting companies.

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
Kaivo-oja, J and Lauraeus (2018)	It means the nature, speed, volume and magnitude of change does not have a predictable pattern (Lawrence, 2013, Sullivan, 2012).	The "U" in the acronym VUCA stands for uncertainty, or the lack of predictability of issues and events (Lawrence, 2013; Kingsinger and Walch, 2012).		Ambiguity is the lack of clarity about the meaning of an event (Caron, 2009, as cited in Kaivo-oja & Lauraeus, 2018), or, as Sullivan (2012), Lawrence (2013) wrote, the "causes and the 'who, what, where, how, and why' behind the things that are happening (that) are unclear and hard to ascertain". Col. Eric G. Kail defined ambiguity in the VUCA model as the "inability to accurately conceptualise threats and opportunities before they become lethal" (Lawrence, 2013; Kail, 2010).
Pandit et al., (2018)	Volatility relates to speed, magnitude and dynamics of change.	Uncertainty is the lack of predictability of events and issues.	Confounding issues faced by an organization (military or otherwise) lead to Complexity	Ambiguity is the lack of clarity about conditions faced by the organization (Horney et al., 2010).
Robbins (2018)	Volatility indicates chaos where reliable prediction is impossible and where change is regular and substantial	Uncertainty refers to the difficulty in interpreting coherent patterns in the change (Ibid).	By complexity is meant the complex ecosystem of moving parts in any market. It describes iterations of simple patterns [9] combined in	Ambiguity refers to our lack of capacity to read the signals from markets or consumers with any clarity, certainty or accuracy.

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
			a labyrinth of overlaps and loops making it difficult to decipher the signal from the noise [8].	
Saleh and Watson (2017)	Volatility: the pace of the change in the business environment (Swarbrick and Stearman, 2012), the volume of the change (Horney et al., 2010; Swarbrick and Stearman, 2012), its magnitude and hence the degree of turbulence it creates (Horney et al., 2010; Welbourn, 2015).	Uncertainty: the lack of knowledge about a situation or an event, especially about its cause and effect relationship (Bennett and Lemoine, 2014a), hence the future cannot be predicted confidently (Horney et al., 2010; Shaffer and Zalewski, 2011; Welbourn, 2015) and the development of long term- strategic decisions is difficult (Rodriguez and Rodriguez, 2015).	Complexity: the interconnected parts, networks and procedures within the organization and with the external business environment (Bennett and Lemoine, 2014a; Rodriguez and Rodriguez, 2015), which might even be unidentifiable and/or contradict each other (Shaffer and Zalewski, 2011).	Ambiguity: the confused options presented by a situation or event (Horney et al., 2010) and the diversity of potential results (Swarbrick and Stearman, 2012) in which the outcome cannot be clearly described (Swarbrick and Stearman, 2012).
Schulze et al., (2021)	"volatility" is characterized by frequent and unpredictable changes	"uncertainty" refers to the lack of knowledge as to whether an event will result in a significant change	"complexity" is the presence of an interconnected and convoluted network of information and procedures	"ambiguity" is defined as the inability to understand cause and effect
Sharif and Irani (2017)	where there is a rate of change itself	where there is a lack of clarity about present and future outcomes	where there are multiple and competing decision factors	where there may be a multiplicity of meanings and significance
Sturmberg (2010)	Volatility – the rate of change. Volatility refers	Uncertainty – lack of clarity about the present	Complexity – the multiplicity of key	the lack of clarity about the meaning of an event.

Table 2.3. (Continued)				
Authors	**Authors**	**Authors**	**Authors**	**Authors**
	to the nature and dynamics of change, the nature and speed of the forces of change, and the nature of change catalysts.	situation and future. Uncertainty alludes to the lack of predictability, the prospects for surprise, and the sense of awareness and understanding of issues and events.	decision factors. Complexity denotes interconnectedness, resulting from the multiplex of forces, the confounding of issues and the chaos and confusion that surround an organization.	Ambiguity conveys the haziness of reality, the potential for misreads and the mixed meanings of conditions; and is associated to cause-and-effect confusion.
Sucharita (2016)	Volatility–as the pace and volume of change is relentless in one's life-time	Uncertainty–regarding one's future performance, even when the present situation stable	Complexity–in the different environment we pass through, with host of decision variables and stakeholders	Ambiguity–of choice of source, means and methods, for achieving the desired outcome
Ungureanu et al., (2018)	Volatility refers to the rate and unpredictability of change in an organization's environment over time, which creates doubts about the future conditions of the organization.	Uncertainty refers to a lack of knowledge as to whether an event will create meaningful change, even when the cause and effect mechanisms are clearly understood.	Complexity refers to many interconnected parts forming an elaborate network of information and procedures that are difficult to manage.	Ambiguity refers to a lack of knowledge as to the basic rules of the game and to a lack of precedent for making predictions as to what to expect (Bennett & Lemoine, 2014a, b).
Webb (2016)	Volatility is about the nature and dynamics of change, and the nature and speed of change forces and change catalysts.	Uncertainty is about the lack of predictability, the prospects for surprise and the sense of awareness and understanding of issues and events.	Complexity is about the multiplex of forces, the confounding of issues and the chaos and confusion that surround these.	Ambiguity is about the haziness of reality and the mixed meanings of various conditions and circumstances.

Volatility. The first construct related to the first idea of VUCA is volatility, which covers the constant change of the world (Billiones, 2019). To examine this, the constructs and ideas that characterise it in each definition were highlighted. Themes such as change (33), uncertainty (11), unpredictability (11), dynamics (10), and instability (7) were used to characterise volatility (Table 4). Moreover, volatility appeared to be associated with the disruption of trends (5), daily fluctuations (4), inherent to the volatile world (2), and unexpected occurrences (2). However, as Warwick-Ching (2013) noted, volatility provided the opportunity for profit (1) (Geysi *et al*., 2019) (see Figure 2.3.).

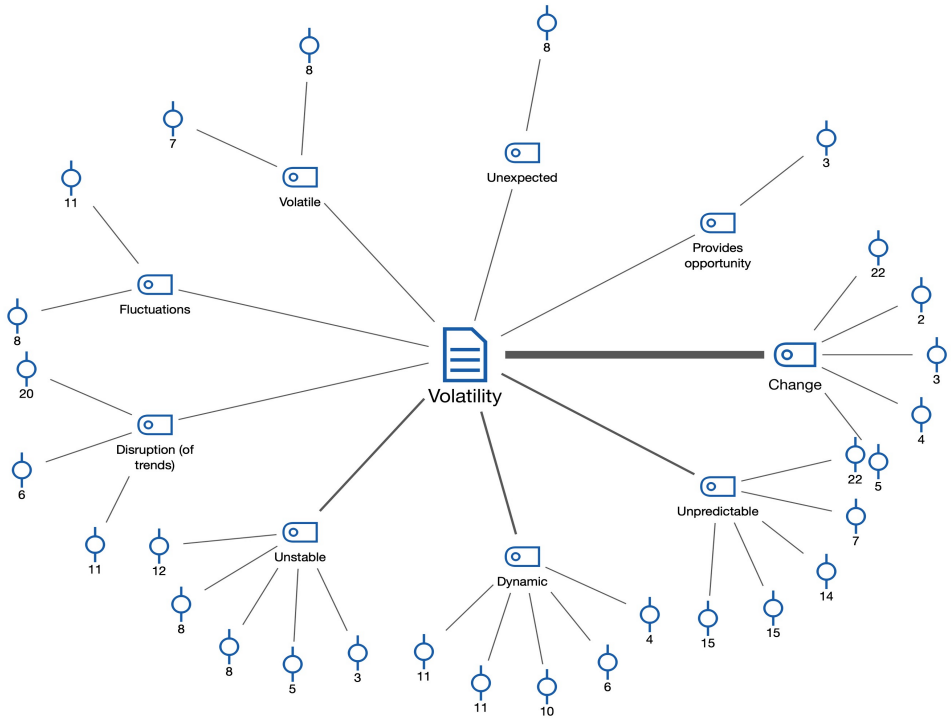


Figure 2.3. Conceptual Analysis of Volatility*

**Note.* "⌽" means the number of times they are identified in our review. "▬" means that they are the most common terms related with volatility.

Uncertainty. Uncertainty was the second construct studied. The "U" in the acronym VUCA stands for "unpredictability," or the inability to predict situations and incidents (Lawrence, 2013). This appeared to be associated with the unpredictable nature of the future (Bader *et al*., 2019), and modern life (Billiones, 2019) (22). Uncertainty has also been characterised as the lack of

information about the outcomes (12) (Bader *et al*., 2019) and the mechanisms of change that were not only unpredictable but also unknown (9) (Bodenhausen and Peery, 2009). As Welbourn (2015) emphasised, it was the lack of knowledge about a situation or an event, especially about its cause-and-effect relationship (Bennett and Lemoine, 2014) (5), which enhanced the prospects for surprise (3) (Hernandez and Allen, 2013). Lastly, despite its unexpectedness (2), this construct might be seen positively as it provides opportunity (2) (Hemingway and Marquart, 2013). Uncertainty was also associated with the construct of Volatility (1) (Bader *et al*., 2019) (Figure 2.4.).

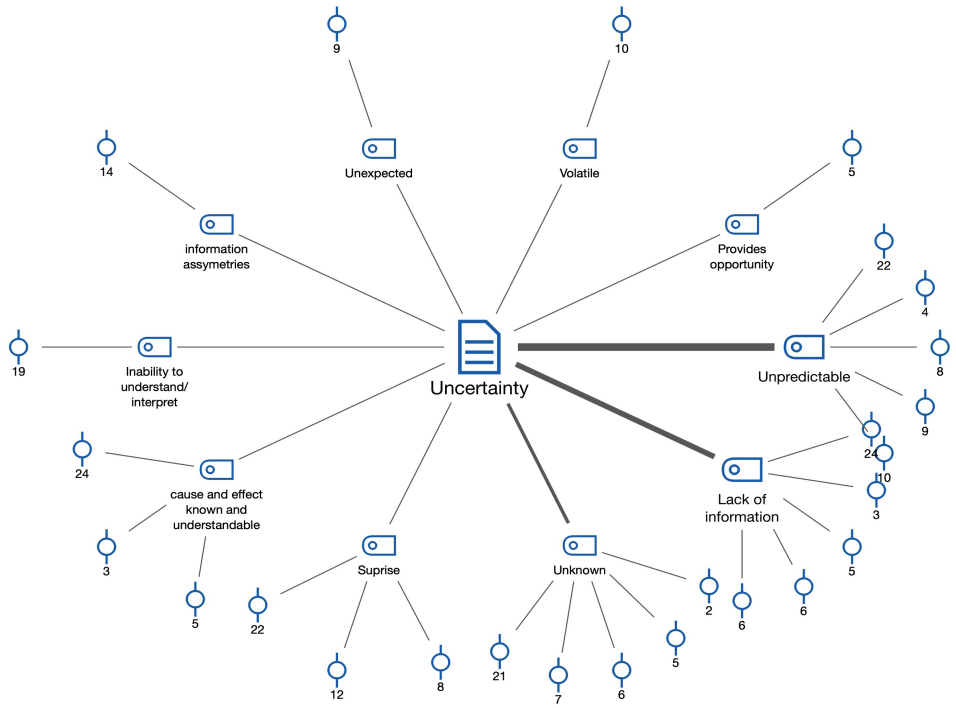


Figure 2.4. Conceptual Analysis of Uncertainty*

**Note.* "⌀" means the number of times they are identified in our review. "▬" means that they are the most frequent terms related with uncertainty.

Complexity. The "C" in the acronym VUCA was associated with the organisation's interconnected parts, networks, and procedures, as well as the external business environment (Bennett and Lemoine, 2014; Rodriguez and Rodriguez, 2015), which could be unidentifiable and/or contradict each other (Shaffer and Zalewski, 2011). We ascertained that complexity was mostly associated

with the quantity of factors needed to analyse (16) and with the relations between them (22). Similarly, Billiones (2019) emphasised that complexity was seen in the multiple interconnected confounding issues we faced each day. Thus, the confounding nature of the elements that individuals had to deal with (8) and the chaos and confusion that arises (9) create complex (7) and multiform environments (5), with a variety of factors to analyse (4). Complexity also appeared to be a cause of the U in the acronym VUCA (Uncertainty) (9) (Figure 2.5.).

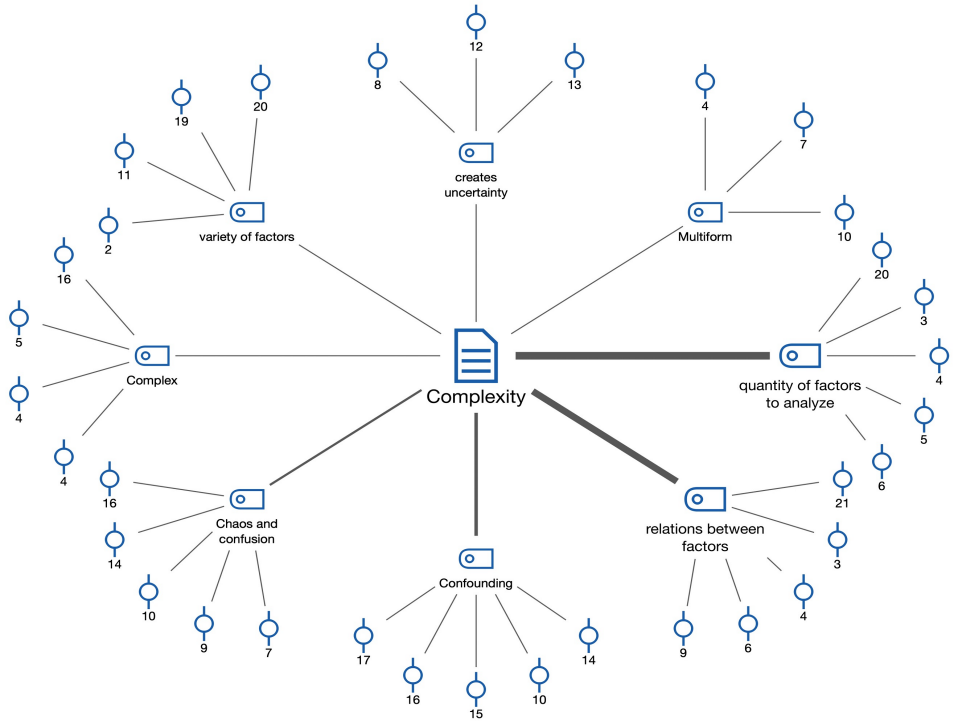


Figure 2.5. Conceptual Analysis of Complexity*

**Note.* "⌽" means the number of times they are identified in our review. "▬" means that they are the most common terms related with complexity.

Ambiguity. As defined by both Sullivan (2012) and Lawrence (2013), ambiguity is the "causes and the 'who, what, where, how, and why' behind the things that were happening (that) are unclear and hard to ascertain" and describes the lack of clarity about the meaning of an event (Caron, 2009, as cited in Kaivo-oja and Lauraeus, 2018). It was previously defined as an "inability to appropriately comprehend threats and opportunities before they become fatal" (Lawrence, 2013). Ambiguity was also associated with the inability to understand/interpret conditions or events (17), the lack of

clarity (17), and, as a result, the potential multiple interpretations each event/condition may have (15). Furthermore, it has also been associated with uncertainty (9) and volatility (3) and was contextualised by complexity (2). Studies identified its relationship with the confounding nature of the multiple meanings that events may have (7), and with a lack of information to interpret them (4). The unpredictable nature of events was also associated with ambiguity (3), as well as its unexpectedness (1) and unknown meaning (1). Notwithstanding, despite the negative visions of ambiguity, it might equally be seen as an opportunity (1) (Bennet and Lemoine, 2014) (Figure 2.6.).

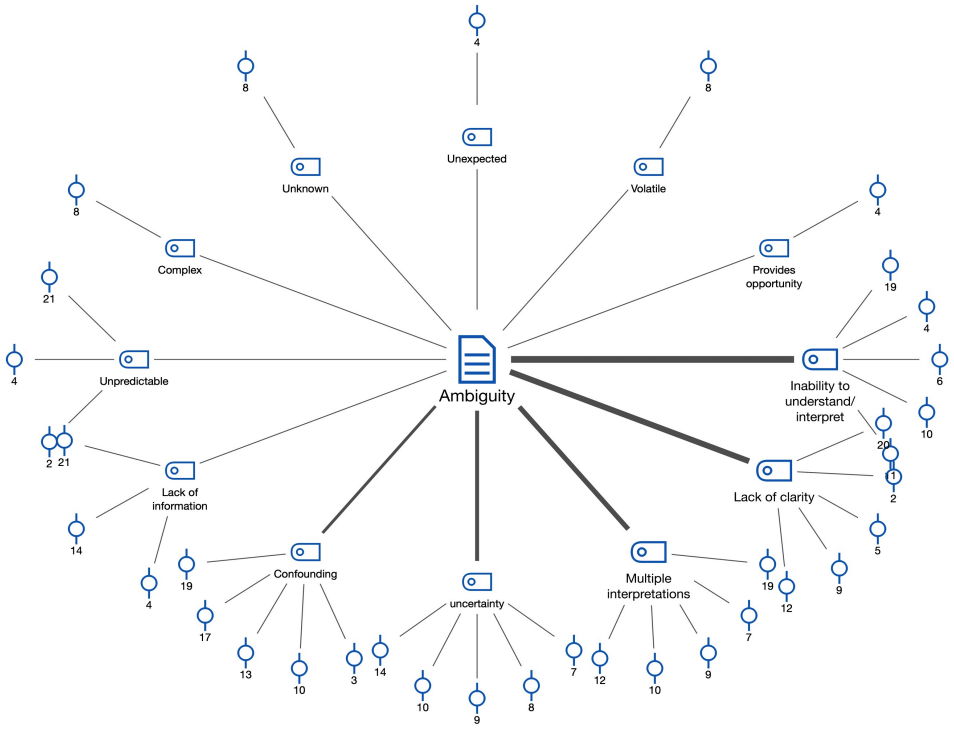


Figure 2.6. Conceptual Analysis of Ambiguity*

**Note.* "○" means the number of times they are identified in our review. "▬" means that they are the most common terms related with ambiguity.

Table 2.4. summarises the main words associated with each construct of VUCA derived from the literature review.

Table 2.4. Main Words Associated with Each Component of VUCA

Volatility	*n*
Change	23
Unpredictable	8
Dynamic	6
Unstable	6
Uncertainty	
Unpredictable	13
Lack of information	10
Unknown	6
Complexity	
Quantity of factors to analyse	14
Relations between factors	13
Confounding	7
Chaos and confusion	6
Ambiguity	
Inability to understand/interpret	11
Lack of clarity	10
Multiple interpretations	8
Uncertainty	7
Confounding	5

2.5. Synthesis and Discussion

The primary aim of this review was to conduct a literature review and create a conceptual map of VUCA to elucidate the precise meaning of each component and how it may overlap with others. In total, 26 papers were analysed out of the 833 related papers to achieve this aim. Overlaps were indeed found among the components of VUCA. Certainly, the individual components of VUCA were not always disruptive on their own, usually existing in some combination. For example, a market for new products can be both volatile and ambiguous, or expanding into a new region during a period of major governmental change can be both complex and uncertain (Bennett and Lemoine, 2014, p.317). Therefore, the distinctions between volatile, uncertain, complex, and ambiguous business environments are not separated by a clear line (Loyd, 2015). The results showed that uncertainty was associated with the construct of volatility, complexity appeared to be a cause of uncertainty, and ambiguity was mostly associated with uncertainty, whereas volatility appeared as a result of complexity. Thus, when researchers discuss one construct, it is not always clear what they are talking about. For example, when a researcher is talking about ambiguity, they

might be referring to uncertainty, volatility, or complexity. Therefore, when the components of VUCA are discussed, people might not be talking about the same thing because there has been no clear distinction between components. Thus, trying to investigate the same components by referring to different things can be very misleading.

In Figure 2.7., we present a picture of the meanings more commonly associated with each construct, without any overlap, that may increase managers' accuracy in dealing with tough environments. The conceptual map shows that, overall, volatility was mainly found to be linked to *change*; uncertainty was mostly related to the *unpredictable nature of events*; complexity was associated with the *quantity of factors and their multiple relations*; and ambiguity appeared to be the result of the *inability to understand and interpret the meaning* of what happens (either for the lack of clarity or the multiple interpretations that it may derive). Thus, this study has shed some light regarding the meanings of the components and their specificities.

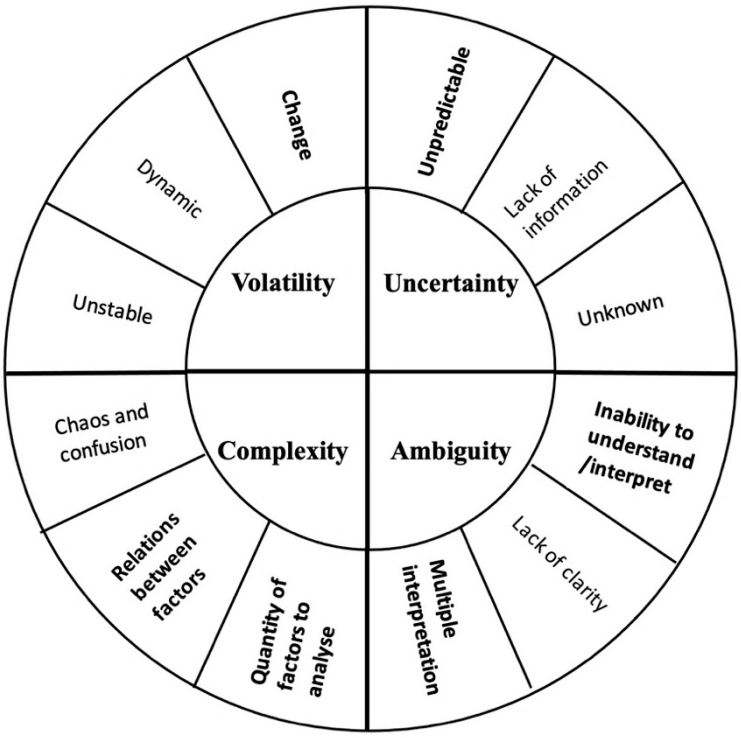


Figure 2.7. Conceptual Map of the Acronym VUCA

2.5.1. Strengths and Limitations

The current review has several strengths. To begin with, to the best of our knowledge, this is the first study to systematically review the acronym VUCA. Furthermore, this is the first study to create a conceptual map to analyse the overlaps of the components of VUCA. We conclude that there is no clear distinction among the constructs, and they do overlap with each other. Overall, the present review provides a sound basis for future studies.

Despite the positive features of this paper, the present review has several limitations. Because of the exploratory character of the study and the role of the concept-mapping framework, we are unable to evaluate the model's indicated links empirically. The research is unique in that it uses a thorough concept-mapping methodology to classify distinct VUCA components and build linkages and interactions between them. Moreover, there are a few empirical and experimental studies exploring VUCA. Therefore, we cannot draw a cause-and-effect relationship, namely the impact the use of the VUCA framework has had on businesses.

2.5.2. Implications for Research and Practice

The conceptual map of VUCA, presented in the current review, might serve as a guide for future research and practice. An essential next step could be to propose a model of VUCA. Summarising what is known about the antecedents and consequences of VUCA on business performance might highlight some avenues for future research. This paper provides a conceptual map to the researchers and with this conceptual map, they can see the “big picture” and have a better understanding of visualising the relationships. Another important next step could be to investigate the role of VUCA constructs in strategic decision-making. Are they clear, useful, insightful, and applicable? Do they provide direction for action (namely strategic action)? A better understanding of each component of the acronym may be useful for managers dealing with rapidly changing environments. Furthermore, it may be beneficial to investigate how to cope with VUCA and deal with the negatives of living through turbulent times. Lastly, our findings make an essential contribution to the literature by clarifying the components of VUCA so, in future studies, researchers can separate the components more clearly and reach reliable results. The conceptual map may enable managers to more easily decodify environmental dynamics and improve their strategic decisions.

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CHAPTER III

Perceived Effects of Teleworking on Adaptive Performance: a Moderated Mediation Model of Leadership Effectiveness and Negative Affect[2]

[2] This chapter is published as:
Taşkan, B., Junça-Silva, A., & Caetano, A. (2024). Perceived effects of teleworking on adaptive performance: a moderated mediation model of leadership effectiveness and negative affect. *International Journal of Organizational Analysis, 32*(10), 2321-2338. https://doi.org/10.1108/IJOA-06-2023-3787

3.1. Abstract

Purpose - Drawing on the Conservation of Resources theory, we contend that individuals' perceptions of telework effects associate with their adaptive performance by shaping their negative emotional experiences, with perceived leadership effectiveness acting as a critical moderator in this relationship.

Design/methodology/approach - A cross-sectional design was used, with data collected from a final sample of 209 teleworkers via an online survey.

Findings - The results demonstrated a significant indirect effect of the perceived effects of teleworking on adaptive performance through negative affect. Furthermore, leadership effectiveness moderated the indirect effect, in a way that the indirect effect was only significant for those who had ineffective leaders and moderate effective leaders; so, the indirect effect was strengthened for those who had less effective leaders (versus effective leaders).

Originality - This study examines the positive link between teleworking perceptions and adaptive performance through the reduction of negative affect, in line with the Conservation of Resources theory. Moreover, a reduction in negative emotions among employees during telework is associated with enhanced performance. Notably, the study reveals that leadership effectiveness moderates this connection as playing a crucial role in moderating these effects, particularly when leaders are perceived as less effective, offering insights for organizations considering telework strategies.

Keywords: Adaptive performance, telework, negative affect, leadership effectiveness.

3.2. Introduction

With the COVID-19 pandemic, heavy changes have occurred in daily life and the business world. In today's world, organizations are also undergoing significant changes following diverse types of innovations, especially technological, and with uncertainty a constant in daily life (Calarco, 2016; Li *et al.,* 2021). The COVID-19 pandemic brought heightened uncertainty to daily life (Caggiano *et al*., 2020). The literature has emphasized the need for organizational adaptability to uncertain events that constitute part of this process of change and transformation (Griffin *et al*., 2007) which, in turn, enhances the relevance of adaptive performance. Indeed, success in organizational change mostly depends on employees adapting effectively to changing conditions and taking on personal responsibility for change (Ghitulescu, 2013).

In keeping with the technological changes and developments, flexible working models, such as telework - "working outside the conventional workplace and communicating by way of telecommunications or computer-based technology" (Kurland and Bailey, 1999, p. 384) - have started to spread throughout business life. These technological developments have provided many opportunities and innovations both for organizations and for the daily routines of their employees and enabling an increase in remote working. Furthermore, the Covid-19 pandemic pushed many organizations into quickly adopting this as a strategy to reduce the spread of the virus while ensuring the maintenance of productivity levels. In this context, employees are able to learn new ways of working and deploy technology to adapt their performance to contribute by adding value to organizations (Huang *et al*., 2014; Sahut and Lissillour, 2023). However, individual efforts to adapt to new situations remain contingent on several personal and contextual factors. According to the Conservation of Resources theory (Hobfoll, 2001), individuals strive to maintain and acquire personal resources necessary for coping with uncertainty and daily life changes. Hence, when individuals perceive telework as a positive phenomenon, it can be seen as a valuable resource that enhances their experience during teleworking. Hence, when they perceive telework as a positive thing, their adaptive performance likely increases.

Uncertain events require some sensemaking efforts to be able to act effectively in constantly changing situations; moreover, the leader's role in the behaviour of group members may be critical to success. Hence, research on organizational behaviour has placed a great focus on understanding leadership effectiveness (Giessner *et al*., 2009).

Definitions of leadership include “the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organization” (House *et al*., 1999, p. 184). In the telework setting, the leadership role gains greater relevance in motivating employees to positively deal with new circumstances and to continue pursuing the organizational objectives. For instance, leaders must adjust their practices regarding planning, communicating, supporting, and providing feedback to their remote followers. Therefore, employee perceptions of leadership effectiveness in this new context may moderate the way they feel, and experience telework, conditioning their disposition to proactively cope with uncertainties and adapting their performance.

As organizations grapple with these transformative changes, a critical gap in the literature becomes evident. Despite the relevance and increasing adoption of remote working models, such as teleworking, few studies are exploring why and when its perceived effects influence adaptive performance. Thus, the present study sets out to deepen our understanding of the perceived effects of telework on adaptive performance by exploring why and when this occurs. Therefore, based on the conservation of resources theory (Hobfoll, 2001), we expect that employees' more positive evaluations of telework will be linked to decreased negative affect, subsequently fostering heightened levels of adaptive performance. Thus, we developed a framework considering negative affect as a process through which the perceived effects of teleworking influence adaptive performance and deploying the perception of leadership effectiveness as a moderator of this indirect effect. This study contributes to the theoretical understanding of organizational dynamics in the telework era and also provides practical insights for organizations seeking to navigate these transformative changes successfully. Furthermore, understanding what resources may buffer or strengthen the relationship between the perceived effects of telework on both affective and behavioural outcomes will help managers make informed decisions regarding telework implementation and to what extent it should be adopted. Lastly, disentangling the role of leadership effectiveness in teleworking settings will support the design of strategies in the form of interventions to better advise and train leaders to understand how and when to act with their followers.

3.2.1. Theoretical Background

3.2.1.1. Telework and Adaptive Performance

Job performance is a central topic in organizational behaviour research and a key indicator of effective organizations (Campbell, 1990), which is fundamental to organizational success. Job performance may be defined as the "actions, behaviours, and outcomes that employees engage in or bring about that are linked with and contribute to organizational goals" (Viswesvaran and Ones, 2005, p. 354).

The current rapidly changing environment requires an adaptive performance model that aligns with the dynamics of organizational environments and with their functioning affecting job performance that raises the need for adaptive behaviours to meet constantly changing job requirements (Jundt *et al*., 2014). Contemporary working life often demonstrates how adaptive performance is crucial to employees achieving success in the light of the newly emerging and ever-changing job demands. In the face of emerging and ever-changing job demands, adaptive performance becomes crucial for employee success (Griffin *et al.,* 2007). Griffin and his colleagues (2007) define adaptive performance as "the degree to which individuals cope with, respond to, and/or support changes resulting in more effective contributions in their role as individuals, team members, or as members of the organization" (p. 175). This definition emphasizes the proactive nature of adaptive performance in addressing changes, thereby enhancing individual, team, and organizational effectiveness. According to Park and Park (2019), adaptive performance represents the need to effectively address adaptability to changes in the work settings. The empirical literature consistently underscores the positive correlation between adaptive behaviour and various aspects of organizational success. Moreover, several studies identify how adaptive behaviour facilitates job performance, career, and organizational success (Griffin *et al*., 2007), change management, and individual and organizational learning (Dorsey *et al*., 2010). Furthermore, adaptive performance becomes especially important for employees to do their jobs effectively when shifting to teleworking. Adaptive performance gains heightened importance during the shift to teleworking, as noted by Hamid (2023), where telework arrangements can influence employees' ability to adapt creatively to new challenges, which in turn affects their adaptive performance. Telework arrangements have the potential to significantly influence employees' ability to creatively adapt to new challenges, subsequently affecting their

overall adaptive performance. This suggests that the nature of telework can play a crucial role in shaping an employee's capacity to perform adaptively.

Teleworking, as a flexible working model, emerged during the transition to the information society and has been implemented as a working model by many companies worldwide. As a definition of telework, Illegems and Verbeke (2004) propose "paid work from home, a satellite office, a telework centre or any other workstation outside of the main office for at least one day per workweek" (p. 319). Several studies report the positive effects of teleworking on organizational outcomes such as higher levels of efficiency, productivity, organizational commitment, (Martin and MacDonnel, 2012), satisfaction, job performance (Magnier-Watanabe *et al.,* 2022), and well-being (Junça-Silva *et al*., 2022).

In line with the conservation of resources theory (Hobfoll, 1989; Hobfoll *et al*., 2018), while working from home, employees avoid spending their resources on commuting to and from the job, alongside the time almost inevitably spent in traffic jams. With the time saved by teleworking, they gain more spare time for themselves, whether for leisure activities or spending quality time with their families (Pabilonia and Vernon, 2020), thus establishing a better work and non-work articulation balance (Choudhury *et al*., 2022). They can thereby protect their resources by investing in the work itself (Hobfoll *et al*., 2018). By protecting their resources, employees can enhance their overall well-being and contribute positively to organizational goals.

In essence, the literature supports the notion that telework, by its nature, influences resource dynamics, subsequently affecting adaptive performance. The interplay between telework and adaptive performance becomes crucial for understanding how employees navigate change and contribute effectively to organizational goals in the evolving landscape of work.

3.2.1.2. Negative affect as a mediating mechanism

Jundt and Shoss (2023) delineated a process framework for adaptive performance in the context of evolving work environments, emphasizing a systematic approach that individuals should undertake. This framework underscores the systematic approach individuals should undertake when faced with change. This pathway initiates with the recognition of the change, followed by a comprehensive evaluation. Subsequent steps involve formulating viable strategies, acquiring pertinent knowledge, and ultimately, executing the selected plan of action. Simultaneously, they underscore the influence of emotions, cognitions, motivations, and contextual factors in shaping

and being shaped by the adaptive processes. Additionally, they posit that the emotional repercussions are both precursors and outcomes in the individual adaptation journey, marking a dynamic interplay throughout the process. While much research has focused on the contributions of positive affect to adaptive performance, a noticeable gap exists in understanding the ramifications of negative affect. Addressing this gap, our investigation aims to examine the role and implications of negative affect in adaptive performance. Zaccaro and Banks (2004) pointed out that employees frequently experience intimidation or anxiety when confronted with change, particularly concerning their ability to perform effectively in novel circumstances. Managing stress, emotions, and how employees handle their feelings can be valuable when it comes to adapting to workplace changes (Richels *et al.,*2020). Notwithstanding the considerable research focus on the contributions of positive affect to adaptive performance (Luthans et al., 2007; Parker and Collins, 2010; Tugade and Fredrickson, 2004), there exists a conspicuous gap in understanding the ramifications of negative affect. Addressing this lacuna, our investigation pivots to scrutinize the role and implications of negative affect in the adaptive performance.

Negative affect encompasses the emotional states, processes, and functions that are valued in and of themselves as well as causal drivers of workplace behaviour (Diener *et al*., 2020). Negative affect thus includes unpleasant emotions, such as worries, tension, anxiety, and nervousness (Warr *et al.,* 2014). Employees who experience unpleasant emotions at work more often are generally less satisfied with their jobs and more willing to quit (Ashkanasy, 2003). Negative affect influences performance due to difficulties in managing workplace stressors, and individuals with high levels of negative affect may be less likely to access resources that aid effective job performance. Cropanzano and Wright (2001) propose that happiness significantly relates to dispositional affect (Watson and Clark, 1984) and this represents a significant antecedent of performance. Indeed, negative affect influences performance due to the difficulties arising in managing workplace stressors. People with high levels of negative affect are more likely to be facing external stressors at work (e.g., interpersonal conflicts and increased workloads (Spector and Jex, 1998)); hence, they may be less likely to access the resources that would help them perform their jobs effectively (e.g., co-worker support, Zellars and Perrewe, 2001). Negative affect can play a pivotal role in shaping an employee's ability to adapt to new challenges and perform effectively. Research by Watson and Tellegen (1985) has highlighted the significance of affect in influencing cognitive processes and decision-making, underscoring its potential link to adaptive behaviors. Furthermore,

a study conducted by Cropanzano and colleagues (2001) delved into the relationship between negative affectivity and job performance, demonstrating that high levels of negative affect can hinder an employee's ability to cope with workplace demands.

Recent studies have emphasized the relevance of autonomy when analysing telework (e.g., Grant *et al*., 2019), especially in technical or professional positions. Moreover, teleworkers expressed lower levels of negative feelings while remote working when compared to commuters (Giménez-Nadal *et al*., 2020). Bloom and colleagues (2015) conducted a comprehensive meta-analysis that showed teleworking has positive effects on job satisfaction and stress reduction. Teleworkers reported lower levels of negative affect due to the increased control over their work environment and schedule. Also, teleworkers experienced lower levels of work-life conflict and work pressure, which could contribute to lower negative affect (Chatrakul Na Ayudhya *et al.,* 2017). Golden and colleagues (2008) investigated teleworkers over a 10-year period and found that teleworking was associated with reduced stress and burnout. The flexibility of telework allowed employees to better manage their work-life balance, leading to a reduction in negative affect. Moreover, recent research by Lu and Zhuang (2023) highlighted the positive affect of teleworking on employees' emotional well-being. Their study demonstrated that teleworking contributes to a more positive emotional state among employees, especially among men. Similarly, telework arrangements were linked to improved psychological well-being, with employees reporting lower levels of negative affect in remote work settings (Johnson *et al.,* 2020).

Drawing upon the insights garnered from this literature, we anticipate that telework might serve as a mitigating factor in the experience of negative affect, thereby fostering enhanced adaptive performance. Consequently, we posit the ensuing hypothesis:

H1. Negative affect mediates the perceived effects of telework on adaptive performance.

3.2.1.3. The moderating role of perceived leadership effectiveness

Leadership, an indispensable resource within workplaces, exerts influence not only on the organizational setting but also on the provision of resources crucial for employees to fulfill their job expectations. Moreover, leaders are critical in workplaces because they not only associate with the work setting and provide employees with the resources needed to meet their job expectations but also prevent potential resource losses (Bakker and Demerouti, 2017). Situations such as the COVID-19 crisis make effective leadership, able to mobilize followers, extremely important.

Effective leaders return results within the timeframes deemed appropriate to their industries and meet the expectations of stakeholders (e.g., Goleman, 2000).

Leadership effectiveness can be defined as "judgments of how well someone performs as a leader" (Sy and Knippenberg, 2021, p. 11). A leader's perceived effectiveness strongly correlates with the frequency of positive emotions experienced by their workers. This implies that effective leaders tend to create a work environment that fosters positive emotional experiences among those they lead (Diener *et al*., 2020). Notably, followers evaluate their leader's effectiveness based on their observable behaviours (van Knippenberg, 2011). As a result, when leaders take steps to address their followers' requirements, like acknowledging their contributions, and accommodate their motivations, such as facilitating teleworking, it is probable that this will lead to heighten the positive affect (Dabke, 2016) while simultaneously reducing the negative affect.

The effectiveness of leaders also attains a great level of importance in teleworking as in traditional face-to-face working models because they still act as role models and thus shape the conditions that facilitate or hinder how their followers experience teleworking. When followers perceive their leader as effective, this enables a positive psychological climate that buffers against the stress triggered by uncertain events and/or changing times. However, the perception of ineffective leadership behaviour may generate the opposite effect, hence, bringing about conditions that hinder the adaptation of employees to their new working conditions (Pyc *et al*., 2017).

In alignment with the Cognitive-Affective Personality System (CAPS; Mischel and Shoda, 1995, 1998), we propose that a more nuanced prediction of adaptive performance can be achieved through a detailed exploration of the interplay between individuals' evaluations of a leader's effectiveness and their attitudes toward teleworking. According to the cognitive-affective system theory, interactions between people's perceptions and the environment in which they engage in generally stable relationships lead to behaviour (Mischel and Shoda, 1995). Additionally, by taking into account interactions between people's behaviours, situations, and cognitive perceptions, rather consistent distinctions between people emerge (Vansteelandt and Van Mechelen, 1998). The cognitive-affective system theory posits that circumstances vary in the degree to which they offer psychological cues for the expression of various behaviours, such as adaptive performance behaviours (Tett and Burnett, 2003). In accordance with the cognitive-affective system theory, individuals respond differently to similar cues because of systematic

differences in how they encode and process environmental information (Mischel and Shoda, 1995).

Our emphasis on the expression of telework-related adaptive behaviours led us to consider the Covid-19 situation in which there was a sudden need for a change in working conditions. Hence, adaptive performance levels became crucial to both understanding and responding to such change. Furthermore, we take into account employees' perceptions of leader effectiveness, recognizing it as a pivotal element that can potentially facilitate or hinder adaptive behaviours in the context of organizational change (Conger and Kanungo, 1987).

Alongside the studies conducted by Koopman *et al.* (2016) and Xu *et al.* (2023), we employed both COR theory and CAPS as the theoretical foundation for our study. To provide a deeper understanding of these concerns, we relied on the COR theory and intertwine it with the CAPS. While COR introduces a greater level of specificity to our hypotheses, CAPS acknowledges the significance of leadership effectiveness. Accordingly, we propose that perceptions of leadership effectiveness will moderate the indirect effect of attitudes to teleworking and adaptive performance via negative affect. We therefore arrive at the following hypothesis (Figure 3.1.):

H2. Leadership effectiveness moderates the indirect effect of perceived effects of telework on adaptive performance through negative affect, in such a way that the relationship becomes weaker for those who perceive their leader as more effective (versus ineffective).

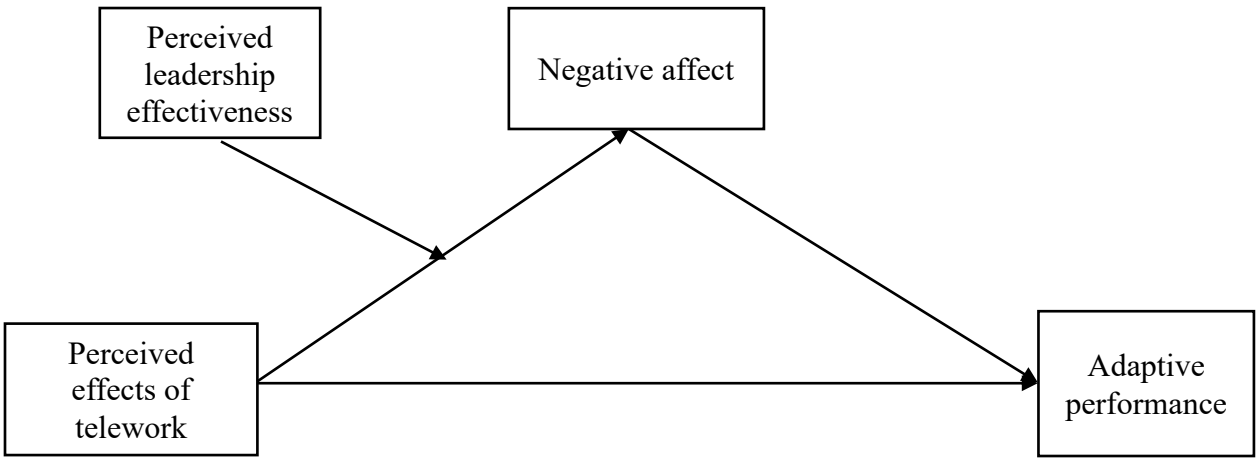


Figure 3.1. The Conceptual Framework

3.3. Method

3.3.1. Participants

Data used in this study were collected from a large project focused on individual performance in the new emerging working contexts. All participants were Portuguese working adults who work remotely. They were invited to take part in a study investigating telework and job attitudes. A total of 209 teleworkers participated in this study. A majority of participants were female (59%), the mean age was 36.93 years (*SD*=12.13), and the mean organizational tenure was 16.29 (*SD*=12.37). In addition, their weekly work hours averaged around 40 hours (*SD* = 11.59). Furthermore, 34% of the participants had a bachelor's degree, while 39% held a high school diploma. Participants were working mainly in business and professional services.

3.3.3. Measures

3.3.3.1. Adaptive performance

To measure individual adaptive performance, we used the three-item individual task adaptivity scale (Griffin *et al*., 2007; e.g., "Coped with changes to the way you have to do your core tasks") and two items from the Job Adaptability Inventory (Pulakos et al., 2000; e.g., "I find innovative ways to deal with unexpected events"). Respondents answered according to a five-point Likert scale (1 "*never*" to 5 "*always*"). This returned a .73 alpha.

3.3.3.2. Perceived effects of telework

To measure the perceived effects of telework, we used the 8-item E-Work Life Scale (Grant *et al*., 2019; e.g., "When e-working I can concentrate better on my work tasks"). The items were again measured on a five-point Likert scale (from 1= *strongly agree* to 5= *strongly disagree*). The scale generated a .89 alpha.

3.3.3.3. Negative affect

We used the eight items from the Multi Affect Indicator (Warr *et al*., 2014; e.g., "nervous") to measure the frequency of negative affect experiences at work in the last 24 hours. Respondents

stated their answers on a five-point Likert scale (1 "*never*" to 5 "*always*"). This obtained a .87 alpha.

3.3.3.4. Perceived leadership effectiveness

We measured perceived leadership effectiveness according to the four items put forward by Cicero and colleagues (2010) (e.g., "My supervisor influences my level of commitment effectively"). The responses were again provided by a five-point Likert scale (1 "*strongly disagree*" to 5 "*strongly agree*"). The scale reported a .91 alpha.

3.3.4. Procedure

We collected data according to the snowball procedure (Parker *et al*., 2019) to build a group of participants who were diverse and directly relevant to our research topic. We started by selecting some initial participants who were 22 teleworkers and were experts in the area from professional networks, and they agreed to join us after understanding the study. Then, these initial participants provided contacts that led to further participants. They each received an email requesting their participation in a teleworking study. Those answering this introductory email then received another email explaining the study was both anonymous and confidential. They then signed informed consent forms before receiving the hyperlink to access the survey. Initially, we received responses from 300 individuals; of these, 227, representing approximately 76%, provided signed consent. Following this, 18 individuals were identified as outliers and consequently excluded from the analysis, yielding a final sample size of 209 participants. Ethical considerations were upheld and we followed institutional guidelines, making sure everyone understood and agreed before joining. Confidentiality and anonymity were assured.

3.3.5. Data analysis

We utilized the PROCESS macro in SPSS (Hayes, 2018) to test the hypotheses. First, we tested the indirect effect through Model 4 before then testing the moderated mediation hypothesis through Model 7. This macro method contains the advantage of deploying a bootstrapping approach to determine the significance of the indirect effects at various levels of the moderator (Hayes, 2018).

3.4. Results

3.4.1. Descriptive statistics

Table 3.1. presents an overview of the descriptive statistics as well as the correlations between all the variables.

Table 3.1. Descriptive statistics and correlations between variables

	Mean	SD	1	2	3	4
1. Perceived effects of telework	3.42	.86	1			
2. Adaptive performance	4.23	.55	.259**	1		
3. Negative affect	2.51	.67	-.250**	-.256**	1	
4. Perceived leadership effectiveness	3.79	.99	.051	.298**	-.265**	1

**. Correlation is significant at the 0.01 level (2-tailed).

3.4.2. Hypotheses testing

We tested the indirect effect of the perceived consequences of telework on adaptive performance via negative affect. The predictors accounted for a significant variation in negative affect, R^2=.0626; $F_{(1,207)}$=13.8153, p<.001. The results revealed a negative association between the perceived effect of telework and negative affect (b = -.1954, SE = .0526, p<.001) and a positive association between the perceived effect of telework adaptive performance (b = .1334, SE = .0437, p<.05). Negative affect was linked to a detrimental effect on adaptive performance. (b = -.1677, SE = .0560, p<.05).

The model thereby attained significance ($F_{(2,206)}$=12.1913, p<.001); the perceived effects of telework and negative affect together accounted for 11% of the variance in adaptive performance (see Table 3.2. and Figure 3.2.). Moreover, the indirect effect of the telework perceptions on adaptive performance through negative affect stood at .03 (p< .05), with 95% CI [0.01, 0.07], thus reflected a significant mediation effect. The total effect (b=.17, p<.001), including the perceived effects of telework and adaptive performance and their relationship after introducing negative affect (b=.13, p<.05) was significant and thereby identifies a partial mediation effect. Thus, this provided support to H1. Overall, these results suggested the perceived effects of telework influence the adaptive performance of teleworkers through negative affect.

Table 3.2. Moderated mediation analysis

	coeff	se	t	p	LLCI	ULCI
1. Perceived effects of telework on negative affect	-.1954	.0526	-3.7169	.0003	-.2990	-.0918
2. Perceived leadership effectiveness on negative affect	-.5988	.1688	-3.5468	.0005	-.9317	-.2659
3. Negative affect on adaptive performance	-.1677	.0560	-2.9959	.0031	-.2780	-.0573
4. Perceived effects of telework on adaptive performance	.1334	.0437	3.0511	.0026	.0472	.2196

LLCI = Lower limit confidence interval; ULCI = Upper limit confidence interval.

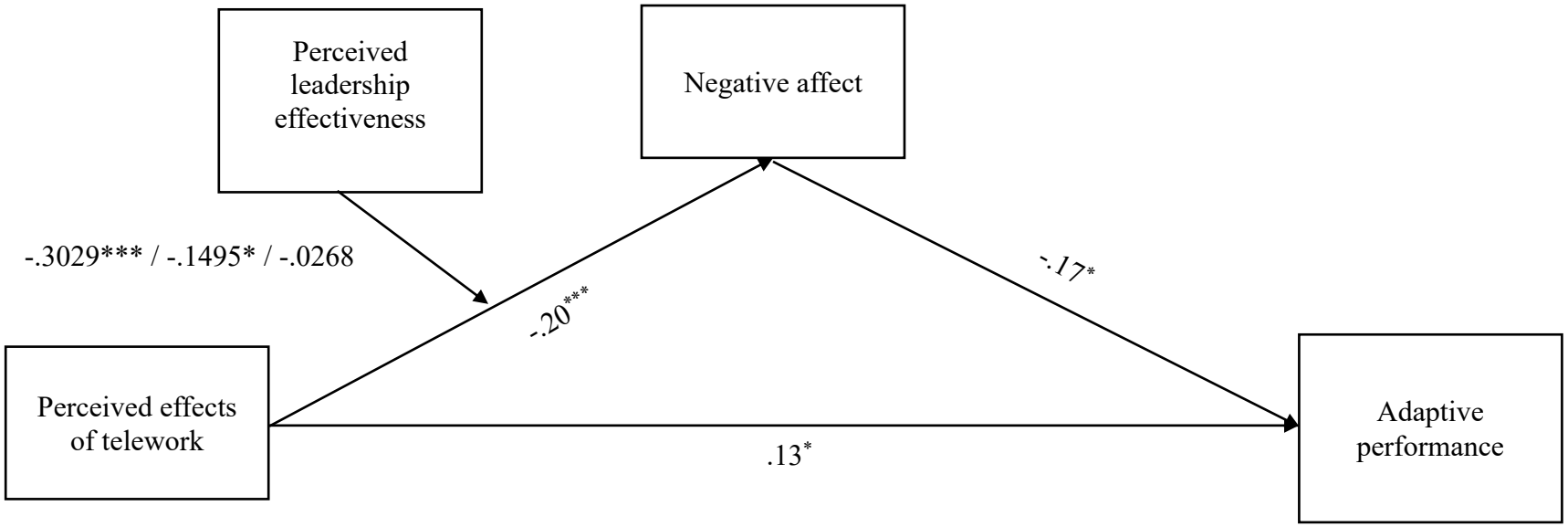


Figure 3.2. The moderated mediation analysis (model 7 by Hayes, 2018).
*p < .05; ***p < .001.

Beyond examining the mediating role of negative affect on adaptive performance in the context of teleworking, we also explored the potential moderating effect of perceived leadership effectiveness on this mediation. Notably, we found a significant interaction between the perceived effects of telework and leadership effectiveness (b = .1227, SE = .0469, p<.05) as detailed in Table 3.3. Consequently, in accordance with hypothesis 2, we found evidence to support the moderated mediation model, as shown by the moderated mediation index (index = -.02, 95% CI [-.050, -.001]). Following the guidelines proposed by Dawson and Richter (2006), we determined the points at which this indirect effect becomes significant. The analysis revealed that the conditional indirect effect was significant both at 1 SD below the mean (effect = .05, 95% CI [.01, .10]) and at the mean values of the moderator (effect = .03, 95% CI [.004, .05]). On the other hand, the indirect effect did not reach significance when evaluated at 1 SD above the mean of the moderator (effect = .01, 95% CI [-.03, .04]) (Figure 3.3.).

Table 3.3. Moderator analysis; conditional effect of the perceived effects of telework on negative affect at values of the moderator (perceived leadership effectiveness)

Perceived Leadership effectiveness	Effect	se	LLCI	ULCI
Low	-.3029	.0674	-.4357	-.1700
Medium	-.1495	.0521	-.2521	-.0468
High	-.0268	.0787	-.1819	.1284

LLCI = Lower limit confidence interval; ULCI = Upper limit confidence interval.

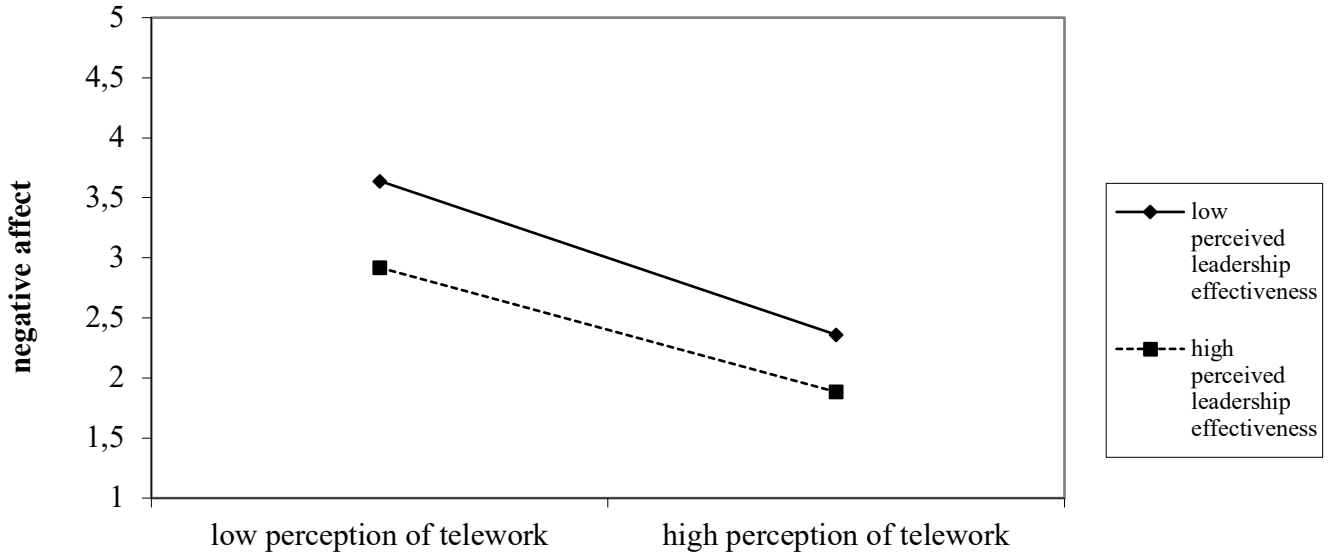


Figure 3.3. The moderating effect of perceived leadership effectiveness on the perception of telework-negative affect pathway

3.5. Discussion

In this study, the perceived effects of teleworking negatively relate to negative affect and positively relate to adaptive performance. Thus, when individuals work from home display higher levels of adaptive performance due to lower levels of negative affect. However, these findings also report how this indirect effect remains conditional on leadership effectiveness.

The conservation of resources theory (Hobfoll, 2001) states that individuals strive to conserve and acquire the personal resources they need to deal with the uncertainties and changes in their daily lives. Furthermore, employees working from home are able to save their resources by avoiding expenditure on commuting as well as the time lost in traffic jams. Therefore, they save their time while simultaneously preserving their resources and deploying for the tasks at hand, which is essential to performance (Hobfoll *et al*., 2018). According to the literature, teleworking may foster positive relationships with diverse positive organizational outcomes, including wellbeing and performance (e.g., Grant *et al*., 2019), organizational commitment, job satisfaction and well-being (Shipman *et al.,* 2023). To express this differently, teleworking generates benefits both for organizations and for employees (Martin and MacDonnell, 2012). This study aligns both with other empirical evidence and with COR theory and points out how perceiving telework positively increases adaptive performance.

Another noteworthy contribution to the literature stems from exploring negative affect as a mediator of the relationship between the perceived effects of telework and adaptive performance. The findings identify a significant indirect effect and support the hypothesis that positive perceptions of teleworking improve adaptive performance by decreasing levels of negative affect. Recent studies have also demonstrated how teleworkers tend to be happier, more committed to work, and report higher levels of job satisfaction (Adamovic, 2022; Blahopoulou *et al*., 2022). When employees feel happier while (tele)working, it's probable that they also experience lower levels of negative emotions. This, in turn, tends to boost their adaptive performance.

Also, this study identifies how perceptions of leadership effectiveness moderate the indirect effect. The results support our hypothesis by indicating that the indirect effect of teleworking perceptions on adaptive performance via negative affect was weaker for individuals who perceive their leaders as more effective than for those who assess them as less effective. In other words, negative affect is more dependent on a positive perception of telework when the leader is perceived as less effective. Hence, when workers perceive teleworking positively, that is, when they enjoy

working from home, negative affect decreases. However, in this case, no differences arise between those perceiving their leaders as effective or ineffective. On the other hand, when there are negative perceptions of teleworking, that is, when people do not enjoy working from home, negative affect significantly increases, especially for those perceiving their leaders as less effective (in comparison with those perceiving their leaders as more effective). Even though negative affect is higher for those who had less effective leaders, these ones benefit more from having a positive view of telework, that is it is likely that they appraise what is happening in a more positive way as a strategy to overcome the lack of a good leader. To put it differently, leadership effectiveness becomes especially useful when employees are working remotely from their homes and facing challenges or stress due to this arrangement. This could occur when telework leads to increased work responsibilities or blurs the lines between work and personal life (Grant *et al.,* 2019). Effective leadership in such situations can help individuals manage their negative emotions and enhance their ability to adapt and perform well. Further, when employees do not have a full support from the leader, they become more vulnerable to the situations making them in need to appraise telework more beneficial as a strategy to reduce negative affective reactions. This outcome is consistent with the Cognitive-Affective Processing System (CAPS) theory proposed by Mischel and Shoda (1995, 1998), which elucidates the interplay between emotional elements (such as perceived telework outcomes) and cognitive aspects (such as leadership assessments) in forecasting emotions and behaviours. While COR theory is a robust framework for leadership effectiveness, incorporating the Cognitive-Affective Personality System (CAPS) allows for a more comprehensive understanding of the individual differences influencing leadership dynamics in our study. When leadership is perceived as more effective, teleworkers are more prone to seek guidance and support from their leaders to help them understand and cope with uncertainties while working remotely. This perceived effectiveness may also be interpreted as a source of social support, which may explain why the negative affect weakens when leaders are perceived as more effective.

In a comprehensive sense, this study significantly advances our understanding of the intricate relationship between worker perceptions of teleworking effects and their subsequent link on adaptive performance. Consequently, we shed light on the mechanism underlying the positive influence of perceived teleworking effects on adaptive performance, which arises from the reduction in occurrences of negative affect. This insight addresses the "how" aspect of the

equation. Importantly, this indirect effect does not follow a linear trajectory, being contingent upon the perceived leadership effectiveness. Specifically, this influence wanes among those who perceive their leaders as less effective, in contrast to those under effective leadership. This result answers the pivotal "when" query and extends the literature's boundaries by showcasing a framework that introduces the perception of leadership effectiveness as a moderator of the indirect effect, utilizing the conduit of negative affect as a pathway through which perceived telework effects influence adaptive performance. Furthermore, this study extends its significance by addressing a pertinent question with relevance to numerous organizations contemplating future business strategies: Does telework offer a viable working approach?

3.5.1. Limitations

Despite its strengths, this paper also displays some limitations. First, although we relied on theoretical arguments, we can't infer any causality as the cross-sectional design doesn't allow to capture dynamic changes over time and the directional effect between the mediator and the outcome. A longitudinal study is needed to gain a clearer understanding of temporal sequences and enhancing causal inferences of the effects found in our exploratory study and to better clarify how the moderator conditions the relationship between perceived telework and negative affect, or the adaptive performance. Second, another limitation derives from the data being self-reported, which can lead to measurement bias (Spector, 2006). A third limitation revolves around measuring the performance variable. We collected subjective evaluations of adaptive performance, but future studies should adopt other methods of measuring performance (e.g., 360-degree feedback). Furthermore, we would welcome studies that incorporate other variables capable of explaining the relationship we propose in this study or, alternatively, proposing variables that serve as antecedents or consequences to those variables.

3.5.2. Implications

This research holds substantial implications for both workers and organizations. Our findings emphasize the importance of telework and its positive effects on adaptive performance with negative affect serving a mediating role while leadership effectiveness acts as a moderator. Telework should yield favourable outcomes for both employees and organizations, allowing for potential expansion within certain business sectors. Consequently, telework offers employees

benefits such as time savings (Janneck *et al., 2018)*, reduced stress (Anderson *et al., 2015;* Fonner and Roloff, 2010; Gajendran and Harrison, 2007), improved work-life balance (Gajendran and Harrison, 2007), enhanced well-being (Kossek *et al.,* 2006), and cost savings (Global Workplace Analytics, 2021). On the organizational front, there are cost reductions due to decreased expenses, including office infrastructure, electricity, and water usage, contributing to improved financial efficiency (Harpaz, 2002); this also may contribute to environmental sustainability by reducing energy consumption, water usage, and the carbon footprint associated with daily office operations. To summarize, the extensive body of research underscores the idea that teleworking yields positive outcomes across multiple aspects, benefiting both employees and organizations, thereby fostering a mutually advantageous situation and win-win scenario.

Leaders can significantly benefit from targeted training that focuses on the intricacies and demands of teleworking. Leaders who underwent specialized training in telework management exhibited improved team cohesion and performance (Kniffin *et al.,* 2021). Both workers and managers within organizations need to acknowledge the transformative nature of this new working arrangement. This recognition prompts a re-evaluation of established work practices and necessitates the acquisition of novel skills to proficiently manage the situation. This adaptability is essential not only to safeguard the well-being and dedication of employees but also to realign performance standards. Comprehensive training and development initiatives tailored for teleworkers and their managers can serve as a catalyst for maintaining motivation. Such training also encourages employees to disengage from work when necessary and to establish appropriate work schedules, promoting a healthier work-life balance. By honing leadership skills that are particularly suited to remote work scenarios, organizations can sustain and enhance their employees' performance while working remotely. Looking forward, the future of remote work hinges on the critical adaptation of leadership skills. Effective leadership is foundational for sustaining employee performance and satisfaction in this ever-evolving landscape. Notably, the emphasis on empathy and support, demonstrated through practices like one-on-one check-ins and flexible work policies, indicates a transformative shift towards prioritizing work-life balance and holistic well-being. This signals a fundamental change in leadership strategies, necessitating a more comprehensive approach to successfully navigate the dynamics of the future of remote work. Concurrently, the investments in technology and continuous training for seamless collaboration project a trajectory of perpetual innovation within remote teams, redefining the work environment

with a focus on dynamism and creativity. As leaders adeptly adapt their strategies, they not only enhance their current effectiveness in overcoming telework challenges but also play a pivotal role in shaping a positive and progressive future for remote work. The realization is growing that effective leadership in virtual environments is not just a present-day requirement but an instrumental force shaping the very essence of the future of work.

In considering limitations and future research directions section, our study opens doors to further exploration in several key areas. Firstly, an in-depth investigation into the specific mechanisms through which leadership effectiveness moderates the relationship between telework, adaptive performance, and negative affect could provide valuable insights. Exploring the nuances of leadership strategies in virtual environments and the relationship with team dynamics would contribute to a more comprehensive understanding of effective telework management. Additionally, delving into industry-specific variations in the outcomes of telework could offer tailored insights for different sectors, guiding organizations in optimizing their remote work policies. Moreover, longitudinal studies could shed light on the long-term effects of telework on employee well-being, performance, and organizational outcomes, providing a more nuanced perspective beyond the immediate context. Further research could also examine the challenges and opportunities associated with hybrid work models, where employees divide their time between remote and on-site work. Investigating the adaptability of leadership practices in such hybrid settings would be particularly relevant. Finally, the economic, commercial, and societal effects of widespread telework remain areas ripe for exploration, with potential implications for urban planning, commuting patterns, and the design of future workspaces. By addressing these avenues, future research can not only build upon our current findings but also contribute to the evolving landscape of telework and its multifaceted implications for workers, leaders, and organizations.

In summary, while our findings point to positive outcomes across multiple aspects of teleworking, further clarification, and specific examples are needed to strengthen the economic, commercial, and societal effect of our research. Addressing these aspects will enhance the practical application and significance of our work.

3.6. Conclusion

The relationships investigated in this study add a relevant contribution to the literature. This paper indicates the indirect significance of the perceived effect of telework on adaptive performance

through negative affect. Moreover, the association between the perceived effect of telework and negative affect undergoes moderation by leadership effectiveness, furthermore, demonstrating how leaders' actions become particularly important when workers experience distress working from home. Teleworkers who do not enjoy working from home may therefore benefit from having effective leaders as this appears to reduce the negative affect experienced (when compared to less effective leadership), which in turn improves the adaptive performance. The main interaction effect is that a less effective leader strengthens the indirect relationship.

3.7. References

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CHAPTER IV

The Role of Mindfulness in the Relationship between Uncertainty and Adaptive Performance via Affect: A Within-Person Approach[3]

[3]This chapter is published as:

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4.1. Abstract

Purpose – In the current uncertain working environment, how and when employees adapt their performance is an essential issue. Based on the integrative model of uncertainty tolerance, this study aimed to investigate the relationship between uncertainty and adaptive performance by testing (1) the mediating role of negative affect and (2) mindfulness as a moderator.

Design/methodology/approach – To test the model, 159 participants took part in a diary study during 10 working days (*N*=159 x 10 = 1,590).

Findings – The multilevel results showed that negative affect mediated the within-person effect of uncertainty on adaptive performance. Further, mindfulness moderated the relationship between uncertainty and adaptive performance in such a way that it became stronger for individuals who scored lower on mindfulness (versus higher mindfulness).

Research limitations/implications – Understanding what may sustain and amplify responses to uncertain working conditions may help managers to design interventions that may support their employees' responses to effectively cope with them.

Originality/value – This study shed light on the relevance of both negative affect and mindfulness on the relationship between uncertainty and adaptive performance. In addition, the findings expand the theoretical knowledge of the mechanism underlying the relationship between uncertainty and adaptive performance, and the condition that may strengths this relationship.

Keywords: Adaptive performance; Uncertainty; Negative affect; Mindfulness; Diary study; Multilevel modeling.

4.2. Introduction

Uncertainty in the workplace has increased since the pandemic crisis, with profound implications for employee performance and well-being. Scholars have shown its relations to a wide range of affective states (e.g., fear, anxiety, and stress; Bakioğlu et al., 2020) and behavioral outcomes, such as performance (Wu et al., 2021). For instance, a survey by the American Psychological Association (APA, 2021) found that 70% of employees reported heightened anxiety and stress due to unpredictable and uncertain work conditions. Uncertainty has been identified as a growing factor in work-related daily routines (Bakioğlu et al., 2020; Wu et al., 2021, and scholars have highlighted its relevance for work-related outcomes such as performance (Sadovyy et al., 2021; Taskan et al., 2022). Such increases in uncertainty can ultimately decrease performance (Junça-Silva & Silva, 2022). This rise in uncertainty underscores the need for effective adaptation strategies. The ability to adapt is critical in maintaining performance and well-being in such unpredictable environments. Adaptability is critical for maintaining performance and well-being in such unpredictable environments (Stoltzfus & Barnard, 2022). Uncertainty can be defined as "an individual's perceived inability to predict something accurately" (Milliken, 1987, p. 136). Given the profound implications of uncertainty, it is essential to understand how it affects employee performance and the mechanisms that can mitigate its negative impacts.

During a regular working day, employees must deal with uncertainty when they face several unpredictable and unexpected situations; for instance, sudden changes in deadlines and priorities, ambiguous instructions and information, technical difficulties, or scarce resources, which can disturb their job performance. When that kind of uncertainty is perceived, it frequently results in unpleasant affective reactions – the set of negative emotions experienced - such as fear, frustration, or worry - and behaviors, such as avoidance (Anderson *et al.,* 2019).

The integrative model of uncertainty tolerance (IMUT) provides a comprehensive framework for understanding how uncertainty impacts employee behavior and performance (Hillen *et al.,* 2017). According to the IMUT, uncertainty triggers negative affective reactions, such as anxiety and stress, which can hinder adaptive performance. This study aims to extend the IMUT by exploring the roles of mindfulness and negative affect in the relationship between uncertainty and adaptive performance.

Given the predominance of uncertainty in the workplace, what is necessary in such situations is that employees behave beyond their in-role performance duties, engaging in adaptive performance to accomplish their goals (Griffin and Grote, 2020; Griffin *et al.,* 2010; Ilgen and Pulakos, 1999; Jundt and Shoss, 2023; Rosen *et al.,* 2007; Schraub *et al.,* 2011). Adaptive performance, as described by Hesketh and Neal (1999), pertains to an employee's ability to effectively adjust to dynamic work environments.

The relationship between uncertainty and adaptive performance is well-documented in the literature (e.g., Junça-Silva and Caetano, 2023; Schraub et al., 2011). However, the effects of uncertainty extend beyond performance, encompassing significant emotional outcomes. Hillen et al. (2017) proposed the Integrative Model of Uncertainty Tolerance (IMUT), which elucidates the relationship between perceived uncertainty and affective (e.g., negative affect), attitudinal, and behavioral outcomes, including performance. Perceived uncertainty often elicits negative emotional reactions, such as anxiety, stress, and fear, which subsequently influence employee behavior and work performance. Uncertainty-induced negative affect may impair an individual's capacity to adapt to dynamic work environments. The IMUT posits that individuals' emotional responses to uncertainty can range from mild discomfort to severe distress (Hillen et al., 2017). These emotional reactions may lead to avoidance behaviors, thereby impairing adaptive performance (Carleton, 2016; Hirsh et al., 2012). However, the intensity and nature of these emotional responses are also contingent upon individual characteristics and situational factors (Hillen et al., 2017).

Among individual characteristics, mindfulness has been shown to be a condition through which behavior is shaped even in the face of adverse or uncertain conditions (Zivnuska *et al.,* 2016). Mindfulness has been defined as the ability to be focused on the present, with a non-judgmental attitude, and with an active tendency to look for innovative ways of doing things and implementing them (Pirson *et al.,* 2018; Montani *et al.,* 2018). When individuals have high levels of mindfulness, they tend to be proactive rather than reactive to what happens, and as such, they can anticipate daily stressful events (Charoensukmongkol, 2020) or perceived uncertainties which enhances their adaptive responses (Langer, 1989; Montani *et al.,* 2018). As such, we state that the relationship between perceived uncertainty and adaptive performance will be moderated by mindfulness.

In this study, we emphasize the concept of socio-cognitive mindfulness rather than traditional meditative mindfulness due to its relevance within organizational contexts. Socio-cognitive mindfulness encompasses an active awareness and engagement with the present moment, emphasizing proactive problem-solving and adaptive responses to dynamic workplace challenges (Pirson *et al.,* 2018; Montani *et al.,* 2018). Unlike meditative mindfulness, which focuses primarily on personal relaxation and introspection, socio-cognitive mindfulness aligns more closely with the demands of modern organizations where individuals are required to navigate complex and unpredictable environments (Langer, 1989; Dane, 2011).

By adopting socio-cognitive mindfulness as a framework, we aim to explore how individuals actively utilize their awareness and cognitive flexibility to enhance adaptive performance in response to uncertainty. This approach not only acknowledges the practical applicability of mindfulness within organizational settings but also underscores its role in fostering proactive behaviors and innovative problem-solving strategies amidst varying levels of uncertainty.

Based on empirical studies (e.g., Lomas et al., 2017; Lyddy et al., 2021; Montani et al., 2018), we also assert that those who already have high levels of mindfulness will not have differences in their adaptive performance regardless of perceived uncertainty levels; however, those low on mindfulness will be more dependent upon the levels of uncertainty. In other words, concerning individuals with a lower score on mindfulness - with more reactive patterns of response (Pirson et al., 2018) – their adaptability will only be triggered when they perceive a higher level of uncertainty. So, those with high levels of mindfulness are likely to demonstrate consistent adaptive performance, while those with low levels may be more dependent on their perception of uncertainty to trigger adaptability.

Despite the role of individual differences in the relationship between uncertainty and adaptive performance, so far, to the best of our knowledge, the moderating role of mindfulness has not been empirically tested. Hence, the aim of this study is to investigate the moderating role of mindfulness on the relationship between uncertainty and adaptive performance at the daily level. Furthermore, we also aim to explore the affective mechanisms (i.e., negative affect) through which uncertainty predicts adaptive performance at the daily level.

To illustrate the importance of this study, consider the sudden shift to remote work during the pandemic. Many employees faced new uncertainties daily, from balancing work and home life to navigating new technologies. Those with higher mindfulness adapted more smoothly, maintaining

productivity and well-being, whereas those with lower mindfulness struggled more with the transition. This highlights the critical role mindfulness plays in adaptive performance under uncertain conditions (Franken *et al.,* 2021)

The study provides a comprehensive view of how and when uncertainty affects employees' adaptive performance, highlighting both theoretical and practical benefits by revealing the subtle, frequently undiscussed aspects of this relationship.

4.2.1. Theoretical background and hypothesis development

4.2.1.1. Uncertainty and adaptive performance

The integrative model of uncertainty tolerance (Hillen *et al.,* 2017) underscores the significance of perceived uncertainty in influencing various behavioral responses, as is the case of adaptive performance. According to Griffin *et al.* (2007), adaptive performance refers to how well people deal with, react to, and/or support changes that enable them to perform better in their roles as individuals, members of a company, or team members. This facet of individual performance holds utmost importance in navigating uncertainty, managing stressful daily situations, coping with job demands, and handling other everyday hassles (Charbonnier-Voirin and Roussel, 2012; Griffin and Grote, 2020; Schraub *et al.,* 2011).

The success of organizational change largely depends on employees who adapt effectively to changing conditions and take personal responsibility for change at their level (Ghitulescu, 2013). The need for employees who can manage and cope with change continues to increase day by day. Due to the increasing need of today's organizations, managers should aim to increase the adaptability of employees in order to effectively realize the change in their organizations and should make maximum efforts in this direction (Duarte Alonso *et al.,* 2023; Van den Heuvel *et al.,* 2013). The necessity of adapting to the uncertainties has also provided flexibility in the roles of organizations in business life exhibited by their employees (Neal *et al.,* 2012).

Indeed, empirical evidence exists for the connection between uncertainty and adaptive performance. However, the findings are inconclusive, with some suggesting a positive correlation and others indicating a negative one. For instance, Park and Park (2019) emphasized a negative association between a high level of uncertainty and adaptive performance. Furthermore, Sherehiy and Karwowski (2014) showed that uncertainty impaired employees' adaptability because it

increased distress. On the other hand, Junça-Silva (2023) indicated a positive relationship between uncertainty and adaptive performance. Despite the increase of uncertainty in their working life, individuals might have started to adapt to such working conditions. Moreover, is consistent with the IMUT theory (Hillen *et al.,* 2017), when individuals recognize an uncertainty, they have the choice to either confront it by engaging in adaptive behaviors or evade it. Therefore, uncertain situations could be seen as indicators that there's a requirement for adaptability when dealing with these situations. Additionally, maintaining a moderate level of uncertainty can be a useful signal for identifying when adaptability is called for. As a summary, uncertain events and unexpected situations can offer individuals a chance to enhance their capacity to respond positively and adapt.

The literature on uncertainty and adaptive performance presents a mixed picture, highlighting the need for further exploration. For instance, Park and Park (2019) emphasized a negative association between a high level of uncertainty and adaptive performance, suggesting that increased uncertainty impairs adaptability by exacerbating distress. This aligns with Sherehiy and Karwowski (2014), who found that uncertainty impaired employees' adaptability by increasing distress. However, other studies suggest a more nuanced relationship. Junça-Silva and Caetano (2023) indicated a positive relationship between uncertainty and adaptive performance, suggesting that individuals might have started to adapt to uncertain working conditions over time. These divergent findings suggest that the relationship between uncertainty and adaptive performance is more complex than previously thought. A critical analysis reveals that factors such as individual differences in uncertainty tolerance, the role of coping mechanisms like mindfulness, and the specific contexts in which uncertainty is experienced may explain these discrepancies. For example, while Park and Park (2019) and Sherehiy and Karwowski (2014) highlight the detrimental effects of uncertainty through increased distress, Junça-Silva and Caetano (2023) point to potential adaptive benefits, suggesting that uncertainty can also drive growth and learning under some conditions. By exploring the roles of mindfulness and negative affect, this study aims to reconcile these discrepancies and provide a more comprehensive understanding of the IMUT framework. Mindfulness, specifically, may moderate the relationship between uncertainty and adaptive performance by helping individuals manage their negative affective reactions, thereby enhancing their capacity to adapt.

These diverse findings underscore the importance of examining additional factors that might influence the relationship between uncertainty and adaptive performance. By exploring the roles

of mindfulness and negative affect, our study aims to address these research gaps. Mindfulness may help individuals manage their negative affective reactions, thereby enhancing their capacity to adapt to uncertain conditions. Furthermore, negative affect is proposed as a mediating factor that explains how uncertainty impacts performance. This study's focus on these variables aims to provide a more comprehensive understanding of the IMUT framework, highlighting the dynamic interplay between uncertainty, affect, and adaptive behaviors.

Relying on those studies, we formulated the following hypothesis:

H1. Uncertainty is positively related to adaptive performance.

4.2.1.2. Uncertainty, negative affect, and adaptive performance

Uncertainty creates anxiety and stress because individuals prefer what they know and are used to. The integrative model of uncertainty tolerance (Hillen *et al.,* 2017) suggests that unknown stimuli (events, scenarios, etc.) lead to perceived uncertainty. This causes behavioral (e.g., avoidance, inactivity, decision-deferring, or inattention), cognitive (e.g., assessments of denial, vulnerability, doubt, or danger), or affective (emotions, such as anxiety, aversion, fear, apathy, worry, or despair) reactions. Accordingly, uncertainty can trigger negative affect (Carleton, 2016; Hirsh *et al.,* 2012). Negative affect is acknowledged as a relevant construct concerning workplace behavior similar to other emotional states, processes, and functions that are appreciated in and of themselves (Diener *et al.,* 2020). Negative affect has been negatively associated with adaptive performance (Park and Park, 2019).

It has been demonstrated empirically that negative affect may be a mechanism that explains how negative events impair adaptive performance (Weiss and Cropanzano, 1996). For instance, Kaplan *et al.* (2009) demonstrated that negative affect negatively predicted job performance, as measured by counterproductive work behaviors, organizational citizenship behaviors, occupational injury, and withdrawal behaviors. Further, Gillet *et al.* (2013) conducted three studies (correlational and experimental) demonstrating that negative affect negatively predicted performance. Indeed, negative affective reactions to working conditions or situations may impair individuals' adaptive responses (Zapf *et al.,* 2021).

Based on the integrative model of uncertainty tolerance (Hillen *et al.,* 2017) and empirical literature, we assume that negative affect will mediate the relationship between uncertainty and adaptive performance.

H2. The relationship between uncertainty and adaptive performance is mediated by negative affect.

4.2.1.3. The moderating role of mindfulness

Mindfulness, according to Langer's socio-cognitive perspective, is a dynamic state of awareness characterized by a heightened sensitivity to the present moment. This approach emphasizes active engagement with one's environment and encourages individuals to adopt an open, curious, and flexible mindset (Langer, 1989). Essentially, mindfulness involves being fully present and aware of what is happening around you, rather than being preoccupied with past events or future concerns.─Langer's work, has highlighted the potential benefits of state mindfulness in organizational psychology, suggesting that it can enhance creativity, improve decision-making, and boost overall well-being among employees (Langer, 1989). Her perspective on mindfulness offers a valuable framework for further exploration and application in the field of organizational psychology. Research by Glomb *et al.* (2011) and Dane (2011) further supported the idea that state mindfulness can lead to improved workplace outcomes by promoting a heightened awareness of the present moment and fostering adaptive behaviors within organizations.

People react to uncertainty in various ways, and individual differences play a key role in these reactions. For instance, the integrative model of uncertainty tolerance (Hillen *et al.,* 2017) argues that individual differences may moderate how they perceive and react to uncertainty. That is, some individual characteristics, as is the case of the level of mindfulness, might diminish or amplify a person's reaction to perceived uncertainty.

Mindfulness can be defined as the capacity to generate novelty, seek it out, and be flexible in one's thinking and behavior; in other words, being mindful involves being aware of the present moment and having a higher level of openness to, and acceptance of, what is going on around you (Pirson *et al.,* 2018). Mindfulness is positively related to individual adaptability which is seen as a source of adaptive performance (Johnstone and Wilson-Prangley, 2021). In line with Langer (2014), mindfulness may facilitate employees' effective adaptability to stressful or uncertain situations by keeping them focused on the present, which encourages proactive responses. Levinthal and Rerup (2006) suggested that being attentive leads to "successfully carrying out a new action in a flexible manner" while being less thoughtful leads to "routine-driven behavior" being effectively carried out (p. 503). According to this perspective, highly mindful individuals are more likely to seek innovative solutions when faced with new or challenging situations.

Conversely, those with lower levels of mindfulness tend to adhere to established routines, except when confronted with elevated levels of uncertainty necessitating their attention, prompting them to respond and adapt their performance (Dane, 2011; Dane and Brummel, 2014; Good *et al.,* 2016). *H3.* Mindfulness moderates the relationship between uncertainty and adaptive performance (Fig. 4.1.).

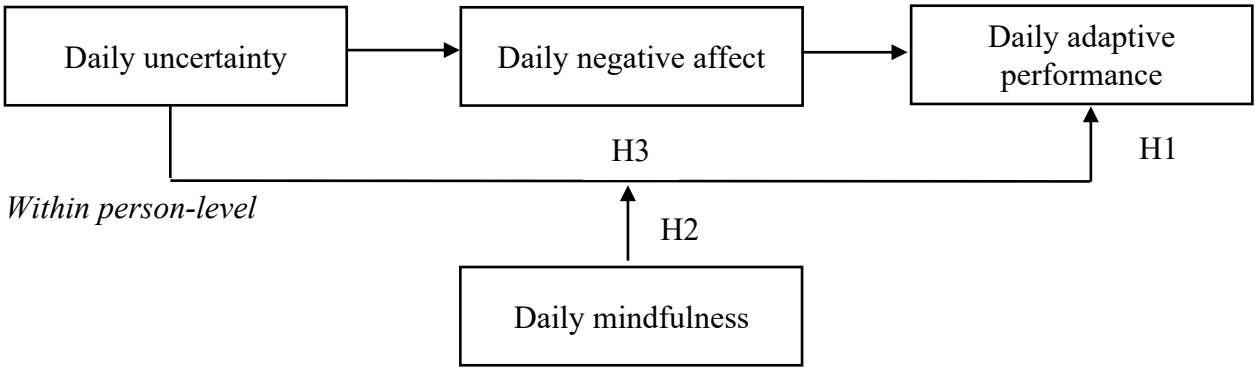


Figure 4.1. The hypothesized model

4.3. Method

4.3.1. Participants and procedure

This study was conducted within a larger project focused on performance in the new working contexts. One hundred and fifty-nine employees took part in the study, and they provided responses to the daily survey over 10 days (N=159 x 10 = 1,590 daily observations). Overall, 58% were women, with a mean age of 33.70 years (SD: 12.71), and a mean tenure of 14 years (SD: 47.56) in the company.

We sent email invitations to employees representing a range of sectors, including finance, administration, and healthcare. These emails introduced the study's objectives and explained the data collection approach to those who expressed interest in participating. Furthermore, a subsequent email emphasized that the participation was voluntary and anonymous. Subsequently, participants indicated their agreement to take part in the study by signing informed consent forms.

Data were gathered via a general survey and daily questionnaires. Participants started to complete a general survey collecting sociodemographic information one week prior to the beginning the daily surveys. Seven days later, the participants completed a brief daily survey from Monday to Friday during the two consecutive weeks. The link to the survey was included in a daily email sent to the participants. This email asked them to complete the survey by 9 p.m., and it was

highlighted that it would only be available for 30 minutes. Over the ten days, 159 out of the 206 employees who volunteered to participate provided valid responses (n=1,590; response rate: 77%).

4.3.1.1. Measures

To measure adaptive performance, we used three items from the Individual Task Adaptivity Scale (Griffin *et al.,* 2007). A sample item was "Today, I adapted well to changes in core tasks". Participants answered on a 5-point scale (1 - *never*; 5 - *always*). Over the 10 days, the omega reliability (ω) was 0.79.

To measure uncertainty, we used three items from the Organizational Change Scale (Rafferty and Griffin, 2006; e.g., "Today, I was unsure about how to react to changes."). Each item was answered on a 5-point scale (1= *strongly disagree*; 5= *strongly agree*). Over the 10 days, the omega reliability (ω) was 0.87.

Negative affect was measured by using four items ("sad", "anxious", "tense", and "discouraged") from the Multi-Affect Indicator (Warr *et al.*, 2014) answered on a 5-point scale (1–*never*; 5–*always*). Over the 10 days, the omega reliability (ω) was 0.83.

To measure mindfulness, we used four items from the Langer Mindfulness Scale (Pirson *et al.,* 2018); two items evaluated novelty seeking (e.g., "Today, I liked to investigate things"), and the other two assessed novelty (e.g., "Today, I made many novel contributions."). Participants answered on a five-point scale (1 = *totally disagree*; 5 = *totally agree*). Over the 10 days, the omega reliability (ω) was 0.82.

4.3.1.2. Data Analyses

This study examined the underlying model using multi-level analysis. The Multilevel Mediation (MLMed) macro in SPSS (Rockwood, 2020) was used to test the hypotheses.

This study employed multi-level analysis using nested data to examine the underlying model. The analysis of variance component was first computed. We found a significant variance in adaptive performance (ICC = 0.74), uncertainty (ICC = 0.55), negative affect (ICC = 0.83), and mindfulness (ICC = 0.81). This showed that there is a large amount of diversity in these characteristic variables both within and between-person levels. We then carried out the multilevel analysis.

Confirmatory factor analyses were performed to test for common method bias. The results show that the four-factor model (uncertainty, negative affect, mindfulness, and adaptive performance) fitted the data well (RMSEA = 0.24, CFI = 0.87 TLI = 0.84, SRMR = 0.15) and showed a better fit when compared to others that were tested. This suggests that common method bias in this study was not a significant issue, together with the reliability indices.

4.4. Results

4.4.1. Descriptive statistical analysis

The descriptive statistics and correlations are presented in Table 4.1.

Table 4.1. Descriptive statistics

(Source: Authors own work)

Variables	M	SD	1	2	3	4
1. Uncertainty	2.82	0.74	_	0.41**	0.25**	0.20**
2. Negative affect	2.15	0.83	0.32**	_	-0.35**	-0.15**
3. Adaptive performance	3.42	0.84	0.23**	-0.16**	_	0.21**
4. Mindfulness	3.29	0.88	0.23**	-0.09**	0.64**	_

Note. Correlations below the diagonal are at the between-person level. Correlations above the diagonal are at the within-person level. N(observations) = 1,590; n(participants) = 159.

**. Correlation is significant at the 0.01 level (2-tailed).

4.4.2. Hypotheses testing

Uncertainty was positively related to adaptive performance (Estimate $_{within}$ = 0.48, p <.001). Thus, H1 was supported.

Hypothesis 2 expected that the within-person relationship between uncertainty and adaptive performance would be mediated by negative affect. The results indicated a significant within-person indirect effect of negative affect (Estimate$_{within}$ = -0.02, p < .01, 95 % CI [-0.033, -0.007]). Thus, H2 was supported.

Hypothesis 3 expected that mindfulness would moderate the relationship between uncertainty and adaptive performance at the within-person level (Estimate$_{within}$ = 0.48, p < .001, CI 95% [0.28, 0.68]). Further, a simple slope analysis revealed that the relationship between uncertainty and adaptive performance was stronger for those who scored lower on mindfulness (than those who

scored higher) (Estimate = 0.39, $p < 0.01$) and that it was no longer significant for those who scored higher on mindfulness (Estimate = 0.03, $p = 0.93$). For participants who scored higher on mindfulness, adaptive performance showed no significant differences regardless of the levels of uncertainty (see Figure 4.2.). Thus, H3 was supported (Table 4.2. and Figure 4.3.).

Table 4.2. The multilevel model analyses: the influence of uncertainty on adaptive performance, via negative affect, and the moderating role of mindfulness

Predictors	Negative Affect ratio (mediator)			Adaptive Performance (criterion)		
Daily Level	*B*	*SE*	*T*	*B*	*SE*	*T*
Within-level effects						
Intercept	0.95***	0.16	5.77	0.98**	0.23	5.64
Uncertainty	0.20***	0.03	7.08	0.48***	0.03	2.30
Negative Affect	-	-	-	-0.10**	0.03	-3.27
Mindfulness	-	-	-	-	-	-
Uncertainty*Mindfulness	-	-	-	-0.09**	0.03	-3.05
Between-level effects						
Uncertainty	0.43***	0.06	7.58	0.44***	0.12	3.78
Negative Affect	-	-	-	-0.20**	0.03	-6.10
Mindfulness	-	-	-	0.74***	0.09	8.29
Uncertainty*Mindfulness	-	-	-	-0.08*	0.03	-2.56

Note. $N_{(observations)} = 1{,}590$; $n_{(participants)} = 159$. ***$p < .001$, ** $p < .01$, *$p < .05$.

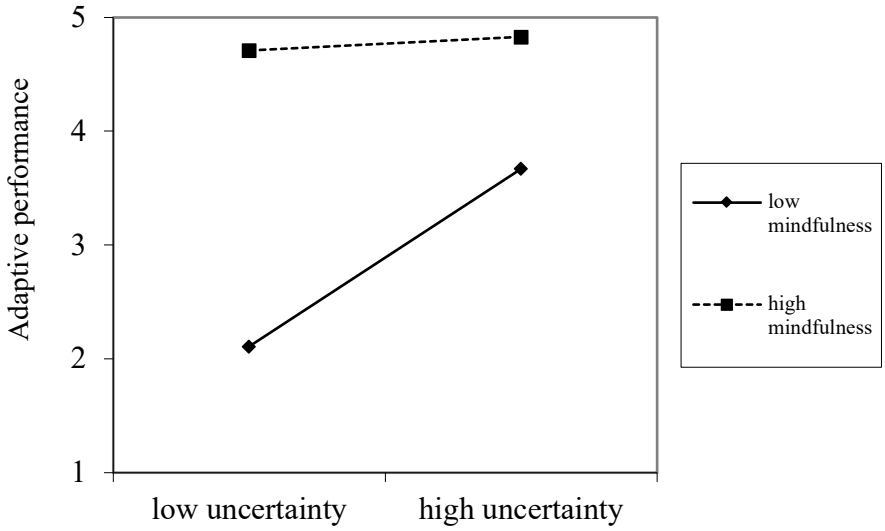


Figure 4.2. Cross-level interaction between daily mindfulness and daily uncertainty predicting daily adaptive performance

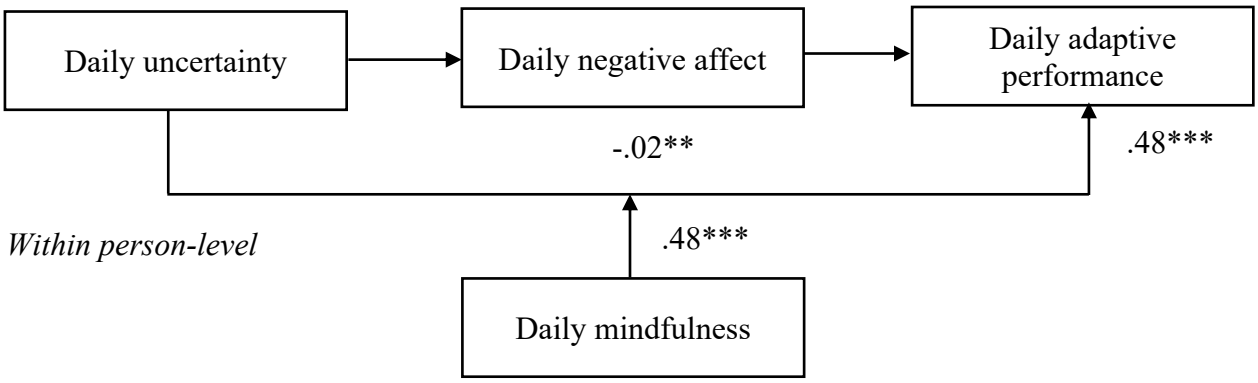


Figure 4.3. Multilevel path model results

***p < .001, **p<.01

4.5. Discussion

Employees' capacity to adapt to new circumstances at work is crucial in the current uncertain environment, marked by rapid technological and business changes. Their adaptation is required because of continually changing job designs and conditions which have been brought on by technological and business changes. Organizations and employees need to adjust and meet important environmental demands that require adaptive change because of the rapid dynamics in working life (Contreras *et al.,* 2020; Franken *et al.,* 2021; Ployhart and Bliese, 2006). For these

reasons, they need to adapt to changing conditions in the workplace, and concepts like routine and stagnation are changing their meaning in today's enterprises (Baard *et al.,* 2014; Moradi *et al.,* 2021).

Our study highlights the critical role of adaptability in navigating these uncertainties and offers new insights into the mechanisms driving adaptive performance. By focusing on the daily impact of uncertainty and the moderating role of mindfulness, our findings reveal important dynamics in contemporary workplaces.

The current uncertain work environment, characterized by rapid technological and business changes, necessitates that employees continually adapt to new job designs and conditions. This study underscores the critical role of adaptability in today's dynamic work settings. By focusing on the daily impact of uncertainty and the moderating role of mindfulness, our findings provide fresh insights into the mechanisms driving adaptive performance in modern workplaces.

Our results align with the integrative model of uncertainty tolerance (Hillen et al., 2017), which suggests that perceived uncertainty can lead to negative affect (e.g., fear or frustration) and specific behaviors (e.g., avoidance or approach). This model supports our findings that uncertainty affects adaptive performance through negative affect, which impacts daily performance. This is consistent with research showing that uncertainty can exacerbate stress and reduce performance (Good et al., 2016). This model supports our findings that uncertainty affects adaptive performance through negative affect, which impacts daily performance. Conversely, our findings diverge from some previous studies that found less significant effects of uncertainty on performance or suggested that uncertainty can sometimes enhance performance by fostering creativity (Miron-Spektor et al., 2011). These studies argue that under some conditions, uncertainty might stimulate innovation and risk-taking, which contrasts with our observation that uncertainty leads to negative affect and decreased performance. This discrepancy may be due to differences in research contexts or methodologies, and it highlights the need for more nuanced investigations into how varying levels of uncertainty impact performance. For instance, while our study indicates that uncertainty primarily generates negative affect, thereby reducing adaptive performance, Miron-Spektor et al. (2011) suggest that in some cases, uncertainty can lead to positive outcomes like creativity and innovation. However, these reactions depend upon the levels of individual or situational factors (e.g. personality or mindfulness). This study demonstrates how and when uncertainty impacts adaptive performance at a daily level. We tested the moderating effect of mindfulness on the

relation between uncertainty and adaptive performance and the mediating effect of negative affect. Overall, the results indicate that uncertainty affects adaptive performance as it leads to negative affective reactions, which, in turn, impact adaptive performance on a daily basis. Moreover, mindfulness shapes the individuals' responses to uncertainty, in a manner so that the association between uncertainty and adaptive performance becomes stronger when they score lower on mindfulness. So, the diary design used in this study allowed us to reveal the dynamic mechanism of the relationship between uncertainty and adaptive performance.

The integrative model of uncertainty tolerance (Hillen *et al.,* 2017) posits that perceived uncertainty can lead to negative affect (e.g., fear or frustration) and certain behaviors (e.g., avoidance or approach), which are influenced by situational or individual factors (e.g., personality or mindfulness). Our study demonstrates that uncertainty impacts adaptive performance through negative affect and that mindfulness can buffer this effect. This highlights the importance of fostering mindfulness in employees to enhance their ability to cope with uncertainty and maintain high adaptive performance.

Our study builds on the work of Glomb et al. (2011) and Dane (2011), who found that state mindfulness enhances workplace outcomes by promoting present-moment awareness and adaptive behaviors. We extend this by demonstrating that mindfulness moderates the relationship between uncertainty and adaptive performance. Specifically, individuals with high mindfulness exhibit stable adaptive performance regardless of uncertainty, while those with low mindfulness show significant fluctuations. This finding is supported by Langer's (1989) socio-cognitive approach, which emphasizes that mindfulness promotes flexibility and openness in dealing with new or challenging situations. However, this contrasts with research suggesting that mindfulness effects are context-dependent and may not uniformly enhance performance across all types of uncertainty (Garland et al., 2015). For instance, some studies have indicated that mindfulness might not significantly buffer the negative impacts of high-stress situations (e.g., Brown & Ryan, 2003). This suggests that while mindfulness generally supports adaptability, its effectiveness might vary depending on the specific nature of the uncertainty or stressor.

The dynamic mechanism revealed by our diary design shows how daily fluctuations in uncertainty and mindfulness affect adaptive performance. This approach provides a nuanced understanding of the temporal aspects of these relationships, offering valuable insights for both researchers and practitioners.

This study makes some contributions to the literature on mindfulness and work-related uncertainty. Firstly, the results show that mindfulness moderates the relationship between uncertainty and adaptive performance, such that it becomes stronger for individuals in a mindful state (versus individuals in a low level of mindful state). Specifically, individuals in a mindful state tend to have higher levels of adaptive performance regardless of their experienced uncertainty. On the other hand, individuals in a low level of mindful state only show high adaptive performance when they perceive an increase in uncertainty. Hence, they may need to change their behaviors when they perceive that uncertainty is increasing; whereas if uncertainty is lower, they may not need to change their behaviors, and as such in that condition their adaptive performance might be inferior (Feldman and Pentland, 2003; Levinthal and Rerup, 2006). Individuals in a low level of mindful state tend to maintain their routines, but when there is high uncertainty, they do tend to adapt their performance; however, even in this case, it is still much less than mindful employees – as these tend to be regularly looking for something to adapt and innovate, regardless of the situation (even in low uncertainty situations) (Pirson *et al.,* 2018). In summary, individuals in a mindful state exhibit higher adaptive performance regardless of uncertainty levels, while those in a low level of mindful state show significant fluctuations in performance based on perceived uncertainty. This finding suggests that mindfulness training could be a key strategy for enhancing employee adaptability in uncertain environments.

Furthermore, the results indicate that negative affect mediates the relationship between uncertainty and adaptive performance, which is consistent with the IMUT (Hillen *et al.,* 2017). Junça-Silva and Silva (2022) showed the significant mediating role of negative affect between uncertainty and mental health. Hence, negative affect appears to be a mechanism that links uncertain working conditions to several outcomes, in this case, adaptive performance. Overall, these findings expand on the literature by showing the mediating role of negative affect and the moderating role of mindfulness in the relationship between uncertainty and adaptive performance.

All in all, mindfulness moderates the relationship between uncertainty and adaptive performance, showing that individuals with lower mindfulness levels are more impacted by uncertainty, resulting in lower adaptive performance. Furthermore, our results indicate that negative affect mediates the relationship between uncertainty and adaptive performance. This aligns with previous research (Junça-Silva and Silva, 2022), reinforcing the idea that emotional responses are crucial in understanding how uncertainty impacts work outcomes.

4.5.1 Limitations and future directions

Our research has some limitations, notwithstanding the theoretical and practical consequences of our findings. To begin with, we employed self-reported measurements, which may have resulted in some common method variance (Podsakoff *et al.,* 2012). Moreover, future research could investigate multisource adaptive performance measures by including those from coworkers, and supervisors. Furthermore, testing the model on other moderators and mediators, to understand the mechanism of the relationship between uncertainty and adaptive performance, might also prove fruitful. Also, not only focusing on employees but also expanding the sample and including managers and leaders can be crucial to understanding "how do managers and leaders navigate uncertainty?" (Loia *et al.,* 2022). Additionally, as a mediator, we used only negative affect so, in future studies, it might be worth testing the effect of positive affect to reach a broader understanding of this issue. A further limitation is that we only focused on the socio-cognitive approach of mindfulness, not the meditative one. Hence, it could be worthwhile to test the effect of meditative mindfulness on the association between uncertainty and adaptive performance.

4.5.2 Practical implications

Exploring the impact of uncertainty on employees' adaptive performance holds significant theoretical and practical implications. The theoretical contribution resides in deepening our understanding of how uncertainty shapes an individual's capacity to adapt effectively. In doing so, it delves into the dynamic processes of how individuals navigate uncertainty, shedding light on the often overlooked nuances of this connection in previous research, offering a more holistic perspective on this pivotal connection. This research delves into the dynamic processes by which individuals navigate uncertainty, shedding light on the often overlooked nuances of this connection. Previous studies, such as those by Karasek and Theorell (1990) and Smith et al. (2015), have highlighted the critical role of uncertainty in influencing adaptive behaviors. Our study builds on these findings, offering a more holistic perspective on this pivotal connection. Furthermore, our study extends the practical applicability of the Integrative Model of Uncertainty Tolerance (IMUT) developed by Hillen *et al.* (2017). By integrating mindfulness and negative affect into the IMUT framework, we provide a more comprehensive understanding of how these factors interact to influence adaptive performance. This approach not only advances theoretical understanding but

also offers practical insights into how organizations can enhance employee adaptability in the face of uncertainty.

In summary, this study addresses the research gaps by critically analyzing previous findings and integrating the roles of mindfulness and negative affect into the IMUT framework. This approach not only advances theoretical understanding but also offers practical insights into how organizations can enhance employee adaptability in the face of uncertainty.

This study indicates that uncertainty is significantly related to negative affect, and in turn, to adaptive performance. In parallel with our study, employees' job performance is hampered by negative affect (Miron-Spektor and Rafaeli, 2009). Gonzalez-Roma et al. (2006) similarly found that employees' job performance is influenced by emotional states. Therefore, recognizing the detrimental effects of negative affect on long-term performance, we propose that managers should implement a range of supportive practices beyond micro-breaks and mindfulness training. These could include fostering open communication channels, timely feedback mechanisms, and creating collaborative spaces to enhance employee resilience towards uncertainty.

Moreover, mindfulness may also be an essential factor in the relationship between uncertainty and adaptive performance. The results indicate that individuals in a mindful state implement adaptive performance easily because they are quick to adjust themselves to their working contexts regardless of whether these are slightly or highly uncertain ones. However, in highly uncertain situations, individuals with lower levels of mindfulness tend to perform better, as their reduced mindfulness appears to mitigate the negative impact of uncertainty on adaptive performance. This finding aligns with the research by Brown and Ryan (2003), who discussed the nuanced role of mindfulness in various performance contexts.

When there is low uncertainty, individuals who have a low level of mindfulness tend to maintain their routines, but when there is high uncertainty, they tend to adapt their performance even if it is much less than the individuals with a high level of mindfulness. Therefore, promoting mindfulness at work could be a strategy to improve their adaptive performance. As such, managers could design training sessions (formal or informal) or mindfulness seminars to improve their employees' competencies to face uncertainty. These findings are consistent with Langer (1989), who emphasized the importance of mindfulness in enhancing cognitive flexibility and adaptive behaviors.

This study bridges the gap between theory and practice by highlighting actionable strategies for enhancing employee adaptability in the face of uncertainty. Future research could explore additional moderators and mediators to further unpack the complex relationship between uncertainty and adaptive performance. Moreover, investigating the effects of positive affect and different types of mindfulness (e.g., meditative) could provide a more comprehensive view of the mechanisms at play. Expanding the sample to include managers and leaders would enhance our understanding of how different organizational roles cope with uncertainty.

From a societal perspective, this research contributes to improving workplace well-being and productivity by identifying practical interventions that can be implemented across various organizational contexts. By demonstrating the benefits of mindfulness training and emotional management strategies, our study offers valuable insights for organizational practices aimed at fostering resilience and adaptability in the workforce.

4.6. Conclusions

This research demonstrates that the relationship between uncertainty and adaptive performance is mediated by negative affect and moderated by mindfulness. Negative affective reactions to uncertainty diminish adaptive performance, while mindfulness mitigates these effects. Individuals with lower mindfulness are more adversely affected by uncertainty, whereas those with higher mindfulness maintain higher performance regardless of uncertainty levels. These findings contribute to the literature by elucidating the dual role of affect and mindfulness in managing workplace uncertainty, extending the Integrative Model of Uncertainty Tolerance (Hillen *et al.,* 2017) to daily workplace dynamics.

Future research should explore additional moderators and mediators, such as positive affect and different types of mindfulness, and include managers and leaders to understand their coping mechanisms. By demonstrating the benefits of mindfulness training and emotional management strategies, our study offers valuable insights for fostering resilience and adaptability in the workforce.

4.7. Ethical Compliance

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. All procedures involving human participants were conducted in accordance with the ethical standards set by the institutional research committee at Iscte – Instituto Universitário de Lisboa (PARECER [Final] PSI_16/2024) and adhered to the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical guidelines. The authors declare no conflicts of interest. Informed consent was obtained from all individual participants included in the study.

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CHAPTER V

How Daily Micro-Events Influence Employees' Daily Overall Health: A Parallel Mediation Path through Daily Uncertainty and Daily Affect[4]

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5.1. Abstract

This study relied on the Affective Events Theory (AET) and Integrative Model of Uncertainty Tolerance (IMUT) to untangle the intricate dynamics by examining how daily micro-events impact employees' daily overall health, elucidating the mediating pathways through uncertainty and affect within the framework of a multilevel diary study. To evaluate the proposed model, we collected daily data over a span of five working days from a sample of 243 employees (243 × 5=1,215). Multilevel modeling showed that daily micro-events influenced daily overall health via daily uncertainty and daily affect. The connections investigated introduce fresh theoretical components to models elucidating the concept of overall health. This study innovatively incorporates uncertainty as a mediating mechanism within the Affective Events Theory (AET), providing fresh insights into the dynamics of employee overall health. By elucidating the interplay between daily micro-events, uncertainty, affect, and overall health, it extends existing theoretical frameworks and offers practical implications for organizational health strategies.

Keywords: Daily micro-events, Daily uncertainty, Daily affect, Daily overall health, Diary study

5.2. Introduction

Employee overall health is a nuanced construct influenced by a plethora of factors, where the prevalence and impact of daily, seemingly minor occurrences—termed micro-events—warrant substantial consideration due to their profound influence (Diener, 2000). Yet these micro-events have not been exhaustively examined within the context of organizational studies. This empirical investigation seeks to enrich the conceptual underpinnings of the Affective Events Theory (AET), as conceptualized by Weiss and Cropanzano in 1996. Specifically, the AET posits that work-related events precipitate emotional responses which, in turn, significantly shape employees' attitudes and behaviors within the workplace.

The literature has shown that factors within the work environment, like daily micro-events, whether uplifts or hassles, have a profound impact on well-being and health (Junça-Silva et al., 2020). There exists a salient lacuna in research surrounding the complex interplay between micro-events, uncertainty, affect, and overall employee health. Through a multilevel diary study methodology, this study endeavors to bridge this gap, presenting new insights on the complex interrelations that go beyond conventional approaches of investigation.

Our study intends to elucidate the mechanisms by which daily micro-events inform emotional reactions (e.g., happy or sad) and thereby influence the broader spectrum of employee health (the judgment that individuals make about their life as a whole or life satisfaction; Diener et al., 1985). In conjunction, we integrate the insights provided by the Integrative Model of Uncertainty Tolerance, as posited by Hillen et al. in 2017, to scrutinize the role of uncertainty within this nexus. Uncertainty refers to an individual's sense of not being able to accurately forecast something (Milliken, 1987).

At the heart of our exploration is the pursuit to discern: How do micro-events affect employee health, and through what mediating mechanisms do uncertainty and affect operate within a multilevel diary study framework? Our study aims are threefold: to dissect the subtle traits of micro-events, to interrogate the mediating functions of uncertainty and affect, and to illuminate the dynamic exchanges among these elements and their effect on employee health. In undertaking this analysis, we intend to offer a substantive contribution to the academic discourse and illuminate the complex web of factors that underpin employee health in the modern work environment. Specifically, the contribution lies in the innovative integration of uncertainty as a mediating mechanism within the Affective Events Theory (AET). This study expands upon the theoretical

boundaries of the AET framework by incorporating uncertainty, thereby shedding light on the nuanced dynamics influencing employee overall health. By elucidating the complex interplay between daily micro-events, uncertainty, affect, and overall health, it not only extends existing theoretical frameworks but also provides valuable insights for developing targeted organizational health strategies.

5.2.1. The relationship between daily micro-events and health

The influential role of health within business contexts is undeniable, impacting both individuals and organizations alike. Recent research underscores the significance of daily micro-events, known as daily hassles and uplifts, within organizational settings, influencing various health indicators such as job satisfaction (Sonnentag et al., 2010). A typical workday is a dynamic interplay of positive and negative micro-events, each exerting its influence on the health and performance of employees (Graf et al., 2017; Junça-Silva et al., 2020), recovery, and relaxation (Parker et al., 2020). These micro-events are essential precursors to understanding health in work environments, shaping daily experiences and behaviors while predicting job performance at different levels within organizations.

Numerous studies highlight the dual nature of daily micro-events, categorizing them into positive uplifts and negative hassles (Kanner et al., 1981). Daily uplifts denote the constructive occurrences within the workplace that contribute to individuals' positive feelings and health on a daily basis. Daily hassles encompass those minor occurrences that may provoke irritation or frustration among individuals in the workplace (Lazarus, 1993). Positive uplifts, such as receiving praise or enjoying meaningful breaks, contribute positively to health, while negative hassles, like encountering a disgruntled colleague or facing interruptions during tasks, pose threats to health. These micro-events not only affect immediate emotional states (e.g., enthusiasm or tension) but also have ripple effects on behavior and performance, both within and between organizational levels (Junça-Silva et al., 2020).

Some studies have shown that they provide insight into the profound emotional fluctuations experienced daily, significantly shaping overall health and well-being (Domagalski & Steelman, 2005). Furthermore, the subjective nature of health, heavily influenced by individual experiences, personality traits, and the work environment, adds another layer of complexity to the understanding of daily micro-events effects (Diener et al., 2017).

The interdisciplinary nature of research on daily micro-events and well-being and health necessitates a comprehensive examination of underlying processes (Taris & Schreurs, 2009). Existing studies often overlook these processes, prompting the need for further exploration (Gross et al., 2011).

5.2.2. The mediating role of affect in the relationship between micro-events and health

The theoretical framework developed by Weiss and Cropanzano in 1996, known as the AET, offers insights into understanding how emotions at work are influenced and their subsequent outcomes (Weiss & Cropanzano, 1996). According to the Affective Events Theory proposed by Weiss and Cropanzano (1996), the workplace environment is characterized by factors that shape the unfolding of affective events on a daily basis. These events elicit either positive or negative emotional responses, subsequently impacting work-related attitudes and behaviors. Affective events are identified as immediate triggers of emotional responses and indirect contributors to overall health.

Utilizing the Affective Events Theory (Weiss & Cropanzano, 1996) as our framework, we embark on an exploration of how daily experiences influence health and performance. These experiences encompass work-related events that trigger positive or negative emotions, subsequently impacting employees' attitudes and behaviors (Weiss & Cropanzano, 1996). We argue that employees' daily micro-events (uplifts and hassles) significantly shape their emotional reactions and subsequent behaviors, such as work engagement and performance. The literature suggests that experiencing positive emotions from daily uplifts, such as peer or managerial support, reduces the likelihood of experiencing negative emotions at work (Sonnentag et al., 2010). These events influence health (Fisher & Noble, 2004), which suggests that individuals are more likely to invest their emotional and cognitive resources in work-related tasks when experiencing positive emotions, leading to improved health. Additionally, Ivancevich (1986) demonstrated that the frequency and intensity of daily uplifts significantly contribute to job performance variance, implying that employees experiencing daily uplifts may report higher levels of health and performance. In the subsequent section, we delve into the relationship between daily uplifts and health as well as between daily uplifts and performance outcomes, proposing a multiple mediator model to elucidate these connections in greater detail.

Hypothesis 1. Daily affect will mediate the relationship between daily micro-events (hassles and uplifts) and daily overall health Specifically, we anticipate that daily hassles and uplifts will contribute to affect, which, in turn, will influence individuals' daily overall health (Figure 5.1.).

5.2.3. The mediating role of uncertainty in the relationship between micro-events and health

Understanding the complex dynamics of how daily experiences shape individuals' health is essential for designing effective interventions to promote mental health. The phenomenon of uncertainty holds significant importance due to its numerous negative psychological effects including negative ones, such as impaired mental health (Han et al., 2011). Despite being an awareness of the unknown, uncertainty often may evoke discomfort and anxiety as individuals tend to prefer familiarity (Hillen et al., 2017).

The Integrative Model of Uncertainty Tolerance (IMUT) provides a comprehensive framework for understanding antecedents and responses to uncertainty (Hillen et al., 2017). According to the IMUT, uncertainty perceptions stem from stimuli, such as micro-events, perceived as unknown, leading to cognitive, affective, and behavioral responses (Dugas et al., 2001). Individual differences, including personality traits, may moderate these responses, intensifying or buffering perceived uncertainty levels (Hillen et al., 2017). Further, studies have consistently shown that uncertainty can induce fear, worry, anxiety, perceptions of vulnerability, and avoidance of decision-making, underscoring its aversive nature and significant consequences for individuals' emotional states (Hillen et al., 2017).

The path from daily hassles to uncertainty and subsequent health can be elucidated by the IMUT (Hillen et al., 2017). Unexpectedly, daily events can trigger uncertainty perceptions, leading to cognitive, affective, and behavioral responses. Individual differences may further influence the intensity of perceived uncertainty. Coping with various events that contribute to perceived uncertainty is a significant challenge in employees' daily work life (Van den Bos & Lind, 2002). Perceived uncertainty manifests as a subjective experience of ignorance, affecting individuals' behaviors and worry levels (Hillen et al., 2017; Van den Bos & Lind, 2002). Moreover, Junça-Silva and Silva (2022) showed that daily uncertainty triggered negative emotions, subsequently diminishing mental health over time.

Hypothesis 2. Daily uncertainty will mediate the relationship between daily micro-events (hassles and uplifts) and daily overall health. Specifically, we anticipate that the ratio between daily hassles

and uplifts will make employees perceive uncertainty, which, in turn, will influence individuals' daily overall health.

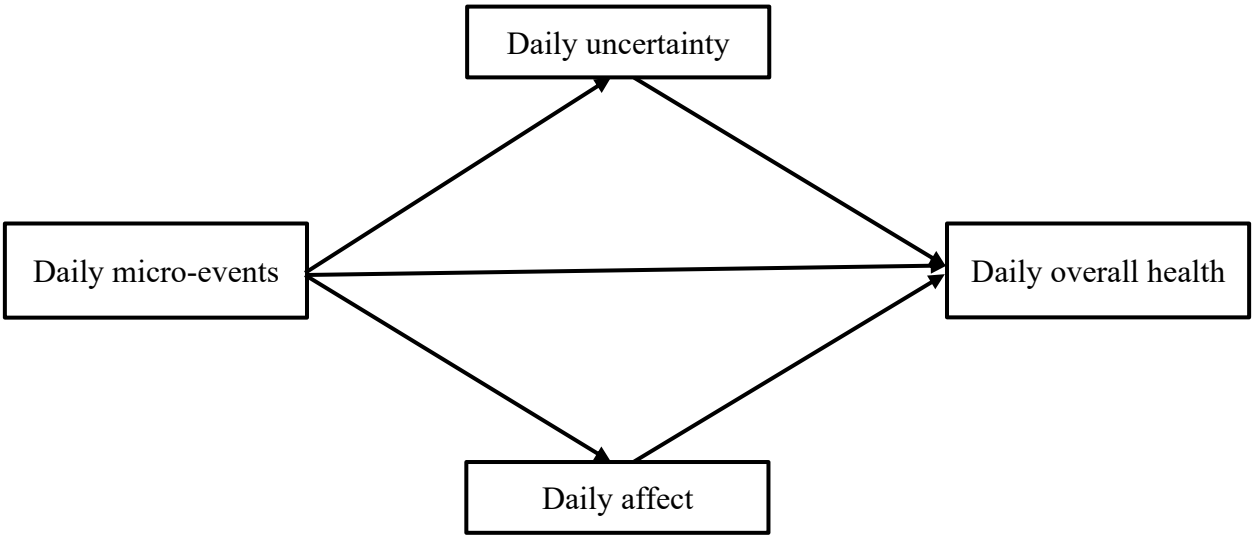


Figure 5.1. The conceptual framework

5.3. Method

5.3.1. Participants and Procedure

Two hundred forty-three working adults participated in this multilevel study. They contributed responses to the daily survey for a duration of 5 days, resulting in a total of 1,215 daily observations (N=243 x 5). The sample consisted of 63% females, with a mean age of 33.69 years (SD = 12.74). Most participants held bachelor's degree (41%) and reported an average organizational tenure of 14 years (SD = 12.49). The sample represented diverse occupational sectors from three different organizations.

Participants were provided with detailed information about the study's objectives and procedures before giving informed consent. The study employed a multilevel research approach, integrating both general and daily diary surveys conducted over five workdays (Monday to Friday). Initially, a general survey was administered one week prior to the daily data collection period. Subsequently, participants were instructed to complete a brief daily survey during a week. To facilitate daily participation, participants received email reminders containing hyperlinks to the daily survey. Clear instructions were provided, and participants were reminded daily to complete

the survey by the end of the working day. Out of the 300 employees initially agreeing to participate, 243 provided valid responses across all five days, resulting in a response rate of 81%.

5.3.2. Materials

Micro-events. We utilized a 15-item scale (Junça Silva et al., 2020), to assess daily hassles and uplifts in the workplace. The scale comprises two subscales: one measuring daily hassles (consisting of 7 items, such as "Today, I had to deal with someone in a rotten mood") and the other assessing uplifts (with eight items, like "Today, I received positive feedback on my performance"). Participants rated their experiences on a 5-point scale ranging from 1 (never) to 5 (4 times or more). Reliability analyses yielded satisfactory results, with $\alpha = .80$ for daily hassles and $\alpha = .70$ for daily uplifts for over the span of 5 days. To examine our hypotheses, we computed a ratio between daily uplifts and hassles. This ratio enables us to discern the proportion of daily uplifts relative to daily hassles. Specifically, a ratio greater than one indicates that daily uplifts occurred more frequently than daily hassles.

Uncertainty. To assess the daily level of uncertainty, we employed four statements derived from the Organizational Change Scale (Rafferty & Griffin, 2006), such as "Today, I was unsure about how to react to changes." Respondents rated each statement on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's α over the span of 5 days was calculated to be .89.

Affect. We assessed daily affect using the Multi-Affect Indicator (Warr et al., 2014), selecting 12 items out of the full questionnaire which originally comprised 16 items; 6 positive and 6 negative. It was designed to assess the frequency of positive and negative affect experienced at work each day (e.g., "enthusiastic", "sad"). Participants provided responses on a 5-point scale ranging from 1 (never) to 5 (always). Multilevel reliability analyses revealed satisfactory reliability for daily positive emotions with a Cronbach's α of .82 and negative emotions with a Cronbach's α of .85. To test our hypotheses, we calculated a ratio that compared the frequency of positive affect to negative affect. This ratio helps us determine how often positive emotions were experienced relative to negative emotions. A ratio higher than one signifies that participants experienced more positive affect than negative affect.

Health. We used seven items from the SF36 health survey (Ware et al., 2007) covering three dimensions which are overall health (one item), mental health (3 items), and vitality (3 items). The

overall health scale item is “Please tell us how you think your health is?” with a 5-point scale ranging from 1 (very bad) to 5 (excellent). The mental health scale includes an item “During work today, how often did you feel happy?” with a 5-point scale ranging from 1 (never) to 5 (always). Moreover, the vitality scale includes an item “During work today, how often did you feel full of life? with a 5-point scale ranging from 1 (never) to 5 (always). The Cronbach’s α over the span of 5 days was calculated to be 0.87.

Control Variables. We included age, sex, and trait affect as control variables in our analysis to address potential confounding factors that might influence the relationship between daily micro-events, daily uncertainty, daily affect, and overall health. Participants provided their age and sex at the start of the study, and we measured trait affect.

While these variables were considered important, our results showed that they did not have a significant impact on the outcomes we were examining. Given their lack of significant effects, we concluded that age, sex, and trait affect did not confound our primary relationships of interest. Thus, for the sake of clarity and simplicity, we have chosen to present our main findings without these control variables.

5.3.3. Data Analysis

Firstly, to examine daily micro-events, we compute a ratio between daily hassles/uplifts. This ratio serves to evaluate the relative magnitude of daily uplifts in relation to daily hassles. A ratio exceeding 1 indicates a predominance of daily uplifts over hassles. This analytical approach suggests that daily hassles and uplifts are not independent occurrences but rather influence each other in some way.

Secondly, in order to assess for any potential common method bias, confirmatory factor analyses were conducted. The findings revealed that the four-factor model, encompassing micro-events, uncertainty, affect and health demonstrated a good fit with the data (root mean square error of approximation (RMSEA) = 0.13, comparative fit index (CFI) = 0.97, Tucker-Lewis index (TLI) = 0.91, Standardized root mean square residuals (SRMR) = 0.03).

Thirdly, the multi-level analysis approach was employed, utilizing nested data to explore the underlying model. Initially, we conducted an analysis of variance components and calculated the Intraclass Correlation Coefficients (ICCs) to determine the extent of variance attributable to within-individual and between-individual differences. The results revealed significant variance in

daily micro-events (ICC = 0.70), daily uncertainty (ICC = 0.89), daily affect (ICC = 0.81), and daily overall health (ICC = 0.87). These ICC values indicate considerable variability in these variables both within and between individuals, justifying further investigation through multilevel analysis.

Finally, for hypothesis testing, we utilized the "Multilevel Mediation" (MLMed) macro within SPSS (Rockwood, 2020). This macro has been noted for its ability to yield similar results in estimating model parameters compared to other software alternatives, such as Mplus. Moreover, it is particularly suited for models incorporating level-2 moderators (Rockwood, 2020). Hence, MLMed serves as an appropriate tool for evaluating both our 1-(1-1)-1 multilevel model.

5.4. Results

5.5.1. Descriptive statistics and correlations

The descriptive statistics and correlations are presented in Table 5.1.

Table 5.1. Descriptive statistics and correlations between variables

	Mean	SD	1	2	3
5. Daily micro-events	1.75	.83	1		
6. Daily uncertainty	2.52	.80	-.430**	1	
7. Daily affect	1.95	1.12	.531**	-.468**	1
8. Daily overall health	3.57	.81	.600**	-.353**	.658**

**. Correlation is significant at the 0.01 level (2-tailed).

5.5.2. Hypothesis testing

Hypothesis 1 proposed that daily affect will mediate the relationship between daily micro-events (hassles and uplifts) and daily overall health Specifically, we anticipate that daily hassles and uplifts will contribute to affect, which, in turn, will influence individuals' daily overall health. Daily micro-events are negatively related to daily uncertainty (γ = -0.19, $p < .001$). Daily uncertainty is negatively related to daily health ($\gamma = -0.09$, $p < .05$), with a significant indirect effect of ($\gamma = 0.02$, $p < .05$) (95%CI [0.01, 0.03]). Hence, the findings in Table 5.2. supported Hypothesis 1.

Table 5.2. Parameter estimates for multilevel mediation model

	Outcome					
	Daily uncertainty			Daily overall health		
	Ý	SE	95% CI	Ý	SE	95% CI
Direct effect						
Daily micro-events	-0.19*	0.04	(-0.26, -0.12)	0.33*	0.03	(0.27, 0.39)
Daily uncertainty	–	–	–	-0.09**	0.03	(-0.14, -0.04)
Indirect effect						
Daily micro-events (via uncertainty)	–	–	–	0.02**	0.01	(0.01, 0.03)
-2LL	7234.94					
AIC	7246.94					
BIC	7284.14					

*p <.001, *p <.05.

Hypothesis 2 proposed that daily uncertainty would mediate the relationship between daily micro-events (hassles and uplifts) and daily overall health. Specifically, we anticipated that the ratio of daily hassles to uplifts would lead employees to perceive uncertainty, which, in turn, would influence their daily overall health. Daily micro-events were positively related to daily affect ($\gamma = 0.38$, $p < .001$), while daily affect was positively related to daily health ($\gamma = 0.26$, $p < .001$), with a significant indirect effect ($\gamma = 0.10$, $p < .001$; 95% CI [0.07, 0.13]). The direct effect of daily micro-events on daily overall health was significant ($\gamma = 0.3309$, $p < .001$). Therefore, the relationship between daily micro-events and daily overall health includes both direct and indirect effects, supporting Hypothesis 2 as shown in the results displayed in Table 5.3.

Table 5.3. Parameter estimates for multilevel mediation model

	Outcome					
	Daily affect			Daily overall health		
	Ý	SE	95% CI	Ý	SE	95% CI
Direct effect						
Daily micro-events	0.38*	0.04	(0.29, 0.46)	0.33*	0.03	(0.27, 0.39)
Daily affect	–	–	–	0.26*	0.02	(0.22, 0.31)
Indirect effect						
Daily micro-events (via affect)	–	–	–	0.10*	0.01	(0.07, 0.13)
-2LL	7234.94					
AIC	7246.94					
BIC	7284.14					

*p <.001.

5.5. Discussion

This study stands as an addition to the evolving discourse on employee health, offering comprehensive insights into the complex interplay between daily micro-events, uncertainty, affect, and overall employee health. By integrating theoretical frameworks from the Affective Events Theory (AET) and the Integrative Model of Uncertainty Tolerance (IMUT), we not only shed light on the complex mechanisms underlying employee health but also pave the way for an understanding of the factors shaping health within contemporary organizational contexts.

Through the application of multilevel modeling, it was demonstrated that the micro-events experienced on a daily basis have a significant impact on one's overall health each day. This influence occurs through a process mediated by daily uncertainty and daily affect. Specifically, the model revealed that these seemingly minor daily events contribute to fluctuations in daily uncertainty, which in turn affect daily emotional states. These emotional states, referred to as daily affect, then play a crucial role in shaping the overall health experienced on any given day. Consequently, the interconnected nature of daily micro-events, uncertainty, and affect underscores the complex dynamics that contribute to daily health outcomes.

5.5.1. Theoretical Implications

Our study contributes to the theoretical landscape by advancing our understanding of the complex dynamics between daily micro-events, uncertainty, affect, and employee health. Grounded in the Affective Events Theory (AET), our findings underscore the impact of daily micro-events on employee health, emphasizing the pivotal role of emotional responses in shaping attitudes and behaviors (Weiss & Cropanzano, 1996). This aligns with the work of Junça-Silva and Caetano (2024), who proposed and tested an affect-to-behaviour-to-outcome route, demonstrating how daily micro-events and subsequent affective reactions lead to performance and satisfaction after work, with mental health moderating this process. Moreover, by incorporating insights from the Integrative Model of Uncertainty Tolerance (IMUT), we elucidate the mediating role of uncertainty perception in the relationship between micro-events and health, highlighting the multifaceted nature of employee experiences in the face of uncertainty (Hillen et al., 2017).

One of the key theoretical contributions of our study lies in the recognition of the dualistic nature of daily micro-events, encompassing both positive uplifts and negative hassles (Junça-Silva et al., 2020). By adopting a nuanced approach that considers the relative balance between these

events, we provide a more comprehensive understanding of their implications for employee health. This perspective challenges traditional dichotomous views of workplace experiences and underscores the need for a deeper understanding of the complexities of daily micro-events and their varied impacts on employee health.

Furthermore, our findings extend existing theoretical frameworks by elucidating the complex interplay between uncertainty, affect, and health. By demonstrating the mediating role of affect in the relationship between micro-events and health, we underscore the importance of emotional experiences in shaping overall health and well-being outcomes (Weiss & Cropanzano, 1996). This finding resonates with theories highlighting the significance of affective experiences in shaping behavior and attitudes, further underscoring the need for a comprehensive holistic approach to understanding employee health.

Lastly, the daily diary methodology employed in this study offers a vantage point for understanding the temporal dynamics of employee health. Unlike traditional cross-sectional designs, which provide snapshots of health at a single point in time, daily diary studies capture the ebb and flow of daily experiences and their immediate effects on well-being and health (Bolger & Laurenceau, 2013). This temporal granularity allows for a more detailed understanding of the processes underlying health fluctuations, shedding light on how daily micro-events unfold and interact with individuals' cognitive and affective states over time.

5.5.2. Practical Implications

The practical implications of our findings are manifold and hold significant relevance for organizational management and the design of interventions aimed at enhancing employee health. Foremost, our findings underscore the importance of recognizing and addressing the impact of daily micro-events on employee health. By fostering a work environment that values and acknowledges the significance of daily uplifts while mitigating the occurrence of daily hassles, organizations can create conditions conducive to employee health and organizational effectiveness. By recognizing the pivotal role of daily micro-events in shaping employee health, organizations can implement targeted interventions to foster a positive work environment and enhance employee resilience. For instance, by promoting a culture of recognition and support, organizations can amplify the occurrence of daily uplifts and mitigate the impact of daily hassles on employee well-being and health (Cameron & Caza, 2004).

Our main message is by equipping employees with the resources and support needed to navigate uncertainty, organizations can mitigate its adverse effects on health and promote resilience in the face of change. Our findings highlight the importance of proactively managing uncertainty perceptions in the workplace. Organizations can implement strategies aimed at reducing uncertainty through transparent communication, fostering a supportive organizational culture, and providing opportunities for skill development and adaptation (Mishra et al., 1998).

Furthermore, our findings underscore the importance of cultivating positive affective experiences within the workplace. Organizations can foster a positive work environment by providing opportunities for employees to experience positive emotions through recognition programs, team-building initiatives, and social support networks (Fredrickson, 2001). By nurturing a climate characterized by positive affect, organizations can enhance employee health and foster a culture of engagement and resilience.

As a result, in an era where the success of organizations is intricately tied to the vitality of their workforce, understanding the intricate web of factors influencing employee health emerges as a critical imperative for both academic inquiry and practical organizational management. This underscores the urgency for both academic inquiry and practical organizational management to unravel the complexities of factors influencing employee health in today's organizational landscape. Moreover, by delving into the mechanisms that elucidate the relationship between daily micro-events and health, researchers can provide valuable insights into fostering positive work environments and enhancing employee health. In doing so, organizations can cultivate environments conducive to flourishing individuals and thriving businesses.

5.5.3. Limitations and Future Directions

Despite its methodological strengths, this study is not without limitations. Firstly, the generalizability of our findings may be limited by the characteristics of our sample and the context of our study. Future research endeavors could replicate our findings in diverse populations and organizational settings to enhance the external validity of our results.

Moreover, the daily diary methodology employed in this study captures only short-term fluctuations in health and may not capture longer-term trends or trajectories. Future research could adopt a large longitudinal approach to examine the enduring effects of daily micro-events on employee health over time.

Additionally, while our study focused on the mediating roles of uncertainty and affect in the relationship between micro-events and health, other potential mechanisms and moderators may influence this relationship. Future research could explore additional factors, such as individual differences, coping strategies, and organizational contextual factors, to provide a more comprehensive understanding of well-being and health dynamics

Furthermore, the daily diary methodology utilized in this study relies on self-report measures, which may introduce common method bias and social desirability effects, potentially influencing the validity of our findings (Podsakoff et al., 2003). Future research could employ multimodal assessment techniques, such as physiological monitoring or behavioral observations, to complement self-report data and provide a more holistic understanding of health dynamics.

In conclusion, this study offers valuable insights into the interplay between daily micro-events, uncertainty, affect, and employee health. By leveraging the daily diary methodology and integrating multiple theoretical frameworks, we advance our understanding of the mechanisms underlying employee health and offer practical implications for organizational practitioners. Moving forward, researchers and practitioners alike can leverage these insights to foster positive work environments and enhance employee health in a rapidly changing world.

5.6. Conclusion

In conclusion, this study advances our understanding of employee health by elucidating the interplay between daily micro-events, uncertainty, affect, and overall health. By integrating insights from AET and IMUT, we provide a nuanced perspective on the mechanisms underlying employee health and offer practical implications for organizational management.

5.7. Ethical Compliance

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. All procedures involving human participants were conducted in accordance with the ethical standards set by the institutional research committee at Iscte – Instituto Universitário de Lisboa and adhered to the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical guidelines. The authors declare no conflicts of interest. Informed consent was obtained from all individual participants included in the study.

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CHAPTER VI

GENERAL DISCUSSION

6.1. Summary of Findings

Gaining insights into how organizations effectively navigate uncertainty in complex and rapidly evolving environments is more important than ever. This thesis examines various aspects of organizational behavior in VUCA world. Through four empirical studies, it explores the conceptual foundations of VUCA settings, investigates how telework affects adaptive performance, analyzes the impact of daily uncertainty on performance, and examines how daily micro-events influence employees' overall health. Together, these studies aim to provide a comprehensive understanding of uncertainty in organizational contexts, addressing both theoretical and practical dimensions.

In recent years, the VUCA acronym has become a staple in describing organizational environments characterized by high levels of uncertainty. However, as revealed through the systematic review presented in this thesis (Chapter II), the definitions and components of VUCA are often blurred, overlapping, and inconsistently applied (Bennett & Lemoine, 2014). To address these ambiguities, this study provides a comprehensive conceptual map to clarify each component of VUCA—volatility, uncertainty, complexity, and ambiguity. This map not only offers a more precise understanding of these elements but also serves as a critical foundation for future research and practical applications. While the study is exploratory in nature and constrained by limited empirical data, it marks a step toward resolving the conceptual ambiguities surrounding VUCA and enhances its utility for understanding uncertainty in organizational environments.

The research also delves into the effects of teleworking on employees' adaptive performance (Chapter III), with a particular focus on the roles of negative affect and leadership effectiveness. Drawing on the Conservation of Resources theory, the findings demonstrate that effective leadership plays a crucial role in mitigating the negative impacts of telework. This underscores the importance of leadership in remote work settings, where uncertainty about communication, performance expectations, and workplace dynamics can challenge employees. The results highlight the need for organizations to develop strategies that enhance leadership effectiveness to support both employee performance and well-being. These findings are particularly relevant in light of the growing prevalence of teleworking, offering insights into how organizations can address uncertainty in virtual work environments.

In exploring how daily uncertainty impacts adaptive performance (Chapter IV), this thesis includes a daily diary approach to capture the nuances of employees' experiences. The study shows

that daily uncertainty influences adaptive performance through its effects on negative affect, with mindfulness playing a moderating role. Mindfulness practices significantly buffer the negative impacts of daily uncertainty, highlighting their potential as a coping mechanism for employees. These results suggest that organizations should actively promote mindfulness initiatives to help employees manage the psychological challenges posed by uncertainty. This study extends the integrative model of uncertainty tolerance, emphasizing the value of mindfulness as a resource for employees navigating daily workplace challenges. By addressing the interplay between uncertainty, negative affect, and mindfulness, this study contributes to both theoretical advancements and practical recommendations for managing uncertainty in organizational contexts.

The thesis further investigates how daily micro-events at work influence employees' overall health (Chapter V), with a specific focus on the mediating roles of daily uncertainty and affect. By incorporating uncertainty as a mediating factor, this study adds a new dimension to Affective Events Theory, which traditionally focuses on the relationship between workplace events and emotions. The findings reveal that daily experiences at work significantly affect overall health, underscoring the importance of managing these events to improve employee well-being. This study highlights that addressing daily uncertainty and affect can lead to healthier work environments, offering organizations actionable insights into fostering employee health. The integration of uncertainty into the Affective Events Theory framework provides a novel perspective on how micro-events shape employees' well-being, further emphasizing the pervasive role of uncertainty in the workplace.

Together, the findings of this thesis advance our understanding of the pervasive role of uncertainty in organizational behavior. By clarifying the conceptual underpinnings of VUCA, examining the effects of telework on adaptive performance, analyzing the impact of daily uncertainty on performance, and exploring how daily micro-events influence overall health, this research provides both theoretical contributions and practical insights. The studies collectively underscore the importance of addressing uncertainty at multiple levels—conceptual, individual, and organizational—while offering actionable strategies to enhance employee performance and well-being in uncertain environments. Table 6.1. summarizes the main research questions and findings in each chapter.

Table 6.1. Main research questions and findings in each chapter

Chapter	Research Questions	Method	Main Findings	Status
Chapter II: Clarifying the Conceptual Map of VUCA: A Systematic Review	- How can we define the components of the acronym VUCA? - What constructs contribute to the definition of VUCA? - What are the fundamental components necessary for the effective functioning of the VUCA acronym?	Systematic review	Several overlaps and relationships between the four terms were identified. A conceptual map was proposed to serve as a basis for future research and practice.	Published in International Journal of Organizational Analysis
Chapter III: Perceived Effects of Teleworking on Adaptive Performance: A Moderated Mediation Model of Leadership Effectiveness and Negative Affect	- Does negative affect mediate the impact of perceived telework effects on adaptive performance? - Does leadership effectiveness moderate the indirect influence of perceived telework effects on adaptive performance through negative affect, with a potential weakening of the indirect effect under higher levels of perceived effective leadership?	Cross-sectional study	Significant indirect effect of perceived telework effects on adaptive performance through negative affect. Leadership effectiveness moderated the indirect effect, with a stronger effect for less effective leaders.	Published in International Journal of Organizational Analysis
Chapter IV: A Within-Individual Study on the Relationship between Daily Uncertainty and Daily Adaptive Performance: The Moderating Role of Daily Mindfulness	- Will daily uncertainty positively predict daily adaptive performance? - Will daily uncertainty's relationship with daily adaptive performance be mediated by daily negative affect? - Will daily mindfulness moderate the association between daily uncertainty and daily adaptive performance?	Multilevel-diary study	Negative affect mediated the within-person effect of uncertainty on adaptive performance. Mindfulness moderated the relationship, with a stronger effect for individuals scoring lower on mindfulness.	Accepted and in press in the Management Research Review

Table 6.1. (Continued)

Chapter	Research Questions	Method	Main Findings	Status
Chapter V: How Daily Micro-events Influence Employees' Daily Overall Health: A Parallel Mediation Path through Daily Uncertainty and Daily Affect	- How do daily micro-events impact employees' daily overall health? - What are the mediating pathways through daily uncertainty and daily affect?	Multilevel -diary study	Daily micro-events influenced daily overall health via daily uncertainty and daily affect. The findings introduced fresh theoretical components to models elucidating the concept of overall health.	Submitted to a journal in Q1

6.2. Theoretical Implications

This thesis provides a nuanced exploration of uncertainty and its impact on organizational behavior, contributing to a deeper understanding of how uncertainty interacts with adaptive performance, emotional experiences, and overall well-being. Across four empirical studies, we examine uncertainty as a cognitive and emotional construct, emphasizing its dual role as both a challenge and a catalyst for growth. The findings align with previous research, which identifies uncertainty as a cognitive process with significant emotional components, including tension, worry, and anxiety (Bal & Van den Bos, 2012; Buhr & Dugas, 2002). Psychological stress theory posits that uncertainty acts as a stressor that impairs emotional regulation and adaptive capacities (Öz, 2001; Sarıçam et al., 2014). Our results build on these foundations, showcasing how uncertainty influences employees' immediate emotional states and long-term behavioral outcomes.

A relevant contribution of this thesis lies in advancing the understanding of uncertainty as a multidimensional construct within the VUCA framework. Study 1 distinguishes between uncertainty and related constructs like ambiguity, highlighting their unique but interconnected effects. While uncertainty often arises from insufficient information and can be addressed through knowledge acquisition, ambiguity stems from interpretive challenges that resist resolution (Bennett & Lemoine, 2014). Complexity involves interconnected variables, while volatility pertains to rapid and unpredictable changes. These distinctions not only clarify theoretical ambiguities but also guide targeted organizational interventions (Bennett & Lemoine, 2014; Millar et al., 2018).

Integrating these models demonstrates the critical role of uncertainty management in enhancing resilience and adaptability at both individual and organizational levels. On an individual level, fostering uncertainty tolerance involves developing emotional intelligence, adaptive problem-solving skills, and mindfulness practices. For organizations, this entails creating a culture of transparency, open communication, and emotional support to enable employees to thrive in uncertain environments. By applying these frameworks, individuals and organizations can better navigate the complexities of an ever-changing world, ultimately improving performance and well-being.

This thesis also deepens insights into the role of individual differences in managing uncertainty. By including the Integrative Model of Uncertainty Tolerance (IMUT) (Fischer et al., 2021), the findings emphasize how individuals with higher tolerance for uncertainty exhibit greater

resilience and adaptability in dynamic environments. Furthermore, the research highlights the importance of affective mechanisms, such as mindfulness and emotional regulation, in buffering the adverse effects of uncertainty. This aligns with Affective Events Theory (Weiss & Cropanzano, 1996), which emphasizes the dynamic interplay between daily experiences and emotional responses.

The concept of adaptive performance continues to evolve, with ongoing research exploring its antecedents, outcomes, and measurement. Scholars emphasize its role in fostering organizational agility, innovation, and resilience in uncertain environments (Griffin et al., 2007; Ployhart & Bliese, 2006; Pulakos et al., 2019). Future studies may further elucidate the mechanisms through which adaptive performance supports individual and organizational success, offering valuable insights into how entities can thrive in a rapidly changing world. By embracing adaptive performance, organizations can cultivate a workforce prepared to meet the challenges of uncertainty, ensuring sustained success in an ever-evolving landscape.

Study 2 introduces preveived leadership effectiveness as a moderator of uncertainty, with significant implications for organizational behavior. Leaders who demonstrate emotional intelligence, clear communication, and conflict resolution skills buffer the stress-inducing effects of uncertainty, fostering trust and psychological safety. These findings resonate with the Job Demands-Resources (JD-R) Theory (Bakker & Demerouti, 2007), which posits that effective leadership can transform job demands, such as uncertainty, into opportunities for growth by providing the necessary resources. Incorporating AI-driven leadership tools, such as sentiment analysis for communication or decision-support systems, could further enhance leadership effectiveness, particularly in managing uncertainty in technologically dynamic environments (Avolio et al., 2014).

Understanding the moderating role of leadership effectiveness in contexts of uncertainty has significant practical implications. Organizations operating in VUCA environments must prioritize leadership development, focusing on emotional intelligence, conflict resolution, and communication skills. By investing in leadership effectiveness, organizations can enhance employee resilience, foster innovation, and maintain high levels of performance even in the face of ambiguity (CCL, 2023; Goleman, 1998; Wright & Cropanzano, 2000). Effective leaders not only guide their teams through ambiguous situations but also create a supportive work environment that enhances employee well-being and performance.

Study 3 further integrates mindfulness as a moderator, demonstrating how attentiveness and cognitive flexibility enable employees to adapt to daily uncertainty. Drawing on Langer's socio-cognitive mindfulness framework (Brown & Ryan, 2003; Hyland et al., 2015; Langer, 1989), the findings suggest that mindfulness-based practices can mitigate negative affect responses, enhancing both individual and organizational resilience. Digital mindfulness programs, such as meditation apps and online platforms, represent an innovative and scalable solution for organizations to support employees in managing workplace challenges (Good et al., 2016). Expanding mindfulness practices to team-level interventions, where groups collectively engage in mindfulness practice, could amplify its effects on collaboration, innovation, and overall organizational performance (Reb et al., 2014).

Study 4 situates uncertainty within the context of daily micro-events, illustrating how seemingly minor experiences cumulatively shape overall well-being and performance. This novel perspective highlights how uncertainty mediates the relationship between micro-events and broader outcomes, underscoring the compound effects of repeated exposure to daily challenges. The findings also contribute to the literature on positive organizational scholarship, which emphasizes the role of positive experiences in fostering resilience and adaptability (Cameron et al., 2003). Organizations can use these insights to create strategies that amplify the positive impact of daily uplifts and minimize the adverse effects of hassles. For instance, implementing recognition programs, promoting clear communication, and fostering a supportive work culture can enhance positive emotional experiences and reduce uncertainty. Training programs focused on emotional intelligence and mindfulness can help employees manage the emotional challenges posed by daily hassles, reducing their impact on uncertainty and overall well-being. The key theoretical implications of this thesis are summarized in Table 6.2., which provides an overview of the major contributions to the understanding of uncertainty and its effects on organizational behavior.

Table 6.2. Summary of theoretical implications

Theoretical Domain	**Main Contribution**
Uncertainty as a Multidimensional Concept	Differentiates uncertainty, ambiguity, complexity, and volatility within the VUCA framework, guiding targeted organizational strategies.
Tolerance for Uncertainty	Highlights individual differences in managing uncertainty, with mindfulness and emotional regulation buffering negative effects.
Adaptive Performance	Links adaptive performance to organizational agility and innovation, suggesting future research on its role in uncertain contexts.
Leadership Effectiveness	Demonstrates how effective leadership mitigates uncertainty, enhancing trust, psychological safety, and growth opportunities.
Mindfulness	Shows mindfulness reduces negative effects of uncertainty, promoting resilience and well-being through individual and team practices.
Daily Micro-events	Highlights the role of daily micro-events in shaping well-being and performance, with strategies to amplify positive impacts and reduce negative ones.

6.3. Practical Implications

The findings of this thesis provide a robust framework for organizations seeking to navigate the complexities of a VUCA world. The practical implications are extensive, offering strategies that address leadership development, employee well-being, and innovative organizational practices to thrive under volatile and uncertain conditions.

Leadership emerges as a cornerstone for mitigating the negative effects of uncertainty. By fostering environments of trust and psychological safety, leaders can empower employees to adapt effectively to rapidly changing circumstances. Leadership training programs incorporating advanced technologies, such as AI-driven tools, can significantly enhance decision-making and communication. Predictive analytics for workforce management and AI-based platforms for real-time sentiment analysis represent critical innovations, enabling leaders to offer clarity and stability in uncertain contexts (Avolio et al., 2014). Furthermore, such programs should prioritize the development of emotional intelligence, conflict resolution, and communication skills, enabling leaders to better support employees during ambiguous situations.

The findings underscore the importance of addressing the emotional dimensions of uncertainty. Organizations can implement mindfulness training programs to equip employees with tools to regulate negative affect, thereby enhancing their resilience and adaptability. For instance, tailored mindfulness programs delivered through digital platforms, such as apps or virtual workshops, can provide employees with accessible methods for managing stress. Embedding mindfulness into the organizational culture through structured team practices or reflective exercises can transform uncertainty into a driver of innovation and collective growth (Langer, 1989; Good et al., 2016). These programs can foster collective mindfulness, enhancing team cohesion and creativity in dynamic environments (Weick & Sutcliffe, 2001). These interventions not only support individual well-being but also enhance team cohesion and foster creativity in dynamic environments.

Daily micro-events were identified as significant influencers of employee well-being and overall health. Addressing these events through targeted initiatives, such as recognition programs, open communication channels, and conflict resolution strategies, can foster a positive emotional climate within the organization. By emphasizing the role of positive experiences in mitigating the adverse effects of daily uncertainty, these practices align with the principles of positive

organizational scholarship, which focus on building resilience and adaptability through daily uplifts and reduced workplace hassles (Cameron et al., 2003).

The evolving nature of work, particularly the increasing prevalence of teleworking, presents both challenges and opportunities. Hybrid work models that balance flexibility with structured support systems have become essential in navigating the uncertainties associated with remote work. Transparent communication, robust technological infrastructure, and AI-driven collaboration tools can enhance team coordination and reduce the stress of ambiguity in virtual environments. These measures also support employee autonomy and well-being, reflecting the critical role of telework in modern organizational strategies. Leadership effectiveness remains pivotal in these contexts, as leaders who communicate transparently and provide meaningful support can significantly mitigate the uncertainties faced by teleworking employees.

The interplay of affect and leadership effectiveness highlights the necessity of integrating these findings into organizational practices. Organizations can benefit from leadership development initiatives that focus on the interplay between emotional intelligence and communication skills. Equipping leaders to address both the cognitive and emotional needs of their teams can enable employees to thrive, even under ambiguous and challenging conditions. Additionally, fostering a culture that recognizes and addresses the impact of daily micro-events can further strengthen organizational resilience, ensuring that employees feel valued and supported on a day-to-day basis.

In sum, the practical implications derived from these findings provide a roadmap for organizations aiming to thrive in a VUCA world. By investing in leadership development, employee well-being, and innovative technologies, organizations can turn uncertainty into an opportunity for growth, innovation, and sustained performance.

6.4. Limitations and Directions for Future Research

While this thesis offers valuable contributions, several limitations warrant attention. First, the reliance on self-reported data introduces the possibility of social desirability bias. Future studies should, for instance, incorporate objective measures, such as physiological indicators of stress or performance metrics, to triangulate findings and enhance validity. Incorporating methods like cortisol level assessments for stress (Hellhammer et al., 2009) or wearable devices for tracking physiological responses could add robustness to future research designs.

Second, the short-term focus of the diary studies limits our understanding of the long-term effects of uncertainty. Large longitudinal designs are needed to explore how sustained exposure to uncertainty influences adaptive performance, well-being, and organizational outcomes. For instance, longitudinal methods have proven effective in capturing the evolving impacts of workplace stressors over time. Additionally, future research could examine the role of digital transformation in shaping uncertainty, particularly in industries undergoing rapid technological change. Digital technologies, such as artificial intelligence and automation, are both sources of uncertainty and tools for managing it, as highlighted by Brynjolfsson and McAfee (2014).

Third, while the present study focused on a parallel mediation model, future research may benefit from exploring alternative explanatory mechanisms. For instance, it may be theoretically plausible to test whether daily uncertainty not only acts as a mediator but also moderates the relationship between daily positive affect and overall health. In highly uncertain contexts, the influence of positive affect on health outcomes may differ in strength or direction, suggesting a potential interaction effect. This perspective aligns with recent developments in uncertainty tolerance literature (e.g., Hillen et al., 2017) and expands the scope of affective events theory (Weiss & Cropanzano, 1996) by integrating contextual sensitivity into affect-health relationships. Investigating such moderation models may provide a more nuanced understanding of how employees psychologically navigate daily experiences in uncertain environments.

Fourth, the cultural homogeneity of the sample limits the generalizability of findings across diverse cultural contexts. Given that uncertainty tolerance and coping mechanisms are influenced by cultural values, cross-cultural studies could provide richer insights into global organizational practices. For instance, the concept of uncertainty avoidance from Hofstede's cultural dimensions theory (Hofstede, 2001) offers a useful framework for understanding how cultural differences shape responses to uncertainty. Studies incorporating cross-national comparisons, such as those by House et al. (2004) in the GLOBE project, could enhance understanding of these dynamics.

Finally, future research should explore the intersection of uncertainty with emerging trends, such as sustainability initiatives. As organizations grapple with environmental and social uncertainties, understanding how adaptive performance and leadership effectiveness intersect with sustainability goals could provide actionable insights for fostering resilience in an era of global challenges. The triple bottom line framework (Elkington, 1997) could serve as a theoretical basis for examining how organizations balance economic, environmental, and social goals in uncertain

contexts. Additionally, studies on corporate social responsibility, such as those by Carroll and Shabana (2010), could offer insights into how organizations navigate uncertainty while maintaining stakeholder trust.

6.5. Conclusion

This thesis contributes to a deeper understanding of uncertainty as a critical variable in organizational behavior, highlighting its cognitive, emotional, and behavioral dimensions. By examining its interplay with adaptive performance, leadership, mindfulness, and daily experiences, we provide a comprehensive framework for managing uncertainty in modern work environments.

The findings underscore that while uncertainty presents significant challenges, it also offers opportunities for growth, innovation, and resilience when managed effectively. By adopting evidence-based strategies, such as fostering mindful leadership, creating supportive work environments, and addressing the emotional dimensions of daily experiences, organizations can transform uncertainty from a source of stress into a catalyst for innovation and well-being.

Looking ahead, the ability to navigate uncertainty will become increasingly critical as organizations face global challenges, from technological disruptions and social and economic upheavals to climate change. This research lays the groundwork for future studies that explore how individuals and organizations can thrive in a world defined by volatility, complexity, and ambiguity. By embracing uncertainty as a driver of adaptability and creativity, organizations can build a future characterized by resilience, innovation, and sustainable success.

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ANNEX A. Materials Used in the Empirical Studies

Study 2: Perceived effects of teleworking on adaptive performance: A moderated mediation model of leadership effectiveness and negative affect.

Scales and Items;

Adaptive Performance (Griffin et al., 2007; Pulakos et al., 2000)

5-point Likert scale from "Very Little" (1) to "A great deal" (5).

1. Coped with changes to the way you have to do your core tasks.
2. I find innovative ways to deal with unexpected events.
3. I adapt to changes in the way I have to do my core tasks.

Teleworking (Grant et al., 2019)

Based on your experience, please indicate to what extent teleworking has a better or worse effect compared to in-person work on the following aspects:

5-point Likert scale from "Much worse" (1) to "Much better" (5).

1. Your quality of life
2. Time management
3. Concentration on tasks
4. Work-life balance
5. Flexibility
6. Sociability
7. Meeting objectives
8. Work productivity

Leadership Effectiveness (*Cicero et al., 2010)*

5-point Likert scale from "Strongly Disagree" (1) to "Strongly Agree" (5)

1. My supervisor provides effective leadership.
2. My supervisor influences my level of commitment effectively.
3. My supervisor is very effective as a leader.
4. Overall, I feel a good level of agreement with my supervisor.

Negative Affect (Warr et al., 2014)

5-point Likert scale from "Never" (1) to "Always" (5)

1. Nervous
2. Downhearted
3. Anxious
4. Dejected
5. Worried
6. Hopeless
7. Tense
8. Depressed

Demographic and Control Variables

1. Age: Reported in years.
2. Gender: Indicated by participants.
3. Education Level: The highest level of education completed.
4. Tenure: Length of employment reported in years.

Study 3: The Role of Mindfulness in the Relationship between Uncertainty and Adaptive Performance via Affect: A Within-Person Approach

Scales and Items;

Adaptive Performance (Griffin et al., 2007; Pulakos et al., 2000)

5-point Likert scale from "very little" (1) to "a great deal" (5).

1. Coped with changes to the way you have to do your core tasks.
2. I find innovative ways to deal with unexpected events.
3. I adapt to changes in the way I have to do my core tasks.

Uncertainty (Rafferty & Griffin, 2006)

5-point Likert scale from "Strongly Disagree" (1) to "Strongly Agree" (5).

1. Today, I was unsure about how to react to changes.
2. Today, I felt that my work environment is changing in an unpredictable way.
3. Today, I felt insecure about the effects of changes in my work unit.

Negative Affect (Warr et al., 2014)

5-point Likert scale from "Never" (1) to "Always" (5).

1. Anxious
2. Discouraged
3. Dejected
4. Tense

Mindfulness(Pirson et al., 2018)

5-point Likert scale from "Totally Disagree" (1) to "Totally Agree" (5).

1. Today, I liked to investigate things.
2. Today, I sought new ways of looking at things.
3. Today, I made many novel contributions.
4. Today, I found it easy to generate new ideas.

Demographic and Control Variables

1. Age: Reported in years.
2. Gender: Indicated by participants.
3. Education Level: The highest level of education completed.
4. Tenure: Length of employment reported in years.

Study 4: How daily micro-events influence employees' daily overall health: A parallel mediation path through daily uncertainty and daily affect

Scales and Items;

Overall Health (Ware et al., 2007)

5-point Likert scale from "Very Bad" (1) to "Excellent" (5).

1. In general, would you say your health is:

5-point Likert scale from "Never" (1) to "Always" (5).

2. During work today, how often did you feel happy?
3. During work today, how often did you feel full of life?
4. During work today, how often did you feel very nervous?
5. During work today, how often did you feel relaxed?

6. During work today, how often did you feel worn out?
7. During work today, how often did you feel tired?

Micro-events (Junça Silva et al., 2020)

5-point Likert scale from "Never" (1) to "4 Times or More" (5)

1. During work today, I spent some time waiting, wasting work time.
2. During work today, low-priority tasks disrupted my work.
3. During work today, I took a long time to start a task.
4. During work today, an apparently easy task became difficult and time-consuming.
5. During work today, I had to deal with someone in a bad mood.
6. During work today, I had difficulties prioritizing my work.
7. During work today, I was interrupted in what I was doing.
8. During work today, people around me were in a good mood.
9. During work today, I communicated effectively with others.
10. During work today, someone was assertive with me.
11. During work today, I had interesting tasks.
12. During work today, I had enough time to do my work.
13. During work today, I received positive feedback about my performance.
14. During work today, I took a break from my work (e.g., to have coffee, relax, talk on the phone).
15. During work today, I was creative and had good ideas.

Uncertainty (Rafferty & Griffin, 2006)

5-point Likert scale from "Strongly Disagree" (1) to "Strongly Agree" (5).

1. Today, I was unsure about how to react to changes.
2. Today, I felt that my work environment is changing in an unpredictable way.
3. Today, I felt insecure about the effects of changes in my work unit.

Affect (Warr et al., 2014)

5-point Likert scale from "Never" (1) to "Always" (5)

1. Enthusiastic
2. Inspired

3. At ease
4. Calm
5. Relaxed
6. Anxious
7. Nervous
8. Worried
9. Sad
10. Depressed
11. Dejected
12. Downhearted

Demographic and Control Variables

1. Age: Reported in years.
2. Gender: Indicated by participants.
3. Education Level: The highest level of education completed.
4. Tenure: Length of employment reported in years.

ANNEX B. First Pages of Published Studies

Study 1: Clarifying the Conceptual Map of VUCA: A Systematic Review

Citation: Taskan, B., Junça-Silva, A., & Caetano, A. (2022). Clarifying the conceptual map of VUCA: a systematic review. *International Journal of Organizational Analysis, 30*(7), 196-217. https://doi.org/10.1108/IJOA-02-2022-3136

First Page:

Clarifying the conceptual map of VUCA: a systematic review

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Abstract

Purpose – Over the past few decades, the environment for organisations has been frequently described using the acronym VUCA: a volatile, uncertain, complex and ambiguous environment. In spite of the popularity of this acronym, it is not unusual to find some overlap concerning the meaning of those terms, as well as poor definitions of each in the literature. Consequently, the main purpose of this paper was to conduct a systematic literature review to obtain a conceptual map of the components of VUCA and their relationships and to highlight some avenues for future research.

Design/methodology/approach – The authors conducted a systematic review of various databases between 1999 and 2021. A total of 833 papers were identified and 26 of them met the inclusion criteria for the current study.

Findings – The subsequent analysis revealed several overlaps and relationships between the four terms. Based on this analysis, the authors propose a conceptual map that could serve as a basis for future research and practice.

Research limitations/implications – Because of the exploratory nature of the study and the scarce number of empirical studies, the impact that the use of the VUCA framework has had on businesses could not be addressed.

Originality/value – By clarifying the different components of VUCA and specifying the relationships between them with a comprehensive conceptual map, this paper may contribute to more rigorous empirical research, as well as help managers and executives more effectively deal with turbulent environments.

Keywords Uncertainty, Volatility, VUCA, Complexity, Ambiguity

Paper type Literature review

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Statements and declarations: All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Burcu Taskan, Ana Junça-Silva and António Caetano. The first draft of the manuscript was written by all authors, and they commented on previous versions of the manuscript. All authors read and approved the final manuscript.



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Study 2: Perceived effects of teleworking on adaptive performance: A moderated mediation model of leadership effectiveness and negative affect. International

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Perceived effects of teleworking on adaptive performance: a moderated mediation model of leadership effectiveness and negative affect

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Abstract

Purpose – Drawing on the conservation of resources theory, this study aims to explore how individuals' perceptions of telework effects associate with their adaptive performance by shaping their negative emotional experiences, with perceived leadership effectiveness acting as a critical moderator in this relationship.

Design/methodology/approach – A cross-sectional design was used, with data collected from a final sample of 209 teleworkers via an online survey.

Findings – The results demonstrated a significant indirect effect of the perceived effects of teleworking on adaptive performance through negative affect. Furthermore, leadership effectiveness moderated the indirect effect, in a way that the indirect effect was only significant for those who had ineffective leaders and moderate effective leaders; therefore, the indirect effect was strengthened for those who had less effective leaders (versus effective leaders).

Originality/value – This study examines the positive link between teleworking perceptions and adaptive performance through the reduction of negative affect, in line with the conservation of resources theory. Moreover, a reduction in negative emotions among employees during telework is associated with enhanced performance. Notably, the study reveals that leadership effectiveness moderates this connection as playing a crucial role in moderating these effects, particularly when leaders are perceived as less effective, offering insights for organizations considering telework strategies.

Keywords Adaptive performance, Telework, Negative affect, Leadership effectiveness

Paper type Research paper

Statements and declarations: All authors contributed to the study's conception and design. Material preparation, data collection and analysis were performed by Burcu Taşkan, Ana Junça-Silva and António Caetano. The first draft of the manuscript was written by all authors, and they commented on previous versions of the manuscript. All authors read and approved the final manuscript. The preparation of this article was supported in part by grants from the Portuguese Foundation for Science and Technology (UIDB/03125/2020), and CIS Iscte, Doctoral Program in Psychology.

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Study 3: The Role of Mindfulness in the Relationship between Uncertainty and Adaptive Performance via Affect: A Within- Person Approach.

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First Page:

THE ROLE OF MINDFULNESS IN THE RELATIONSHIP BETWEEN UNCERTAINTY AND ADAPTIVE PERFORMANCE VIA AFFECT: A WITHIN-PERSON APPROACH

Abstract

Purpose – In the current uncertain working environment, how and when employees adapt their performance is an essential issue. Based on the integrative model of uncertainty tolerance, this study aimed to investigate the relationship between uncertainty and adaptive performance by testing (1) the mediating role of negative affect and (2) mindfulness as a moderator.

Design/methodology/approach – To test the model, 159 participants took part in a diary study during 10 working days (*N*=159 x 10 = 1,590).

Findings – The multilevel results showed that negative affect mediated the within-person effect of uncertainty on adaptive performance. Further, mindfulness moderated the relationship between uncertainty and adaptive performance in such a way that it became stronger for individuals who scored lower on mindfulness (versus higher mindfulness).

Research limitations/implications – Understanding what may sustain and amplify responses to uncertain working conditions may help managers to design interventions that may support their employees' responses to effectively cope with them.

Originality/value – This study shed light on the relevance of both negative affect and mindfulness on the relationship between uncertainty and adaptive performance. In addition, the findings expand the theoretical knowledge of the mechanism underlying the relationship between uncertainty and adaptive performance, and the condition that may strengths this relationship.

Keywords Adaptive performance; Uncertainty; Negative affect; Mindfulness; Diary study; Multilevel modeling.

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