

**LEADERSHIP FOR ALL AGES: INTEGRATING AGE-DIFFERENTIATED LEADERSHIP
AND SELF-DETERMINATION THEORY TO SUPPORT WORKPLACE MOTIVATION**

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ABSTRACT

Integrating self-determination theory (SDT) and age-differentiated leadership (ADL), this thesis examined whether ADL predicts employee motivation through the satisfaction of basic psychological needs (BPNS), whether BPNS mediates the relationship between ADL and employee motivation, and if employees' chronological age influences these relationships. Data was collected using validated measures from an online sample of full-time workers from the United States (N = 266). Results indicated that ADL was significantly positively associated with BPNS, and BPNS was significantly positively associated with autonomous motivation, supporting BPNS as a key explanatory mechanism linking ADL to high-quality motivation. BPNS did not significantly predict controlled motivation, and ADL did not significantly reduce controlled motivation, suggesting that ADL may function more effectively as a promotive mechanism that enhances positive motivational states rather than as a buffer against pressure-based motivation. Results supported a significant indirect effect of ADL on autonomous motivation through BPNS, whereas an indirect effect through controlled motivation was not supported. Contrary to expectations, chronological age did not significantly moderate any primary direct, indirect, or exploratory pathways, including models examining ADL subsets (younger-focused, older-focused, and balanced ADL) and individual psychological needs separately. Exploratory analyses further suggested that all ADL subsets were positively

associated with BPNS and autonomous motivation, while competence emerged as a particularly strong pathway linking ADL to autonomous motivation. In doing so, this thesis provides evidence for the pathways that explain how ADL behaviors support employee motivation through BPNS, and that motivational effects of ADL operate through universal psychological need satisfaction that account for age-related changes as proposed. Additionally, this paper provides evidence-based insights into leadership behaviors that can support employee motivation across the lifespan.

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CHAPTER 1: INTRODUCTION & LITERATURE REVIEW

As of 2024, more than 23% of U.S. workers were aged 55 years or older. This proportion is projected to rise through 2034 (U.S. Bureau of Labor Statistics, 2025). The aging workforce has been documented as a demographic trend, often referred to as “the graying of the workforce.” These demographic changes present both opportunities and challenges, as employees of different ages bring distinct strengths, needs, and expectations to the workplace (Li et al., 2020; Jungmann et al., 2020). The graying of the workforce is influenced by many factors, including increased life expectancy, lower birth rates, and higher average retirement ages (Munnell, 2025; United Nations, 2024; Dattani et al., 2023; Khan & Dander, 2023). In response, scholars and practitioners have increasingly shown interest in understanding the role that leaders can play by adapting their approaches and behaviors to effectively support employees across different life and career stages (De Boom & De Meulenaere, 2024; Hammond et al., 2016).

One framework proposed to address this is age-differentiated leadership (ADL), a leadership style that emphasizes tailoring behaviors to meet the distinct needs, motives, and resources of both younger and older employees (Koziel et al., 2021; Rosing & Jungmann, 2015; Uhlmann et al., 2023). Initially introduced by Tuomi et al. (1997) and later expanded by Wegge and colleagues (2012, 2014), ADL emphasizes individualized support, non-stereotypical treatment (i.e., treating age as a contextual factor rather than a determinant of capability or need; Hertel & Zacher, 2018), and age-inclusive practices. For instance, ADL behaviors may provide flexibility in responsibilities, work design, and deadlines to promote autonomy and recovery, which are especially important to support aging employees as they become more vulnerable to the mental strain of high workloads and time pressure (Uhlmann et al., 2023; Wegge et al., 2014). Current research confirms that ADL may promote positive outcomes by meeting

employees where they are in their careers, yet empirical testing of its underlying mechanisms remains limited (Koziel et al., 2021; Rosing & Jungmann, 2015; Uhlmann et al., 2023).

Building on this conceptualization, applying ADL successfully requires a deep understanding of age-related differences in work motivation, as motivating employees is critical for effectively managing individual and organizational outcomes (Kooij et al., 2008; Li et al., 2020; Popa et al., 2017). While much of the existing leadership literature has focused on transformational leadership and leader–member exchange frameworks (Chua & Ayoko, 2021; Kovjanic et al., 2012; Henderson & Jeong, 2024), these insights often neglect to consider age-related shifts in followers (Hammond et al., 2016). In particular, these frameworks tend to conceptualize work motivation as a relatively stable construct, overlooking the motivational changes that occur across different life and career stages (Jungmann et al., 2020; Hertel & Zacher, 2018; Kooij et al., 2008). Understanding how leaders' actions foster employee motivation can inform more effective leadership training.

To explain the mechanisms through which ADL may foster motivation, this thesis draws on self-determination theory (SDT; Deci & Ryan, 2000), which offers a well-established framework for understanding how work environments, including leadership behaviors, influence employee motivation and well-being (Deci et al., 1989; Chua & Ayoko, 2021; Forner et al., 2021). SDT posits that employees function optimally when three basic psychological needs are satisfied: autonomy (the need to feel volitional and self-directed), competence (the need to feel effective and capable), and relatedness (the need to feel connected and valued by others). Satisfaction of employees' basic psychological needs (basic psychological need satisfaction; BPNS) is a key mechanism that links leadership behavior to positive motivational outcomes, such as autonomous motivation, where work is experienced as meaningful and self-endorsed,

rather than controlled motivation, which is driven by external pressures or obligations (De Boom & De Meulenaere, 2024; Chua & Ayoko, 2021; Rosing & Jungmann, 2015; Gagné & Deci, 2005). Despite its foundational role in SDT, the mediating role of BPNS remains underexplored within leadership contexts (Chua & Ayoko, 2021; Kovjanic et al., 2012). This gap underscores the need for models that acknowledge the nature of motivational changes throughout the lifespan.

In response to the current research gaps, this thesis sought to make three contributions. First, to advance theoretical understanding by empirically testing a model in which BPNS mediates the relationship between ADL and employee motivation. By applying SDT to the context of ADL, this research deepens insight into how leaders can aid in the fulfillment of BPNS to support employee motivation. While foundational theory suggests that ADL may influence motivation, the specific mechanisms underlying this relationship remain underexplored (Kovjanic et al., 2012; De Boom & De Meulenaere, 2024). Clarifying how BPNS functions as a mediator strengthens ADL's theoretical foundation (Wegge et al., 2012; Koziel et al., 2021) and demonstrates how ADL can serve as an evidence-based tool to improve employee outcomes across age groups (Uhlmann et al., 2023; Forner et al., 2021; Rabl & Triana, 2014).

Second, this study contributes to lifespan developmental research, expanding upon lifespan theories of motivation such as the selection, optimization, and compensation (SOC) theory (which suggests that motivation evolves throughout the life due to changes in perceived time horizons, developmental goals, and control capacity), by examining whether age moderates the relationship between ADL, BPNS, and motivation (Kooij et al., 2008; Chua & Ayoko, 2021; Hammond et al., 2016). To my knowledge, the current literature lacks integrated models that simultaneously consider ADL, BPNS, and age with motivation as the outcome. By examining

age as a moderator, this study will offer novel insights into how leaders can tailor their behaviors to align with employees' development, thereby supporting more equitable and effective leadership in increasingly age-diverse workplaces (Li et al., 2020; Rabl & Triana, 2014).

Finally, this research offers practical implications for organizations seeking to motivate and support employees' functioning across all life and career stages. As the workforce ages, and is projected to continue to, it has become essential for organizations and their leaders to understand how to motivate employees of all ages (Hertel & Zacher, 2018). Without such knowledge, organizations risk adopting generic strategies that may alienate older workers, reduce engagement, or contribute to early exits and knowledge loss (Rabl & Triana, 2014). By providing evidence-based recommendations for ADL practices, this study will help organizations foster stronger retention and improve well-being, engagement, and team effectiveness, addressing outcomes that are vital for sustainable workforce management in the context of demographic trends (Richert-Kaźmierska & Stankiewicz, 2016; Wegge et al., 2012; Chua & Ayoko, 2021). In sum, this thesis proposed that ADL enhances employees' BPNS, which in turn increases autonomous motivation and reduces controlled motivation, and that these processes are stronger among older workers, consistent with lifespan theories of motivation.

Age Diversity in the Workforce

Research surrounding age diversity (i.e., the distribution of differences in age among members; Harrison & Klein, 2007) in the workforce is growing due to ongoing demographic shifts, characterized by an increasing proportion of older employees and the co-existence of multiple generations in the workplace (Jungmann et al., 2020; Li et al., 2020; Wegge et al., 2012). Unlike many fixed characteristics (e.g., gender and race), age is a unique attribute in that it is dynamic (subject to significant changes across individuals' career trajectories) and

experienced in its full range over the course of all employees' lives (Hammond et al., 2016; Heckhausen et al., 2010; De Boom & De Meulenaere, 2024). In this respect, age diversity poses a challenge for traditional diversity frameworks that rely on stable characteristics, underscoring the need to account for developmental trajectories (Hammond et al., 2016; Hertel & Zacher, 2018; Zacher, 2015).

Findings on the effects of age diversity are mixed. This has been referred to as a “double-edged sword,” leading to both positive outcomes (e.g., increased intellectual capital, improved problem-solving abilities; Li et al., 2020) and negative outcomes (e.g., increased emotional conflict, activation of age-related stereotypes; Jungmann et al., 2020). This variability has led researchers to focus on the role of contextual factors, such as organizational climate, social dynamics, resources/constraints, and leadership.

When managed effectively, age diversity can be an extremely valuable resource (Wegge et al., 2012; Jungmann et al., 2020). From an intellectual capital perspective, younger employees tend to possess fluid intelligence, which enhances their adaptability, attention, and learning capabilities (Li et al., 2020). In contrast, older workers contribute crystallized intelligence, drawing on their accumulated expertise (Li et al., 2020). In this respect, when leaders differentiate their behaviors, they are able to form teams based on this complementary knowledge, skills, and abilities, forming a richer portfolio of human capital that is more effective in tackling complex or unique tasks. Additionally, leaders' awareness of age-related changes and use of age-inclusive behaviors may buffer against age-based biases by promoting psychological safety and reducing age related salience (Rosing & Jungmann, 2015).

Jungmann et al. (2020) suggest that negative outcomes, such as feelings of isolation and incompetence, are exacerbated when supervisors hold or reinforce age-related stereotypes, such

as viewing older employees as resistant to change or younger employees as unreliable. Such perceptions have been linked to lower team cohesion (De Boom & De Meulenaere, 2024), poor knowledge sharing (Li et al., 2020), and diminished mutual trust (Li et al., 2020). Supervisors' implicit biases and age-related expectations can further amplify these effects, particularly when significant age gaps are present, such as when younger managers oversee older subordinates, thereby violating implicit career timetables (i.e., beliefs about at what age certain career milestones, specifically related to their hierarchical level, should be reached; Rosing & Jungmann, 2015; Kunze et al., 2011).

Traditional leadership models often rely on homogeneous expectations of motivation, capacity, and engagement, which makes it difficult to differentiate and address employees' unique needs and strengths effectively. Hammond et al. (2016) and Shane and Heckhausen (2019) warn against oversimplifying age differences into fixed generational stereotypes. Such generalizations can obscure a wide range of individual differences, leading to ineffective or even discriminatory management practices. This is especially problematic when leaders rely on generalizations to assign tasks, assess readiness, or make development decisions. Overlooking these motivational shifts can lead to a standardized approach to leadership that does not adequately address the unique needs of different age groups. Instead, leaders need to adopt approaches that are responsive to these age-related changes, recognizing the within and across age groups variability, and adapting their behaviors accordingly. In response, the following section examines traditional leadership styles and their limitations and highlights why ADL is well suited to fulfill employees' needs, positively affecting their motivational outcomes.

The Need for Age-Differentiated Leadership

Given age-related differences in managing age-diverse workforces, leadership theories have increasingly evolved to address changes in employee needs. Early leadership theories, such as trait-based and personality-trait-based approaches, initially focused on innate traits (e.g., age, gender, intelligence, and admirability) that posit that certain traits or attributes predict leadership ability and effectiveness, suggesting that leaders are “born, not made” (Liden et al., 2025).

Theories have since experienced shifts in their approach to leadership. These have included behavioral, contingency, and relational approaches and have currently focused on perception-based leadership styles (in which a leader's effectiveness is based on their perceived traits rather than actual traits; Liden et al., 2025). In recent years, styles of leadership that have received the most attention in research have included transformational, transactional, ethical, and servant leadership, with transformational leadership being the most researched, thus most understood, style (Liden et al., 2025).

Originally proposed by Burns in 1978 and later extended by Bass in 1985, transformational leadership (TL) has long been credited for fostering motivation and positive outcomes through methods that involve vision-setting, individualized consideration, and intellectual stimulation, ultimately aiming to shift followers' beliefs, values, and capabilities toward collective interests rather than self-interests (Liden et al., 2025). While TL addresses individualized support, it assumes that leaders' behaviors are equally effective for all employees, overlooking the shifts in motivational needs that employees experience throughout the lifespan. Thus, traditional theories such as TL remain developmentally insensitive, offering limited to no guidance for sustaining employee motivation. In contrast, ADL explicitly integrates age-related and development-related changes into leadership behavior, addressing how leaders can adapt their practices to align with employees' evolving psychological needs and resources.

To address the nuances of leading an age-diverse workforce, scholars have examined two frameworks: age inclusive leadership and ADL. Rooted in diversity management and organizational justice perspectives, age inclusive leadership aims to promote fairness and belonging by reducing age-based biases (Li et al., 2020; De Boom & De Meulenaere, 2024). ADL, which incorporates developmental theories of motivation to direct and differentiate leader behavior in response to employees' age-related changes in needs, resources, and motives (Wegge et al., 2012). Similarly, ADL incorporates age inclusive practices through core principles outlined by Wegge et al. (2012), which include the facilitation of a positive togetherness, collaboration in decision making across all age-groups, and promoting training and education for all age groups. However, ADL moves beyond practices of inclusion to explicitly differentiate their behaviors based on the diverse needs, resources, and motives of an age-diverse workforce (Tuomi et al., 1997; Wegge et al., 2012; Uhlmann et al., 2023). The key difference between age inclusive leadership and ADL thus is their focus. While age inclusive leaders focus on promoting an equitable climate, ADL promotes equity by treating employees as individuals and tailoring work to their specific needs, thus providing all employees with the motivational support that best suits their needs. In short, age-inclusive leadership focuses on equal and non-discriminatory treatment, whereas ADL focuses on equitable, differentiated support tailored to age-related needs.

Originally conceptualized by Tuomi et al. (1997), ADL was defined across four core areas of effective leadership for an age-diverse workforce: (1) maintaining an open-minded, non-stereotypical attitude toward age; (2) demonstrating a strong willingness to cooperate; (3) showing the ability to plan work individually and flexibly; and (4) exhibiting strong communication skills. These competencies highlight that effective leadership across ages requires both attitudinal openness and behavioral adaptability. Wegge et al. (2012) extended the

original framework by Tuomi et al. (1997) in two keyways: (a) by incorporating leadership principles for managing age-diverse teams rather than focusing solely on individual employees, and (b) by broadening ADL's scope beyond the needs of older workers to include younger and middle-aged employees as well. This expansion reflected recognition that developmental changes and corresponding shifts in needs occur continuously throughout employees' careers, rather than only in later life.

In addition to these expanded principles, Wegge et al. (2012) conceptualize ADL as functioning across three subdimensions: leadership focused on younger employees, leadership focused on older employees, and a balanced approach (Koziel et al., 2021; Jungmann et al., 2020). These subdimensions provide practical guidance for leaders to tailor their actions to age-related motives (Wegge et al., 2012). For instance, younger employees may benefit from developmental opportunities and constructive feedback that enhance competence, middle-aged employees may prioritize work–life balance and role autonomy, and older employees may value flexibility, recognition, and opportunities to apply accumulated expertise (Jungmann et al., 2020; Koziel et al., 2021). Through differentiated behaviors, ADL aims to address the evolving nature of motivational priorities by addressing developmental changes in needs.

Using this sub dimensional approach, Koziel et al. (2021) found that a balanced ADL approach was positively associated with perceived work ability, indicating sustained performance across age groups. Similarly, Uhlmann et al. (2023) demonstrated that a balanced approach to ADL buffers high work demands and promotes employee health, suggesting that differentiated leadership functions as a resource that helps employees maintain well-being and effectiveness throughout their careers. Although these studies help establish the benefits of ADL, they often rely on the assumption that these outcomes are related to changing needs and

motivation, without explicitly testing the underlying development mechanisms that make differentiation successful (Koziel et al., 2021).

To conceptualize why these subdimensions of differentiation may be effective and illustrate how leaders can apply them in practice, lifespan theories of motivation, such as the selection, optimization, and compensation (SOC) model (Baltes & Baltes, 1990), provide a useful framework. As detailed by Baltes and Baltes (1990), SOC outlines how individuals adapt to developmental changes in motivation and capacity across the lifespan through three interrelated strategies: selection (focusing on goals that correspond with one's priorities and strengths; Baltes & Baltes, 1990; Zacher & Frese, 2011), optimization (investing effort and resources to enhance goal attainment; Baltes & Baltes, 1990; Zacher & Frese, 2011), and compensation (modifying strategies when resources or abilities decline; Hammond et al., 2016; Baltes & Baltes, 1990; Hertel & Zacher, 2018). These self-regulatory strategies help to explain why employees of different ages may benefit from ADL (Hammond et al., 2016; Jungmann et al., 2020). For instance, a leader might support a younger employee's selection process by assigning tasks that encourage skill acquisition and exploration, facilitate optimization for a mid-career employee by providing autonomy or flexibility to improve productivity, or enable compensation for an older employee by recognizing expertise and reassigning physically demanding responsibilities in favor of mentoring or advisory roles (Rosing & Jungmann, 2015; Hammond et al., 2016). By applying developmental principles such as those reflected in the SOC model, leaders gain knowledge that may enable them to more effectively align their behaviors with employees' changing goals and needs (Hammond et al., 2016; Baltes & Baltes, 1990; Rosing & Jungmann, 2015). In this manner, SOC illustrates the developmental rationale for ADL

by highlighting the dynamic nature of needs and motivation across the lifespan and offering insight into how leaders can support these shifts.

Self-Determination Theory and Work Motivation

To understand why aligning leadership behaviors with employees' age-related needs is important, it is crucial to examine the motivational processes underlying these needs. Self-determination theory (SDT; Deci & Ryan, 2000) offers a valuable framework to explore how leaders influence motivation through BPNS (Xue et al., 2022; Forner et al., 2021; Kovjanic et al., 2012). According to SDT, individuals experience the highest quality of motivation when they feel their basic psychological needs of autonomy, competence, and relatedness are all satisfied. Autonomy refers to one's ability to make decisions and initiate actions from one's own volition, competence is the need to feel effective and capable, and relatedness reflects the need for meaningful connection and acceptance from others. These needs are considered universal, meaning that everyone experiences the desire to have all three satisfied, and that they can be used to predict an individual's motivation. However, the satisfaction of these needs, as well as an individual's motivation, is often impacted by individual characteristics, such as age and gender (Deci & Ryan, 2000; Deci et al., 2017), as well as social contexts, such as interpersonal climate (Deci & Ryan, 2000; Kovjanic et al., 2012).

Kovjanic et al. (2012) demonstrated that the predictive power of the leader-member relationship, characterized by trust and constructive feedback, was positively associated with BPNS. Furthermore, Jensen & Bro (2018) found that transformational leadership predicted BPNS and, in turn, intrinsic motivation. De Boom and De Meulenaere (2024) demonstrated similar effects using an age-inclusive leadership framework. ADL extends this logic by focusing explicitly on employees' developmental motives and age-related needs. ADL behaviors directed

toward younger employees may emphasize learning opportunities and growing autonomy, while those aimed at older employees may highlight recognition of expertise and interpersonal connection. By differentiating behaviors to align with changing motives across the lifespan, ADL functions as a need-supportive leadership style that facilitates employees' satisfaction of autonomy, competence, and relatedness. Hence, it is expected that ADL will be positively associated with employees' BPNS (H1), such that when ADL behaviors are low, employees' BPNS will be lower, and when ADL behaviors are high, employees' BPNS will be higher.

H1: ADL is positively associated with BPNS.

Originally, SDT placed motivation on a continuum ranging from amotivation, which describes a state where intention to act is low, to controlled motivation, where choices and actions are driven by external pressure or obligation, to autonomous motivation, which entails actions made with a sense of choice and personal endorsement (Henderson & Jeong, 2024; Deci & Ryan, 2000). However, more recent research, has transitioned away from this unidimensional view of motivation, to view the needs as the separate forms of motivation that can exist simultaneously (Chua & Ayoko, 2021). The author of SDT and his colleagues, Deci et al. (2017), acknowledged a multidimensional view of motivation noting that different motives have unique variances that cannot be fully captured using a unidimensional model. In response, it is imperative to understand how autonomous motivation and controlled motivation behave as distinct concepts (Chua & Ayoko, 2021; Deci et al., 2017; Van den Broeck, 2016). This multidimensional perspective better reflects how people regulate their behavior across different contexts and aligns with the current SDT theorizing to my knowledge (Gagné et al., 2015; Ryan & Deci, 2017). Therefore, this study will consider autonomous motivation and controlled motivation as separate, but related constructs. Autonomous motivation, includes intrinsic forms

of motivation, in which individuals engage in tasks for inherent enjoyment, as well as identified or integrated regulation, where activities are personally valued and aligned with one's goals. In contrast, controlled motivation encompasses external regulation, driven by rewards or punishments, and introjected regulation, where behavior is influenced by internal pressures such as guilt or obligation. This distinction is important as autonomous motivation is associated with more favorable outcomes, such as high engagement (Chua & Ayoko, 2021) and high performance (Henderson & Jeong, 2024; Eyal & Roth, 2011), while controlled motivation is associated with lower job satisfaction (Forner et al., 2021) and greater turnover intentions (Chua & Ayoko, 2021; Gagné & Deci, 2005).

Moreover, it is through the satisfaction or frustration of basic psychological needs that the quality of an employee's motivation is determined, aligning it with this continuum. When these needs are met, individuals experience higher-quality, autonomous forms of motivation, whereas dissatisfaction leads to lower quality, controlled forms of motivation. Research by Van den Broeck et al. (2016) demonstrated a positive relationship between BPNS and intrinsic motivation, and a negative relationship with controlled regulation. Similarly, Deci et al. (2017) found that employees across multiple work settings who reported greater BPNS displayed higher autonomous motivation and lower controlled motivation. Therefore, BPNS is expected to be positively associated with autonomous motivation (H2) and negatively associated with controlled motivation (H3).

H2: BPNS is positively associated with autonomous motivation.

H3: BPNS is negatively associated with controlled motivation.

The Mediating Role of Basic Psychological Need Satisfaction

Empirical demonstrations of leadership's role in employee motivation appear across multiple studies, primarily through the satisfaction of one or more of the basic psychological needs, as conceptualized within SDT (Kovjanic et al., 2012; Chua & Ayoko, 2021). Consistently, results across these studies reveal a significant relationship predicting work motivation through leadership behaviors supporting needs (De Boom & De Meulenaere, 2024; Kovjanic et al., 2012; Forner et al., 2021). For example, Kovjanic et al. (2012) found that high quality leader–follower relationships, characterized by trust and support, promote BPNS by providing employees with volition, feedback, and interpersonal respect. Relatedly, Forner et al. (2021) cite BPNS as a trigger for positive motivational outcomes that leaders directly impact. As BPNS represents a central explanatory process through which leadership style is likely to relate to employee motivation, it provides a theoretically grounded pathway for testing how ADL aligns with employees' motivational priorities.

According to SDT, the satisfaction of all three basic needs (autonomy, competence, and relatedness) is considered essential for fostering high quality, autonomous motivation (Deci & Ryan, 2000; Gagné & Deci, 2005). Deci et al. (1989) argue that leadership's role can be attributed to the inherent aspects of these roles, such as influence on followers' task characteristics and work design. Research by Deci & Ryan (2000) and Gagné & Deci (2005) supports this suggestion that the main source of BPNS is an individual's social environment, which includes leadership (Deci & Ryan, 2000; Gagné & Deci, 2005). Thus, BPNS offers a clear mechanism through which leadership influences motivational outcomes, providing both a theoretical foundation and an empirically supported pathway for understanding how ADL can adapt to the motivational priorities of a multigenerational workforce.

Although SDT recognizes that each need contributes uniquely to motivation and well-being, researchers have debated whether to assess needs individually or to use a composite (Deci et al., 2017). A composite BPNS score may reduce complexity, particularly when high correlations among the needs raise multicollinearity concerns. Henderson and Jeong (2024) found that only autonomy significantly predicted intrinsic motivation when analyzed alongside competence and relatedness, suggesting that the predictive value of each need may vary across contexts. Similarly, De Boom and De Meulenaere (2024) reported high intercorrelations among needs ($r \geq 0.82$) without multicollinearity issues, allowing them to examine individual mediating effects. Using a composite measure can enhance parsimony in mediation and moderated mediation models while still capturing the essential role of BPNS in leadership effectiveness. This is supported in the foundations of SDT, which posit that the satisfaction of all three needs is essential to motivating employees, rather than emphasizing the role of individual needs. As theoretical and empirical evidence suggests BPNS functions as the key mechanism linking leadership to motivation, I further hypothesize that BPNS will mediate the relationship between ADL and autonomous motivation (H4) and between ADL and controlled motivation (H5).

H4: BPNS mediates the relationship between ADL and autonomous motivation.

H5: BPNS mediates the relationship between ADL and controlled motivation.

Age as a Moderator in Leadership and Motivation Models

Age can also influence the salience of diverse needs, shaping how BPNS affects motivation. For example, older workers may prioritize autonomy and relatedness, while younger workers may place greater emphasis on competence development (Koziel et al., 2021; Rosing & Jungmann, 2015; Shane & Heckhausen, 2019). Because ADL is designed to adjust leader

behaviors to employees' developmental priorities, it is well suited to accommodate these age-related differences.

Research frequently indicates that the effectiveness of leadership behaviors varies depending on employee age (Koziel et al., 2021; Uhlmann et al., 2023; De Boom & De Meulenaere, 2024). For instance, Besen et al. (2013) found that the positive relationships between job characteristics (skill variety, autonomy, and social support) and job satisfaction weakened with increasing age, highlighting that older workers draw on different resources to sustain their motivation. Similarly, evidence indicates that human resource and leadership development practices more strongly predict job attitudes, satisfaction, and commitment in younger employees (Kooij et al., 2008; Innocenti et al., 2013).

Leadership studies show similar patterns. De Boom and De Meulenaere (2024) demonstrated that age-inclusive leadership was more strongly related to intrinsic motivation when leader–member age differences were larger, underscoring the importance of intergenerational fit. Koziel et al. (2021) found that age moderated the link between ADL and workability, with older employees benefiting most from ADL that emphasized autonomy and recognition, while younger employees derived greater benefit from balanced ADL and strong leader–member exchange. These results reinforce that leadership behaviors cannot be expected to have uniform effects across all age groups.

A meta-analysis by Kooij et al. (2008) demonstrated that intrinsic motives increase with age, while growth and extrinsic motives decline. Taken together, this suggests that leadership which fosters intrinsic motivation and autonomy may be particularly beneficial for older workers, whereas younger workers may respond more strongly to leadership that emphasizes growth and development. Although the moderating role of age is well documented, little

attention has been paid to the mechanisms through which these differences emerge. Scholars argue that empirical research should move beyond documenting moderation effects to examine the mediators that explain them (Li et al., 2020; Zacher, 2015). The motivational theory of lifespan development (MTLD) provides a strong rationale for this pursuit.

As outlined by Heckhausen et al. (2010), MTLD argues that individuals regulate their motivation across the lifespan through age-graded control strategies. Younger adults typically rely on primary control strategies that emphasize gaining new skills, expanding competencies, and pursuing growth-oriented goals. In contrast, older adults engage more strongly in secondary control strategies aimed at maintaining well-being, optimizing strengths, and adjusting goals when opportunities narrow. These shifts in control strategies help explain why the salience of BPNS dimensions changes with age, and why leadership behaviors affect employees differently across the lifespan. This perspective aligns closely with the subdimensions of ADL by suggesting that motivational priorities shift with age. For example, leaders can support younger individuals by emphasizing growth and exploration and older individuals by prioritizing meaning, stability, and relational needs. This theoretical perspective supports the premise that age shapes the dimensions of BPNS (autonomy, competence, relatedness) which are most prevalent and which are salient. These age-graded control strategies map onto BPNS dimensions (e.g., younger workers emphasizing competence and growth, while as older workers emphasizing autonomy and relatedness). which help explain why ADL behaviors are believed to successfully motivation employees across ages.

However, prior findings indicate that the effectiveness of ADL may vary depending on employee age. For example, Koziel et al. (2021) found that older employees benefited more from age-targeted leadership, whereas younger and average-aged employees benefited more from

balanced ADL. Similarly, Jungmann et al. (2020) reported stronger training effects for younger employees. These findings suggest that age-differentiated leadership behaviors, designed to address employees' age-related needs, may not operate precisely as theorized. If age moderates the relationship between ADL and motivational outcomes, this would imply that ADL does not function uniformly across employees of all ages. However, such age moderation does not imply that ADL is ineffective; rather, it indicates that its influence varies across employees (De Boom & De Meulenaere, 2024; Zellman et al., 2025). In this context, age would be acting as a variable that helps explain when and for whom ADL is most effective (Kozziel et al., 2021; Jungmann et al., 2020; Zellman et al., 2025).

Yet, ADL is conceptualized as a leadership approach inherently responsive to employees across the lifespan, so it would be expected that age would not change its effectiveness. As a global construct, ADL reflects a balanced set of behaviors intended to support diverse age-related needs simultaneously. From this perspective, if ADL functions are as theorized, age-related differences in need satisfaction may already be integrated into the leadership behavior itself, resulting in no observable age-related moderation. Examining age as a moderator serves to explore the ability for ADL behaviors to be universally supportive. If age moderation was present, it would signal for whom the behaviors are most effective and potential areas for improvement. However, if age moderation is not supported, it would signal that ADL operates as a universally need-supportive leadership approach, and support the ability for ADL behaviors to successfully respond to age and developmental changes and promote universally effective results in positive employee motivation across the lifespan. The present study aims to test if this hold true for the first time in literature, to my knowledge, by exploring age as a moderator between ADL to BPNS, when BPNS mediates the effects of ADL to employee motivation.

If age is found to have meaningful conditional effects, it may have theoretically meaningful repercussions. Variation in the strength of the relationship between ADL and BPNS across age suggests that adaptation and development alone may not fully explain differences in motivational responsiveness (Heckhausen et al., 2010; Koziel et al.). It could also signal that employees at different life stages interpret, prioritize, or internalize leadership behaviors that existing ADL models do not fully capture (Zacher, 2015; Kooij et al., 2008). Therefore, if age-moderation is present, it could flag a need to further examine the mechanisms by which ADL behaviors influence employee motivation (Li et al., 2020) and to clarify why and how these relationships differ across age groups (Zacher, 2015; Zellman et al., 2025).

When discussing age moderation, it is important to consider how age is conceptualized. Importantly, scholars distinguish between objective age (chronological years lived) and subjective age or age identity (how old employees feel or perceive themselves relative to others). These two conceptualizations can have different influences on need satisfaction and motivation. For instance, employees with a younger subjective age may continue to prioritize growth motives or competence development even in later life, whereas those with an older subjective age may place greater emphasis on stability, meaning, and relatedness (Zacher, 2015). Similarly, subjective age has been linked to differences in goal orientation, adaptability, and perceptions of organizational support, which may not always align with chronological age (Kooij et al., 2008; Zacher, 2015).

Studies such as Koziel et al. (2021), De Boom and De Meulenaere (2024), and Uhlmann et al. (2023) rely on chronological age when examining how leadership behaviors interact with employee age, allowing for comparability across findings. Further, MTLTD frames its predictions around chronological age as a proxy for shifts in time horizons, resources, and goal priorities.

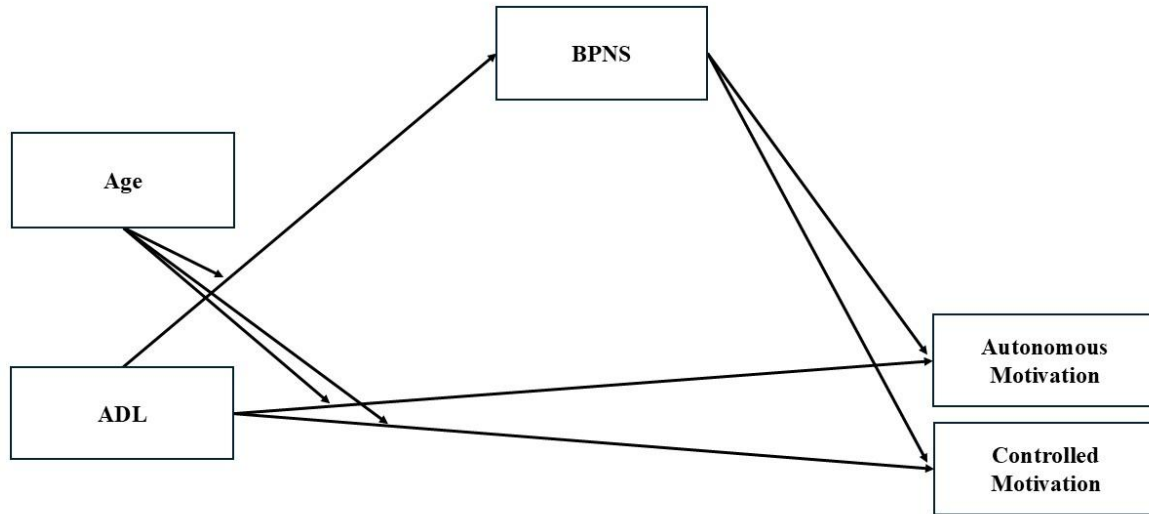
Thus, while subjective age can offer valuable insights, this thesis employs objective age to align with established empirical traditions and theoretical frameworks, ensuring that the findings can be situated within the broader body of leadership and aging research. Drawing from MTLD, which emphasizes changing motivational priorities across the lifespan, it is expected that individuals' autonomous motivation will increase, given that their goals become more intrinsic and goal-aligned, while younger workers are expected to display more controlled motivation, based on their growth and external orientation, which weakens as they age. Specifically, age is expected to moderate the indirect effects of ADL (H6), as well as the direct effects of ADL on autonomous motivation (H7a) and controlled motivation (H7b). The full conceptual model aligned with the hypotheses tested in this thesis is presented in Figure 1.

H6: Employee age moderates the relationship between ADL and BPNS, such that the positive association between ADL and BPNS becomes stronger with increasing age.

H7a: Age moderates the relationship between ADL on motivational outcomes, such that the positive association between ADL and autonomous motivation will strengthen with increasing age.

H7b: Age moderates the relationship between ADL on motivational outcomes, such that the association between ADL and controlled motivation will become weaker (i.e., less positive) with increasing age.

Figure 1
Conceptual Model



Note. ADL represents perceived age-differentiated leadership behaviors. BPNS represents basic psychological need satisfaction.

CHAPTER 2: METHODS

Participants

Participants were recruited online through CloudResearch Connect. CloudResearch enables targeted prescreening for employment status, supervisory structure, and weekly work hours (Douglas et al., 2023). Crowdsourcing platforms have demonstrated strong psychometric reliability and demographic diversity in organizational psychology research (Keith et al., 2017; Lovett et al., 2017). Recent age-responsive leadership studies, such as De Boom and De Meulenaere (2024), have collected data through comparable platforms (e.g., Prolific) and produced results consistent with traditional field samples, further supporting the validity of this recruitment approach.

The target population for this thesis consisted of employed adults from diverse industries. Sampling across multiple occupational sectors was implemented to enhance the generalizability of the findings and to reflect the naturally age-diverse composition of today's workforce. Because age is a key variable and moderator in the proposed model, the sampling plan included age stratification to ensure sufficient representation across younger, middle-aged, and older workers. Age-stratified sampling increases the likelihood of obtaining sufficient representation across early-career, mid-career, and late-career workers, which is necessary for detecting moderation effects and accurately modeling age-related trends in leadership and motivation research (U.S. Census Bureau, 2025; Bornstein et al., 2013). To achieve this, recruitment targets were informed by national labor-force benchmarks and known patterns of online participation pools. According to the U.S. Bureau of Labor Statistics (2025), adults aged 16–34 represent approximately 35.6% of the labor force in 2014 and 35.1% in 2024, whereas our sample included a slightly smaller proportion (29.7%), reflecting both the exclusion of 16–17-year-olds and the

tendency for younger adults to be easier to recruit in online studies (Hoffman et al., 2022). Mid-career adults aged 35–44 were intentionally oversampled (44.8%) relative to U.S. Bureau of Labor Statistics estimates of 20.8% in 2014 and 22.2% in 2024 to counteract the underrepresentation of middle and older-aged workers, which accounts for higher response patterns for younger participants in online samples. Finally, adults ages 45 or older represented 25.5% of our sample, which was lower than the estimates of 43.5% in 2014 and 42.7% in 2024. This strategy helped to ensure stability of cell sizes for conditional effects analyses (Pew Research Center, 2021). Ensuring broad age variability also aligns with recommendations for lifespan-development constructs to be examined using samples that reflect age-heterogeneous workforces (Biere et al., 2022; Bornstein et al., 2013; Kanfer & Ackerman, 2004).

Specifically, participants had to meet the following inclusion criteria to participate in this study: (a) 18 years or older; (b) currently employed in a paid full-time (30 hours or more a week) position; (c) reporting to a direct supervisor; (d) able to complete the survey in English; and (e) be from the United States. To ensure data integrity, three directed attention-check items and one open-ended validity item were embedded throughout the questionnaire (Meade & Craig, 2012). Following best practices for careless response detection (Meade & Craig, 2012), the first directed-response item appeared in the age-differentiated leadership (ADL) measure (e.g., “To confirm your attention, please select *very strongly agree* for this item.”). Within the BPNS measures, a second item was included to detect mid-survey inattention (e.g., “For this item only, please choose *very untrue* for this item.”). The third directed-response item was placed between the autonomous motivation and controlled motivation measures to identify fatigue-related inattentiveness (e.g., “Please select neither *moderate* for this item.”). One open-ended validity

item was included at the end of the item-measures (e.g., “In 1-2 sentences briefly describe what motivates you at work under your current supervisor.”).

To determine the minimum sample size required to detect the hypothesized moderated mediation effects, a power analysis was conducted using G*Power 3.1 (Faul et al., 2009). Consistent with prior leadership and field research, interaction effects were expected to be small in magnitude (Aguinis et al., 2005; McClelland & Judd, 1993), and similar effects have been reported in research examining interactions between age and ADL (Die et al., 2025). Because power to detect a moderated mediation effect depends on adequate power for both constituent paths, sample size determination focused on the index of moderated mediation. Specifically, achieved power was estimated separately for (a) the interaction effect on the a-path linking ADL to BPNS ($f^2 = .042$; three predictors) and (b) the b-path linking need satisfaction to work motivation ($f^2 = .106$; two predictors), using two-tailed tests with $\alpha = .05$.

With a base sample size of $N = 255$, achieved power was .903 for the a-path interaction and .999 for the b-path. Because detection of the index of moderated mediation requires both effects to be statistically significant, the joint probability of detecting both effects was estimated by multiplying these values, yielding an overall power estimate of approximately .90. To account for incomplete or low-quality responses common in online survey research, a 20% oversampling buffer was applied, resulting in a recruitment target of $N = 306$ employed adults and an anticipated final sample of at least 255 participants after data screening. This approach followed established guidance for power analysis in mediation and moderation models (Cohen, 1988; Fritz & MacKinnon, 2007).

Following data collection, responses were exported into R (R Core Team, 2024) for cleaning and data analysis using a structured, multi-step process. The raw dataset consisted of

306 responses. Initial screening focused on participant identification and response validity. Data quality screening was then conducted to evaluate completeness and attentiveness. Six participants who completed less than 50% of the survey were removed. One participant who failed 100% of attention checks and two participants who failed 50% or more of attention checks were removed. Responses to the open-ended validity item were also reviewed, and three cases with duplicate responses were removed. Additional screening identified four cases with unusual text responses were removed due to concerns regarding automated or low-quality responding.

Next, participants were screened based on study eligibility criteria. One participant reported being currently unemployed, and four participants who reported being self-employed were removed because the study focused on employees working under a direct supervisor. Additionally, two participants who reported working fewer than 30 hours per week were removed because this fell below the study's minimum threshold described for full-time employment. Response time was examined as an additional indicator of response quality. Cases with extremely short completion times (less than 4 minutes) and unusually long completion times (greater than 2 standard deviations above the mean) were flagged and reviewed in conjunction with other indicators of response validity. Additional screening was then conducted in R using the longstring index from the *careless* package (Yentes & Wilhelm, 2023) and Mahalanobis distance. Sixteen cases were identified as exhibiting problematic response patterns for longstrings of responses on the initial items of the BPNS scale, and 23 for Mahalanobis distance. After inspecting the flagged responses, the 16 participants flagged for longstring, were also flagged for Mahalanobis distance. These cases were investigated and had extreme values (i.e., not the middle response option given the value 3) across normal and reverse-coded items, indicating inattentive or careless responses therefore these 16 cases were removed. After their

removal, the sample consisted of only 1 case of missingness in responses. To handle the missingness, this participant was removed from the final sample. Therefore, the final analytic sample consisted of 266 participants, reflecting the removal of 40 cases from the original dataset.

Descriptive statistics were computed to summarize participant demographic characteristics. Participants' age ranged from 18 to 74 years ($M = 39.53$, $SD = 9.15$). Age was slightly positively skewed ($skew = 0.81$) with modest kurtosis ($kurtosis = 0.79$), indicating a mild concentration of participants at younger ages but no substantial deviation from normality. With respect to gender, the sample was primarily composed of individuals identifying as male (59.02%, $n = 157$), followed by female (39.47%, $n = 105$), with a small proportion identifying as another gender (1.50%, $n = 4$).

Regarding race, the majority of participants identified as Non-Hispanic White or Euro-American (65.79%, $n = 175$). The remaining participants identified as Black/African American (13.16%, $n = 35$), Latinx/Hispanic (4.89%, $n = 13$), East Asian/Asian American (8.27%, $n = 22$), and, least represented, South Asian, Middle Eastern, Native American, and other categories (7.89%, $n = 21$). This distribution indicates that the sample was predominantly White, with limited representation across other racial groups. Most participants reported not being current students (87.22%, $n = 232$), with smaller proportions identifying as full-time (7.14%, $n = 19$) or part-time students (5.64%, $n = 15$).

Regarding employment status, nearly all participants reported full-time employment (99.62%, $n = 265$), with 1 participant reporting part-time employment. This person was allowed to stay in the analysis as they reported still meeting the minimum hours for inclusion (30 hours or more). Participants reported working an average of 40.92 hours per week ($SD = 5.69$). Participants represented a range of occupational categories. The largest groups were in computer

and mechanical occupations (18.05%, $n = 48$), business and financial operations (12.78%, $n = 34$), and education, training, and library (9.02%, $n = 24$). Additional participants were distributed across healthcare, administrative support, management, and other occupational categories, indicating variability in job types in the sample. Organizational tenure varied widely, ranging from 2 months to 27.67 years ($M = 5.87$ years, $SD = 5.08$ years). Similarly, time with one's current leader ranged from 1 month to 20 years ($M = 3.67$ years, $SD = 3.49$ years). Full descriptive statistics are presented in Table 1.

Design & Procedure

Design

This study employed a cross-sectional survey design to examine how employees' perceptions of ADL relate to their BPNS and work motivation. This design is widely used to examine SDT in the workplace (Chua & Ayoko, 2021; Jensen & Bro, 2018; Kovjanic et al., 2012). Although cross-sectional data cannot directly capture developmental change, this design is theoretically consistent with research on age and motivation when certain assumptions are met (Zacher, 2015). First, it must be assumed that no cohort effects exist. This means that the differences observed between younger and older employees must be assumed to approximate the extent to which exposure to facilitating and constraining workplace factors relates to intraindividual changes in motivation and need satisfaction over time. Secondly, it assumes that employees at high and low levels respond similarly to these factors. Accordingly, cross-sectional data cannot provide causal evidence for developmental change; however, when these assumptions are acknowledged, findings can offer theoretically consistent insights into how interindividual differences reflect intraindividual processes across the working lifespan (Zacher, 2015; Baltes & Baltes, 1990; Heckhausen et al., 2010).

Further, the use of self-reported survey data to assess leadership behavior is well supported within the organizational literature, as employees' perceptions of their supervisors' behaviors are the most proximal indicators of how leadership is experienced and internalized (Gagné & Deci, 2005; Rosing & Jungmann, 2015). Leadership studies often emphasize followers' perceptions as the mechanisms through which leader behaviors influence employee outcomes (Kovjanic et al., 2012; Chua & Ayoko, 2021). Thus, employee self-reports provide theoretically aligned and empirically valid data for investigating individual differences in leadership behaviors.

Surveying employees (followers) rather than supervisors aligns directly with the model's theoretical logic. Because the hypotheses focus on how employees perceive their supervisor's leadership and how these perceptions influence their own need satisfaction and motivation, collecting follower self-reports best captures the psychological mechanisms proposed by SDT (Deci & Ryan, 2000; Gagné & Deci, 2005). This approach also mirrors prior ADL research that operationalized leadership through employee perceptions (Rosing & Jungmann, 2015; Uhlmann et al., 2023). It further allows age to be modeled as a continuous moderator of perceived leadership effects, which enabled the testing of Hypotheses 6 through 8.

Procedure

Participants for this survey were recruited through CloudResearch Connect (Hartman et al., 2024), which filters for prescreened participants who meet the set inclusion criteria. A brief recruitment description was provided outlining the study's purpose and expectations for participants (see Appendix A for recruitment materials). Participants were then provided with an electronic informed consent form (see Appendix B for informed consent materials) that described the voluntary nature of participation, data confidentiality, approximate time commitment for

completion (~15 minutes), and the compensation amount (\$1.88/person). Consent was required before participants were able to proceed from this page.

Eligible participants then completed a battery of validated measures to assess ADL (Koziel et al., 2021), BPNS (Deci & Ryan, 2000; Deci et al., 2001; Ilardi et al., 1993; Kasser et al., 1992), and autonomous and controlled motivation (Gagné et al., 2015). See Appendix C for the full item sets. Additional demographic information (including age, gender, race/ethnicity, job, tenure, industry, and job level) was collected after the measurement items for descriptive purposes and moderation analyses. To ensure confidentiality of the collected data and anonymity of all respondents, personally identifiable information (e.g., names, addresses, place, or location) was not collected, and IP addresses were not stored. Rather, survey responses were linked only to a randomly assigned participant ID within CloudResearch. Upon completing the survey, the participants were debriefed with a brief explanation of the study's purpose (see Appendix D), then thanked and provided with compensation.

Measures

Age-Differentiated Leadership

Perceived ADL was measured using the 16-item Age-Differentiated Leadership (ADL) Scale by Koziel et al. (2021). The measure captures employees' perceptions of how their supervisor adapts leadership behaviors to meet the differing needs, strengths, and experiences of team members. Items are categorized across three subdimensions including (1) leadership behavior focused on younger employees, (2) leadership behavior focused on older employees, and (3) leadership behavior balanced for younger and older employees). Koziel et al. (2021) reported strong reliability across all subdimensions ($\alpha = .94-.96$) and intraclass correlation coefficients (ICCs) ranging from .79 to .85, indicating that the instrument reliably differentiates

individual perceptions. Responses were recorded on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Examples of items used include “My supervisor considers age-related strengths when assigning tasks” and “My supervisor adjusts feedback to match employees’ experience levels.” Scores were then averaged across items, with higher values indicating that employees perceived their supervisor as more responsive, flexible, and attentive to age-related differences, and lower values indicating lower levels of ADL behaviors. In this study, the scale was found to be reliable ($\alpha = .92$; $\omega = .93$).

Basic Psychological Need Satisfaction

BPNS was measured using the 21-item Basic Psychological Need Satisfaction (at work) Scale (BPNS-W; Deci & Ryan, 2000; Deci et al., 2001; Ilardi et al., 1993; Kasser et al., 1992). The measure captures the extent to which employees perceive their needs for autonomy, competence, and relatedness as satisfied within the work domain. Respondents rated each statement on a 5-point Likert scale (1 = *Not true*, 5 = *True*). Example items included “I feel like I can make a lot of inputs to deciding how my job gets done” (autonomy), “I have been able to learn interesting new skills on my job” (competence), and “I really like the people I work with” (relatedness). Research consistently reports high levels of internal consistency, $\alpha \approx .85 - .90$ for the overall scale and supports construct validity through correlations with autonomous motivation and controlled motivation (Gagné & Deci, 2005). In this study, the scale was found to be reliable ($\alpha = .90$; $\omega = .92$).

Autonomous Motivation and Controlled Motivation

Autonomous motivation was measured with the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015). This contains intrinsic motivation and identified motivation (i.e., acting because the work is enjoyable or personally valued) subscales represented across 6

items. Items were rated on a 5-point Likert scale (1 = *Not at all*, 5 = *Completely*). Higher scores indicated stronger autonomous motivation, while lower scores suggest reduced internal motivation or indifference. Example items include “Because others will reward me financially only if I put enough effort in my job (e.g., employer, supervisor...)” and “Because the work I do is interesting.” Cronbach’s α is typically around .80 – .85 (Gagné et al., 2015), which provided preliminary support for the use of this scale for measuring autonomous motivation. In this study, the scale was found to be reliable ($\alpha = .90$; $\omega = .95$).

Controlled motivation was also measured using the MWMS, specifically the external regulation and introjected regulation subscales, which contain 10 items in total. These items assess performance driven by external rewards or internal pressures. Higher scores on the external regulation subscales reflect motivation that’s driven by social factors, for example motivation that is driven from a need to gain respect of coworkers, materialistic/monetary factors, or avoidance of negative consequences (e.g., loss of the privilege to flexible work arrangements). Lower scores indicate reduced external pressure and a more self-determined motivational orientation. Example items included “Because I have to prove to myself that I can” and “Because others will respect me more (e.g., supervisor, colleagues).” In prior studies internal reliability for this subscale has been found to range from .75 to .85 (Gagné & Deci, 2005), which supported the use of this scale for measuring controlled motivation (in addition to autonomous). In this study, the scale was found to be reliable ($\alpha = 0.83$, $\omega = 0.90$).

CHAPTER 3: RESULTS

All relevant analyses were performed using R version 4.4.2 (R Core Team, 2024). No missing data points were identified; thus all relevant analyses consisted of the full sample size ($N = 266$). Assumptions for linear regression were evaluated to ensure ordinary least square (OLS) regression was acceptable for analyses aligning with hypothesis 1-3, as well as supplementary analyses that did not meet the qualifications for path-analysis. Visual inspection of residual plots indicated that the assumption of linearity was met across all models, as no systematic curvature was observed in the relationships between predictors and outcomes. The residuals appeared to be evenly distributed across fitted values, supporting the assumption of homoscedasticity. Examination of Q-Q plots had minor deviations at the tails, however the overall distribution was approximately normal, therefore the assumption that errors are independent was considered to be met.

For simple regression models with a single predictor, multicollinearity was not applicable. For the indirect effect models estimating the b and c' paths, which included both ADL and BPNS as predictors, multicollinearity was assessed using variance inflation factors (VIF). All VIF values ranged from 1.02 to 1.90, indicating no evidence of problematic multicollinearity. In the moderated indirect effect models, raw VIFs for ADL, age, and the interaction term were elevated (VIFs = 18.04, 31.79, and 45.80, respectively). Consistent with recommendations for models containing higher-order terms, generalized VIFs were computed. Predictor-level VIFs were substantially lower and within acceptable ranges, indicating that multicollinearity did not pose a substantive concern in the moderated models.

Outliers were assessed across multiple criteria, including studentized residuals, Cook's distance, *dfbetas*, and leverage values. Three cases in model 1 and two cases in model 2 were observed with studentized residual values outside the normal range ($> |3|$). Cook's distance values and *dfbetas* across all models did not surpass the threshold ($D > 1$, $|dfbeta| > 2/\sqrt{n}$). Across the three models, twelve cases in Model 1, nineteen cases in Model 2, and eight cases in Model 3 exceeded the leverage cutoff for a one-predictor model ($h > .0150$). As outliers were not found across multiple indicators, the identified cases were assumed to be noninfluential. Sensitivity analyses confirmed that removing these cases did not meaningfully change model estimates; therefore, all observations were retained.

A correlation matrix was computed to examine associations among all study variables, including ADL, BPNS, their respective subdimensions, motivational outcomes, and demographic covariates. Correlations are listed in Table 1. All correlations are reported as Pearson correlations except for those computed with gender, which are reported as point biserial correlations given the categorical nature of gender. Global ADL demonstrated significant positive correlations with BPNS ($r = .57, p < .001$) and autonomous motivation ($r = .33, p < .001$). ADL was also positively associated with each BPNS subscale, autonomy ($r = .47, p < .001$), relatedness ($r = .48, p < .001$), and competence ($r = .47, p < .001$). The ADL subdimensions showed similar patterns, as displayed in Table 1. These findings indicate that regardless of the specific age-differentiated emphasis, more positive perceptions of ADL relate to stronger need satisfaction and autonomous motivation. BPNS was strongly associated with autonomous motivation ($r = .41, p < .001$), consistent with SDT's proposition that need satisfaction facilitates internalized motivation. Autonomous motivation was positively associated with autonomy ($r = .41, p < .001$), relatedness ($r = .42, p < .001$), and competence ($r = .50, p < .001$). Autonomous and controlled

motivation were moderately and positively correlated ($r = .36, p < .001$), suggesting that individuals may simultaneously experience both motivational orientations. In contrast, controlled motivation was not significantly associated with global ADL ($r = .10, p = .09$) or BPNS ($r = -.03, p = .65$), indicating that perceptions of overall age-differentiated leadership and need satisfaction do not meaningfully relate to externally regulated motivation. However, small positive correlations emerged between controlled motivation and older-focused ADL ($r = .12, p = .047$), as well as with younger-focused ADL ($r = .12, p = .046$).

In regard to demographic variables, age was not significantly correlated with ADL, BPNS, or motivational outcomes (all $p > .05$). However, age showed positive associations with tenure ($r = .34, p < .001$) and time with leader ($r = .24, p < .001$). These relationships are typical in organizational samples, as older employees generally have longer organizational tenure and more time working under their current supervisor. Tenure and time with leader were also strongly correlated with one another ($r = .65, p < .001$), reflecting a natural developmental link between these career-related variables. Gender was not significantly correlated with any primary study variables (all $p > .05$).

Table 1.*Descriptives and correlations amongst tested variables*

Variable	<i>M</i>	<i>SD</i>	<i>Skew</i>	<i>Kurtosis</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ADL	4.01	0.66	-0.88	1.39	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2. Younger-focused ADL	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Older-focused ADL	—	—	—	—	—	.61*** [.53, .68]	—	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Balanced ADL	—	—	—	—	—	.73*** [.67, .78]	.68*** [.61, .74]	—	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. BPNS	3.83	0.59	-0.59	0.30	.57*** [.49, .65]	.44*** [.34, .53]	.39*** [.28, .49]	.42*** [.32, .52]	—	NA	NA	NA	NA	NA	NA	NA	NA
6. Autonomy	3.55	0.67	-0.61	0.43	.47*** [.37, .56]	.46*** [.36, .55]	.38*** [.27, .48]	.42*** [.32, .52]	.55*** [.46, .63]	—	NA	NA	NA	NA	NA	NA	NA
7. Relatedness	3.78	0.75	-0.60	0.37	.48*** [.38, .57]	.44*** [.34, .53]	.39*** [.28, .49]	.44*** [.34, .53]	.59*** [.51, .67]	.61*** [.52, .68]	—	NA	NA	NA	NA	NA	NA
8. Competence	4.03	0.65	-0.47	-0.13	.47*** [.36, .55]	.45*** [.35, .54]	.38*** [.27, .48]	.41*** [.31, .51]	.55*** [.46, .63]	.55*** [.46, .63]	.61*** [.52, .68]	—	NA	NA	NA	NA	NA
9. Autonomous Motivation	3.69	0.92	-0.80	0.47	.33*** [.21, .43]	.30*** [.18, .40]	.29*** [.17, .39]	.29*** [.18, .40]	.41*** [.31, .51]	.50*** [.41, .59]	.42*** [.31, .51]	.50*** [.41, .59]	—	NA	NA	NA	NA
10. Controlled Motivation	3.19	0.78	-0.15	-0.36	.10 [-.02, .22]	.12* [.00, .24]	.12* [.00, .24]	.05 [-.07, .17]	-.03 [-.15, .09]	.15* [.03, .27]	.06 [-.06, .18]	.15* [.03, .27]	.36*** [.25, .46]	—	NA	NA	NA
11. Age	39.53	9.15	0.81	0.79	-.05 [-.17, .07]	.00 [-.12, .12]	-.11 [-.23, .01]	-.03 [-.15, .09]	.05 [-.07, .17]	.05 [-.07, .17]	.02 [-.10, .14]	.03 [-.09, .15]	.02 [-.10, .14]	-.09 [-.21, .03]	—	NA	NA
12. Gender	—	—	—	—	-.05 [-.17, .07]	-.04 [-.16, .08]	-.05 [-.17, .07]	-.05 [-.17, .07]	-.02 [-.14, .10]	-.02 [-.14, .10]	-.07 [-.18, .05]	-.08 [-.20, .04]	.05 [-.07, .17]	-.01 [-.13, .11]	-.06 [-.18, .06]	—	NA
13. Tenure	70.38	61.00	1.62	2.95	.08 [-.04, .19]	.11 [-.01, .23]	-.01 [-.13, .11]	.10 [-.02, .21]	.08 [-.04, .20]	.08 [-.04, .20]	.06 [-.06, .18]	.04 [-.08, .16]	-.01 [-.13, .12]	-.11 [-.23, .01]	.34*** [.23, .45]	.04 [-.08, .16]	—
14. Time with Leader	44.05	41.90	1.88	4.35	.06 [-.06, .18]	.12* [.00, .24]	.02 [-.10, .14]	.03 [-.09, .15]	.15* [.03, .27]	.15* [.03, .27]	.14* [.02, .26]	.11 [-.01, .22]	.04 [-.08, .16]	-.04 [-.16, .08]	.24*** [.13, .35]	-.01 [-.13, .11]	.65*** [.58, .72]

Note. All correlations are presented as Pearson correlations, except for gender which is reported as point biserial. ADL represents perceived age-differentiated leadership behaviors. Global correlations for ADL are omitted. BPNS represents basic psychological need satisfaction. *M* represents mean and *SD* represents standard deviation. * indicates $p < .05$, ** $p < .01$ *** $p < .001$.

Hypothesis Testing

The hypothesized model, illustrated in Figure 1, includes ADL as the independent variable, BPNS as the mediating variable, and both autonomous and controlled motivation as dependent variables. Age is modeled as a continuous moderator for the ADL to BPNS pathway. To test Hypotheses 1-3, three separate simple linear regressions were analyzed. Gender was coded as 0 = male, 1 = women and minority groups (Hertel & Zacher, 2018; Kaabomeir et al., 2022)], tenure (Kaabomeir et al., 2022), time with leader, and age (Kaabomeir et al., 2022; Kooij et al., 2008) were included as covariates in all analyses.

Hypothesis 1 predicted that ADL would be positively associated with BPNS. Results from the regression analysis indicated that the overall model was significant, $F(5, 260) = 28.39$, $p < .001$, explaining 35% of the variance in BPNS ($R^2 = .35$). Consistent with Hypothesis 1, ADL was significantly and positively associated with BPNS, $b = 0.51$, $SE = 0.05$, 95% $CI [0.42, 0.60]$, $p < .01$. This finding indicates that employees who perceived higher levels of ADL reported greater BPNS. Among the covariates, time with leader was significantly associated with BPNS ($b = 0.00$, $p < .01$), whereas age, gender, and tenure were not significant. Therefore, there is statistical evidence to support Hypothesis 1. Regression results are presented in Table 2.

Table 2.
Regression Results of BPNS on ADL

	<i>b</i>	<i>SE</i>	<i>b</i> 95% <i>CI</i>	<i>p</i>	<i>sr</i> ²
Intercept	1.62	0.25	[1.13, 2.11]	< .001	—
ADL	0.51	0.05	[0.42, 0.60]	< .001	0.32
Age	0.00	0.00	[-0.00, 0.01]	0.253	0.00
Gender	-0.03	0.05	[-0.12, 0.06]	0.567	0.00
Tenure	-0.00	0.00	[-0.00, 0.00]	0.138	0.01
Time with leader	0.00	0.00	[0.00, 0.00]	0.001	0.02

Note. Model summary: $R^2 = .35$, $F(5, 260) = 28.39$, $p < .001$. represents perceived age-differentiated leadership behaviors. *b* represents unstandardized regression weights. *SE* represents standard error. *CI* represents confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. Age, gender, tenure, and time with leader were included as covariates.

Hypothesis 2 predicted that BPNS would be positively associated with autonomous motivation. Results from the regression analysis indicated that the overall model was significant, $F(5, 260) = 20.47, p < .001$, accounting for 28% of the variance in autonomous motivation ($R^2 = .28$). Consistent with Hypothesis 2, BPNS was significantly and positively associated with autonomous motivation, $b = 0.83, SE = 0.08, 95\% CI [0.67, 1.00], p < .001$. This indicates that employees who reported greater BPNS also reported higher levels of autonomous motivation. None of the covariates (age, gender, tenure, or time with leader) significantly predicted autonomous motivation. Therefore, there is statistical evidence to support Hypothesis 2. Regression results are presented in Table 3.

Table 3.
Regression Results of Autonomous Motivation on BPNS

	<i>b</i>	<i>SE</i>	<i>b</i> 95% <i>CI</i>	<i>p</i>	<i>sr</i> ²
Intercept	0.25	0.41	[-0.56, 1.06]	0.545	—
BPNS	0.83	0.08	[0.67, 1.00]	< .001	0.28
Age	0.00	0.01	[-0.01, 0.01]	0.665	0.00
Gender	0.13	0.08	[-0.02, 0.28]	0.085	0.01
Tenure	-0.00	0.00	[-0.00, 0.00]	0.540	0.00
Time with leader	-0.00	0.00	[-0.00, 0.00]	0.774	0.00

Note. Model summary: $R^2 = .28, F(5, 260) = 20.47, p < .001$. BPNS represents basic psychological need satisfaction. *b* represents unstandardized regression weights. *SE* represents standard error. *CI* represents confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. Age, gender, tenure, and time with leader were included as covariates.

Hypothesis 3 predicted that BPNS would be negatively associated with controlled motivation. Results from the regression analysis indicated that the overall model was not significant, $F(5, 260) = 1.25, p = .287$, explaining only 2% of the variance in controlled motivation ($R^2 = .02$). Contrary to expectations, BPNS was not significantly associated with controlled motivation, $b = 0.11, SE = 0.08, 95\% CI [-0.05, 0.27], p = .190$. Furthermore, the observed coefficient was positive rather than negative, which was inconsistent with the hypothesized direction of the relationship. These findings suggest that satisfaction of basic

psychological needs was not a meaningful predictor of controlled motivation in this sample.

None of the covariates significantly predicted controlled motivation. Therefore, there is no statistical evidence to support Hypothesis 3. Regression results are presented in Table 4.

Table 4.
Regression Results of Controlled Motivation on BPNS

	<i>b</i>	<i>SE</i>	<i>b</i> 95% <i>CI</i>	<i>p</i>	<i>sr</i> ²
Intercept	3.08	0.41	[2.28, 3.88]	<.001	—
BPNS	0.11	0.08	[-0.05, 0.27]	0.190	0.01
Age	-0.01	0.01	[-0.02, 0.01]	0.324	0.00
Gender	-0.00	0.08	[-0.15, 0.15]	0.960	0.00
Tenure	0.00	0.00	[-0.00, 0.00]	0.161	0.01
Time with leader	0.00	0.00	[-0.00, 0.00]	0.481	0.01

Note. Model summary: $R^2 = .02$, $F(5, 260) = 1.25$, $p = 0.287$. BPNS represents basic psychological needs satisfaction. *b* represents unstandardized regression weights. *SE* represents standard error. *CI* represents confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. Age, gender, tenure, and time with leader were included as covariates.

To test Hypotheses 4 and 5, indirect effects were analyzed using path analysis in the *lavaan* package in R (Rosseel, 2012) with 5,000 bias-corrected bootstrap samples. Indirect effects were estimated for the expected mediation pathways simultaneously. Hypotheses were considered to be supported if the 95% confidence intervals for the indirect paths did not include zero (Fritz & MacKinnon, 2007). This procedure aligns with best practices for mediation testing in cross-sectional research, as it provides greater accuracy in estimating indirect effects without assuming normality (Fritz & MacKinnon, 2007; MacKinnon, 2004; Schoemann et al., 2017). Because the direct relationships among ADL, BPNS, autonomous motivation, and controlled motivation were evaluated in Hypotheses 1–3, interpretation of the present model focuses primarily on the indirect effects.

According to Hypothesis 4, BPNS was expected to have indirect effects on the relationship between ADL and autonomous motivation. The path analysis model explained 35.5% of the variance in BPNS ($R^2 = .36$), 29.1% of the variance in autonomous motivation (R^2

= .29), and 3.1% of the variance in controlled motivation ($R^2 = .03$). The indirect effect of ADL on autonomous motivation through BPNS was evident based on the confidence interval, $ab = 0.41$, 95% $CI = [0.29, 0.55]$. This indicates that ADL is associated with higher BPNS, which in turn is associated with greater autonomous motivation. Therefore, there is statistical evidence to support Hypothesis 4. Path analysis results for the model testing Hypothesis 4 and Hypothesis 5 are presented in Table 5.

Table 5.
Indirect-Effects of BPNS Path Analysis Results

Path	Outcome	Predictor	b	b 95% CI	β
a	BPNS	ADL	0.51	[0.41, 0.61]	0.57
b1	Autonomous	BPNS	0.79	[0.58, 0.99]	0.51
c'1	Autonomous	ADL	0.07	[-0.12, 0.26]	0.05
b2	Controlled	BPNS	0.04	[-0.17, 0.23]	0.03
c'2	Controlled	ADL	0.11	[-0.08, 0.31]	0.09
ab1	Autonomous	Indirect Effect	0.41	[0.29, 0.55]	0.29
ab2	Controlled	Indirect Effect	0.02	[-0.09, 0.11]	0.02
c1	Autonomous	Total Effect	0.47	[0.29, 0.65]	0.34
c2	Controlled	Total Effect	0.13	[-0.04, 0.31]	0.11

Note. Model R^2 : BPNS = .35, autonomous motivation = .28, controlled motivation = .03. BPNS represents basic psychological need satisfaction. Autonomous and controlled represent the two forms of motivation, respectively. b represents unstandardized regression weights. SE represents standard error. CI represents confidence interval. Square brackets are used to enclose the lower and upper limits of a confidence interval. Confidence intervals are based on 5,000 bootstrap samples. B indicates the standardized regression weights. Age, gender, tenure, and time with leader were included as covariates. Path a represents the effect of ADL on BPNS; b1 and b2 represent the effects of BPNS on autonomous and controlled motivation, respectively; c'1 and c'2 represent the direct effects of ADL on autonomous and controlled motivation, respectively; ab1 and ab2 represent the indirect effects of ADL through BPNS on autonomous and controlled motivation, respectively; and c1 and c2 represent the total effects of ADL on autonomous and controlled motivation, respectively.

For Hypothesis 5, it was expected that BPNS would have an indirect effect on the relationship between ADL and controlled motivation. The indirect effect of ADL on controlled motivation through BPNS was not significant, $ab = 0.02$, 95% $CI = [-0.09, 0.11]$. These results

indicate that BPNS did not serve as a mechanism linking ADL to controlled motivation.

Therefore, there is no statistical evidence to support Hypothesis 5 (see Table 5).

To test Hypotheses 6 through 8, a moderated mediation analysis was conducted using path analysis in the *lavaan* package in R (Rosseel, 2012) with 5,000 bootstrap samples. Both motivation types were included as separate outcomes in this model and age was entered as a continuous moderator. All lower-order terms and interaction terms were included in the model, and conditional effects were estimated at low (25th percentile), mean, and high (75th percentile) levels of age. These percentiles corresponded to ages 34 years (low), 38 years (mean), and 44 years (high).

It was expected for Hypothesis 6 that age would moderate the relationship between ADL and BPNS, such that the relationship would vary as a function of age. There was not a significant moderating effect of age on the relationship between ADL and BPNS, $b = -0.00$, 95% $CI [-0.02, 0.01]$. This indicates that age does not play a moderating role in the relationship between ADL and BPNS. Therefore, there is no statistical evidence to support Hypothesis 6. Predictor, direct, and interaction effects of the moderated mediation model are presented in Table 6

Table 6*Predictor, Direct, and Interaction Effects of the Age-Moderated Mediation Model*

Path	Outcome	Predictor	<i>b</i>	<i>b</i> 95% <i>CI</i>	β
a	BPNS	ADL	0.66	[0.14, 1.12]	0.74
w	BPNS	Age	0.02	[-0.04, 0.07]	0.29
aw	BPNS	ADL $\times$ Age	-0.00	[-0.02, 0.01]	-0.27
c'1	Autonomous Motivation	ADL	0.53	[-0.12, 1.13]	0.38
w1	Autonomous Motivation	Age	0.05	[-0.01, 0.11]	0.48
c'1w	Autonomous Motivation	ADL $\times$ Age	-0.01	[-0.03, 0.003]	-0.56
b1	Autonomous Motivation	BPNS	0.78	[0.58, 0.99]	0.50
c'2	Controlled Motivation	ADL	0.35	[-0.44, 1.057]	0.29
w2	Controlled Motivation	Age	0.02	[-0.06, 0.08]	0.22
c'2w	Controlled Motivation	ADL $\times$ Age	-0.00	[-0.02, 0.01]	-0.33
b2	Controlled Motivation	BPNS	0.03	[-0.17, 0.21]	0.03

Note. Model R^2 : BPNS = .36, autonomous motivation = .29, controlled motivation = .03. BPNS represents basic psychological need satisfaction. Autonomous and controlled represent the two forms of motivation, respectively. *SE* represents standard error. *CI* represents confidence interval. *B* indicates the standardized regression weights. Confidence intervals are bootstrap confidence intervals from 5,000 resamples. Gender, tenure, and time with leader were included as covariates. Path a represents the effect of ADL on BPNS, path b represents the effect of BPNS on motivation outcomes, c' paths represent direct effects of ADL on motivation outcomes, aw represents the interaction between ADL and age predicting BPNS, and c'w paths represent the interactions between ADL and age predicting motivation outcomes.

For Hypothesis 7, it was expected that age would moderate the relationship between ADL and motivation outcomes. There was not a significant moderating effect of age on the relationship between ADL and autonomous motivation ($b = -0.01$, 95% *CI* [-0.03, 0.003]) or controlled motivation ($b = -0.01$, 95% *CI* [-0.02, 0.01]). These results indicate that age does not influence the direct relationship between ADL and motivation outcomes in the current sample. Therefore, there is no statistical evidence to support Hypothesis 7. Predictor, direct, and interaction effects of the moderated mediation model are presented in Table 6.

Lastly, in accordance with Hypothesis 8, it was expected that age would moderate the indirect effects of ADL on motivation through BPNS. The index of moderated mediation for autonomous motivation was not significant ($b = -0.00$, 95% $CI [-0.01, 0.01]$). Similarly, index of moderated mediation for controlled motivation was not significant, ($b = -0.00$, $SE = 0.00$, 95% $CI [-0.002, 0.001]$). These findings indicate that the indirect effects did not differ as a function of age in the sample. Therefore, there is no statistical evidence to support Hypothesis 8. Indices of moderated mediation are presented in Table 7.

Table 7.
Index of Moderated Mediation.

Outcome	b	SE	95% CI	β
Autonomous	-0.00	0.01	[-0.01, 0.01]	-0.14
Controlled	0.00	0.00	[-0.002, 0.001]	-0.01

Note. Autonomous and controlled represent the two forms of motivation, respectively. SE represents standard error. CI represents confidence interval. B indicates the standardized regression weights. Confidence intervals are bootstrap confidence intervals from 5,000 resamples.

Exploratory Analyses

To further examine potential boundary conditions of the proposed relationships, additional moderation analyses were conducted using tenure and gender as alternative moderators. These analyses were exploratory and intended to provide additional context for the primary findings.

Individual Needs

To further explore whether age may function as a boundary condition when BPNS is separated into its individual needs, an exploratory moderated mediation path model was estimated in which autonomy, competence, and relatedness were simultaneously included as mediators. Consistent with the approach taken in Hypotheses 6 through 8, age was retained as a continuous moderator of the relationship between ADL and each need. This model permitted

examination of whether age moderated the relationship between ADL and each need while accounting for overlap among the three needs, as well as whether conditional indirect effects differed across levels of age. Results indicated that age did not significantly moderate the relationship between ADL and autonomy, $b = 0.00$, 95% $CI [-0.01, 0.01]$, competence, $b = -0.01$, 95% $CI [-0.02, 0.01]$, or relatedness, $b = -0.01$, 95% $CI [-0.02, 0.01]$. Therefore, there was no statistical evidence that age moderated the relationship between ADL and any of the three psychological needs. With respect to the direct effects, ADL was positively associated with competence, $b = 0.65$, 95% $CI [0.06, 1.19]$, and relatedness, $b = 0.746$, 95% $CI [0.03, 1.36]$, but was not significantly associated with autonomy, $b = 0.46$, 95% $CI [-0.09, 0.90]$. Age was not significantly associated with autonomy, competence, or relatedness. The model explained 24.3% of the variance in autonomy, 23.3% of the variance in competence, 24.9% of the variance in relatedness, 30.6% of the variance in autonomous motivation, and 6.5% of the variance in controlled motivation.

When predicting autonomous motivation, competence was positively associated with autonomous motivation, $b = 0.48$, 95% $CI [0.27, 0.66]$. Additionally, autonomy was significant, but demonstrated a comparatively weaker positive relationship with autonomous motivation than competence, $b = 0.19$, 95% $CI [0.002, 0.39]$. In contrast, relatedness, $b = 0.13$ 95% $CI [-0.06, 0.31]$, was not a significant unique predictor after accounting for the other needs. When predicting controlled motivation, autonomy was negatively associated with controlled motivation, $b = -0.21$, 95% $CI [-0.39, -0.02]$, whereas competence was positively associated with controlled motivation, $b = 0.25$, 95% $CI [0.05, 0.41]$. Relatedness was not significantly associated with controlled motivation, $b = -0.01$, 95% $CI [-0.19, 0.16]$.

After examining the indirect effects, based on the 95% *CI*, a significant indirect effect of ADL on autonomous motivation through competence was revealed, $b = 0.22$, 95% *CI* [0.12, 0.34]. The indirect effect through autonomy was also significant, $b = 0.09$, 95% *CI* [0.001, 0.19], whereas the indirect effect through relatedness was not significant, $b = 0.07$, 95% *CI* [-0.03, 0.18]. For controlled motivation, significant indirect effects were observed through autonomy, $b = -0.099$, 95% *CI* [-0.20, -0.01], and competence, $b = 0.12$, 95% *CI* [0.02, 0.20], whereas the indirect effect through relatedness was not significant, $b = -0.008$, 95% *CI* [-0.11, 0.09].

Table 8.*Predictor, Direct, and Interaction Effects of the Age-Moderated, Individual-Needs-Mediated Model*

Path	Outcome	Predictor	<i>b</i>	<i>b</i> 95% <i>CI</i>	β
a1	Autonomy	ADL	0.46	[-0.09, 0.904]	0.445
w1	Autonomy	Age	0.00	[-0.053, 0.047]	0.030
a1w	Autonomy	ADL $\times$ Age	0.00	[-0.010, 0.014]	0.047
a2	Competence	ADL	0.65	[0.064, 1.192]	0.653
w2	Competence	Age	0.02	[-0.038, 0.077]	0.308
a2w	Competence	ADL $\times$ Age	-0.01	[-0.018, 0.009]	-0.319
a3	Relatedness	ADL	0.75	[0.03, 1.36]	0.65
w3	Relatedness	Age	0.02	[-0.06, 0.09]	0.28
a3w	Relatedness	ADL $\times$ Age	-0.01	[-0.02, 0.01]	-0.30
b1	Autonomous Motivation	Autonomy	0.19	[0.00, 0.39]	0.14
b2	Autonomous Motivation	Competence	0.48	[0.27, 0.66]	0.34
b3	Autonomous Motivation	Relatedness	0.13	[-0.06, 0.31]	0.11
c'1	Autonomous Motivation	ADL	0.56	[-0.11, 1.15]	0.40
w4	Autonomous Motivation	Age	0.05	[-0.01, 0.11]	0.49
c'1w	Autonomous Motivation	ADL $\times$ Age	-0.01	[-0.03, 0.003]	-0.56
b4	Controlled Motivation	Autonomy	-0.21	[-0.39, -0.02]	-0.18
b5	Controlled Motivation	Competence	0.25	[0.05, 0.41]	0.21
b6	Controlled Motivation	Relatedness	-0.01	[-0.19, 0.16]	-0.01
c'2	Controlled Motivation	ADL	0.31	[-0.40, 0.99]	0.26
w5	Controlled Motivation	Age	0.01	[-0.05, 0.07]	0.17
c'2w	Controlled Motivation	ADL $\times$ Age	-0.01	[-0.02, 0.01]	-0.27
ab1	—	Indirect Effect	0.09	[0.001, 0.19]	—
ab2	—	Indirect Effect	0.22	[0.12, 0.34]	—
ab3	—	Indirect Effect	0.07	[-0.03, 0.18]	—
ab4	—	Indirect Effect	-0.10	[-0.195, -0.01]	—
ab5	—	Indirect Effect	0.11	[0.02, 0.20]	—
ab6	—	Indirect Effect	-0.01	[-0.11, 0.09]	—

Note. Autonomous and controlled represent the two forms of motivation, respectively. *SE* represents standard error. Unstandardized coefficients (*b*) reported with standard errors (*SE*). β = standardized coefficient. *CI* represents confidence interval. Confidence intervals are based on 5,000 bootstrap samples. Gender, tenure, and time with leader were included as covariates. a paths represent effects of ADL on autonomy, competence, and relatedness; b paths represent effects of the needs on motivation outcomes; c' paths represent direct effects of ADL on motivation outcomes; w paths represent age effects; interaction paths represent moderation by age; and ab paths represent indirect effects.

Age-Differentiated Leadership Subsets

To further examine whether age moderation may emerge when ADL is disaggregated, regression analyses were conducted using balanced ADL, older-focused ADL, and younger-

focused ADL as predictors of BPNS, autonomous motivation, and controlled motivation. Each model included age and the interaction term between the ADL subset and age, consistent with the approach used in Hypotheses 1 through 3 with the addition of moderation. These analyses permitted examination of whether disaggregating ADL would reveal moderation effects that were not observed in the primary model. Gender, tenure, and time with leader were included in each of the moderated regressions.

For BPNS, it was expected that each ADL subset would be positively associated with BPNS and that age may moderate these relationships. Results indicated that balanced ADL, $b = 0.54$, $SE = 0.17$, $p = .002$, older-focused ADL, $b = 0.52$, $SE = 0.18$, $p = .004$, and younger-focused ADL, $b = 0.59$, $SE = 0.17$, $p < .001$, were all significantly positively associated with BPNS. However, none of the interaction terms were significant (balanced: $b = -0.00$, $SE = 0.00$, $p = .505$; older-focused: $b = -0.00$, $SE = 0.00$, $p = .404$; younger-focused: $b = -0.00$, $SE = 0.00$, $p = .253$). Therefore, there is statistical evidence that all ADL subsets are positively associated with BPNS, but no statistical evidence that age moderates these relationships.

For autonomous motivation, it was expected that each ADL subset would be positively associated with autonomous motivation and that age may moderate these relationships. Results indicated that balanced ADL, $b = 0.92$, $SE = 0.31$, $p = .003$, older-focused ADL, $b = 0.79$, $SE = 0.31$, $p = .012$, and younger-focused ADL, $b = 0.86$, $SE = 0.30$, $p = .004$, were all significantly positively associated with autonomous motivation. However, none of the interaction terms were significant (balanced: $b = -0.01$, $SE = 0.01$, $p = .074$; older-focused: $b = -0.01$, $SE = 0.01$, $p = .166$; younger-focused: $b = -0.01$, $SE = 0.01$, $p = .085$). Therefore, there is statistical evidence that all ADL subsets are positively associated with autonomous motivation, however there is no statistical evidence to suggest that age moderates these relationships.

For controlled motivation, it was expected that ADL subsets may be negatively associated with controlled motivation and that age may moderate these relationships. Results indicated that none of the ADL subsets were significantly associated with controlled motivation (balanced: $b = 0.13$, $SE = 0.28$, $p = .636$; older-focused: $b = 0.50$, $SE = 0.27$, $p = .069$; younger-focused: $b = 0.35$, $SE = 0.26$, $p = .182$), and none of the interaction terms were significant (balanced: $b = -0.00$, $SE = 0.01$, $p = .811$; older-focused: $b = -0.01$, $SE = 0.01$, $p = .155$; younger-focused: $b = -0.01$, $SE = 0.01$, $p = .392$). Therefore, there is no statistical evidence that ADL subsets are associated with controlled motivation or that age moderates these relationships.

Time with Leader

To further explore whether time with leader may function as a boundary condition of the relationship between ADL, BPNS, and motivation, an exploratory moderated mediation model was estimated using time with leader as a continuous moderator. Time with leader was explored as a moderator of the relationship between ADL and BPNS, as well as the direct relationships between ADL and autonomous and controlled motivation. Quartile values for time with leader were 13.0 months (25th percentile), 33.5 months (50th percentile), and 60.0 months (75th percentile).

Results revealed that there was no significant moderating effect of time with leader on the relationship between ADL and BPNS, $b = 0.000$, 95% $CI [-0.002, 0.003]$. This indicates that time with leader does not moderate the relationship between ADL and BPNS.

Additionally, time with leader was explored as a moderator in the relationship between ADL and motivation outcomes. There was not a significant moderating effect of time with leader on the relationship between ADL and autonomous motivation, $b = -0.00$, 95% $CI [-0.005, 0.004]$, or controlled motivation, $b = -0.00$, 95% $CI [-0.004, 0.003]$. These findings indicate that time

with leader does not influence the direct relationship between ADL and motivation outcomes in the current sample. Therefore, there is no statistical evidence that time with leader moderates these relationships.

Lastly, time with leader was explored as a moderator of the indirect effects of ADL on motivation through BPNS. The index of moderated mediation for autonomous motivation was not significant, $b = 0.00$, 95% *CI* [-0.002, 0.002]. Similarly, the index of moderated mediation for controlled motivation was not significant, $b = 0.00$, 95% *CI* [0.000, 0.000]. These findings indicate that the indirect effects did not differ as a function of time with leader. Therefore, there is no statistical evidence that time with leader moderates the indirect effects of ADL on motivation through BPNS. This suggests that the relationships among the study variables were relatively consistent regardless of the length of the leader–follower relationship.

CHAPTER 4: DISCUSSION

The workforce is more age-diverse than ever and will continue to become increasingly older (U.S. Bureau of Labor Statistics, 2025). Theories such as the selection, optimization, and compensation (SOC; Baltes & Baltes, 1990) model and motivational theory of lifespan development (MTLD; Heckhausen et al., 2010), posit that the needs of works change with increasing age. Additionally, self-determination theory (SDT; Deci & Ryan, 2000) posits that it is through the satisfaction of basic psychological needs (autonomy, competence, and relatedness) that leaders can foster high quality, self-endorsed motivation in their followers. Therefore, the way leadership responds to employees of differing ages sparked interest in understanding how aspects of leadership, motivation, and aging can be optimized for the workforce (Zacher, 2015; Hertel & Zacher, 2018). This highlighted the need to investigate the mechanisms through which leaders can support employees and how this differs across ages (Zellman et al., 2025; De Boom & De Meulenaere, 2024; Rosing & Jungmann, 2015). Age-differentiated leadership (ADL) is a leadership style that differentiates behaviors for employees with consideration to age-related changes in motives, resources, and values (Wegge et al., 2012; 2014; Koziel et al., 2021; Rosing & Jungmann, 2015; Uhlmann et al., 2023). The present study examined the impact of age on employees' perceptions of ADL behaviors in their leader and work motivation through the satisfaction of basic psychological needs (BPNS).

Across all analyses, three patterns were consistent. First, ADL was strongly associated with BPNS, and BPNS was strongly associated with autonomous motivation. Second, neither ADL nor BPNS meaningfully predicted controlled motivation. Third, age did not moderate any direct, indirect, or exploratory pathways. These findings largely support self-determination theory (SDT; Deci & Ryan, 2000), which emphasizes the universal importance of autonomy,

competence, and relatedness in motivation outcomes (Deci & Ryan, 2009; Van den Broeck et al., 2016), while contrasting with lifespan theories that predict age-related differences in motivational processes (Hammond et al., 2016; Shane & Heckhausen, 2019).

Age-Differentiated Leadership

As expected, higher perceptions of ADL behaviors were associated with increased BPNS, indicating that ADL behaviors support employees' needs of autonomy, competence, and relatedness globally. This finding is consistent with research linking leadership styles that have similar principles as ADL, such as individualized consideration and age inclusivity, to the fulfillment of BPNS (De Boom & De Meulenaere, 2024; Jensen & Bro, 2018; Kovjanic et al., 2012). This aligns with SDT perspectives that posit that leaders can facilitate motivation through providing resources and fostering environments that promote the satisfaction of employees' autonomy, competence, and relatedness (Deci & Ryan, 2009; Olafsen et al., 2018).

Additionally, the subsets of ADL (younger employee focused, older employee focused, and a balanced approach) were each associated with higher levels of BPNS, indicating that ADL behaviors were effective across all subsets in improving BPNS in this study. This aligns with findings that show other leadership models, such as age-inclusive leadership, can benefit employees across multiple contexts (De Boom & De Meulenaere, 2024). This pattern may be especially meaningful when contrasted with prior ADL research that has often emphasized subgroup-conditional effects. Koziel et al. (2021) found that certain ADL subsets were more beneficial for specific age groups, contrasting the present findings suggest.

Moreover, higher perceptions of ADL behaviors in an individual's leader were associated with higher autonomous motivation, meaning that they were more likely to engage in work because of personal endorsement of the value or meaning of their work (Deci & Ryan, 2009).

This finding is consistent with research on age inclusive leadership and transformational leadership, which demonstrates that need-responsive leadership behaviors enhance intrinsic and autonomous motivation (De Boom & De Meulenaere, 2024; Jensen & Bro, 2018). This suggests that ADL behaviors influence motivation by shaping employees' experiences and providing support for psychological needs that underlie high-quality, autonomous motivation (Olafsen et al., 2018).

These findings are also strongly supported by Eyal and Roth (2011), who found that transformational leadership predicted autonomous motivation, and accounting these results to leadership behaviors that foster identification, value internalization, and self-endorsed engagement rather than compliance. This is theoretically important because SDT distinguishes autonomous motivation as motivation rooted in personal endorsement, meaning, or intrinsic interest rather than obligation. Thus, the present findings suggest that ADL may similarly support employees not merely by increasing motivation quantity, but by shaping motivation quality through internalization processes. In this way, ADL may help employees perceive work as more congruent with evolving developmental values while preserving universal psychological need support. Within the framework of selection, optimization, and compensation (SOC), this finding suggests that ADL behaviors serve as a resource that supports employees in their ability to select viable goals, optimize their resources, and use compensation to address losses (Zacher, 2015).

Contrary to expectations, ADL levels were not associated with employees' levels of controlled motivation, suggesting that ADL has no direct impact on controlled motivation in this sample. This aligns with research that points to similar leadership behaviors, such as transformational leadership, not reducing controlled forms of motivation (Eyal & Roth, 2011). This may be because controlled motivation is driven by things such as external demands or

internalized guilt or pressure, separately from the presence of ADL behaviors (Van den Broeck et al., 2016). This means, ADL may enhance positive forms of motivation without necessarily having diminishing effects on controlled forms.

Van den Broeck et al. (2016) provide especially strong meta-analytic support for this interpretation, demonstrating across 119 samples that BPNS robustly predicts autonomous motivation but explains negligible variance in external and introjected (controlled) motivation. Their findings suggest a “positive versus negative asymmetry,” in which need satisfaction primarily drives growth-oriented outcomes, whereas controlled motivation is more strongly associated with need frustration or pressure-based mechanisms. Accordingly, the present findings may suggest that ADL acts primarily to support need satisfaction pathways and self-endorsed motivation without necessarily buffering the external contingencies, organizational pressures, or internalized guilt that sustain controlled motivation.

Chua and Ayoko (2021) offer an important contrasting perspective by showing that even transformational leadership can sometimes positively predict controlled motivation when employees feel pressure to meet elevated expectations or avoid disappointing highly inspirational leaders. This contradiction is theoretically useful because it suggests that supportive leadership styles do not universally impact controlled motivation; rather, leadership may be associated with controlled motivation when supportive behaviors from leadership become psychological pressuring. The absence of this effect in the present study may therefore indicate that ADL, at least within this sample, was not broadly experienced as pressure-inducing. Collectively, these findings reinforce the distinction in more recent SDT research between autonomous and controlled motivation.

Basic Psychological Need Satisfaction

As expected in Hypothesis 2, BPNS was strongly associated with autonomous motivation. This relationship is consistent with SDT's logic that places BPNS as the primary driver of high-quality, self-endorsed motivation (Deci & Ryan, 2009; Van den Broeck et al., 2016). These findings reinforce the role of BPNS in shaping employees' autonomous forms of motivation. When examining the individual needs separately, competence appeared to be the strongest in its relation to autonomous motivation, followed by relatedness and autonomy. This pattern is consistent with research that has suggested that competence may play a particularly important role in driving work motivation, specifically when considering task-related motives (Jensen & Bro, 2018; Kovjanic et al., 2012).

Contrary to Hypothesis 3, BPNS was not significantly associated with controlled motivation. These results align with meta-analytic evidence showing that BPNS predicts autonomous motivation but explains negligible variance in controlled motivation (Van den Broeck et al., 2016). Research suggests that controlled motivation is more strongly associated with need frustration rather than lack of BPNS (Chua & Ayoko, 2021; Eyal & Roth, 2011). This suggests that controlled motivation forms act on separate pathways not present in the current model.

Consistent with Hypothesis 4, BPNS significantly and indirectly effected the relationship between ADL and autonomous motivation. Confidence intervals for the indirect effect did not include zero, indicating a robust mediation effect. This finding supports SDT and leadership research demonstrating that BPNS is the primary mechanism linking supportive leadership to autonomous motivation (Olafsen et al., 2018; De Boom & De Meulenaere, 2024). ADL appears to enhance autonomous motivation by creating environments that allow employees to feel capable, connected, and self-directed. Regarding individual needs, competence demonstrated the

strongest indirect effect, followed by relatedness and autonomy. These results align with research showing that competence often plays a central mediating role for performance-related outcomes (Jensen & Bro, 2018; Kovjanic et al., 2012). Relatedness and autonomy also contributed meaningfully, consistent with research showing that all three needs support intrinsic motivation (De Boom & De Meulenaere, 2024). These findings, may suggest that feelings of being capable and effective in one's work is the most important to support across all employees when aiming to improve their autonomous motivation. As all three needs were found to globally have indirect effects on this pathway as well, they all appear to be of importance for fostering autonomous motivation, however competence may be especially importance based on contextual factors.

Contrary to expectations for Hypothesis 5, BPNS did not have a significant indirect effect on the relationship between ADL and controlled motivation. This pattern is consistent with studies showing that controlled motivation is more strongly predicted by transactional or controlling leadership behaviors (Eyal & Roth, 2011) and may even increase under highly inspirational leadership if employees feel pressure to meet elevated expectations (Chua & Ayoko, 2021). Moreover, it aligns with distinctions that have been made in SDT literature between need satisfaction, which predicts growth-oriented outcomes, and need frustration, which predicts pressure-based outcomes (Van den Broeck et al., 2016). Therefore, while ADL increased need satisfaction in this sample, it may not reduce the external pressures or internalized obligations that drive controlled motivation.

The Role of Age

Contrary to expectations, the current study did not find evidence that age influenced any of the direct or indirect pathways examined. Specifically, age did not moderate the relationships between ADL and BPNS, ADL and motivation, or the indirect effects of ADL on motivation

through BPNS. Similar findings emerged when BPNS was separated into autonomy, competence, and relatedness, as well as when balanced, older-focused, and younger-focused ADL behaviors were examined independently. Collectively, these results suggest that the relationships observed in the present study operated similarly across employees regardless of age.

Interestingly, age also did not influence the relationships between ADL subsets and BPNS, indicating that employees responded similarly to younger-focused, older-focused, and balanced ADL behaviors regardless of their age. This finding differs from prior research that has reported age-dependent relationships between ADL and employee outcomes (e.g., Koziel et al., 2021; Jungmann et al., 2020). However, it is consistent with the broader pattern of findings observed in the present study, in which age did not emerge as a meaningful boundary condition for any of the relationships examined.

Several explanations may account for the lack of age effects. First, it is possible that age-related differences were less pronounced in the present sample than anticipated. Although chronological age is frequently used in lifespan research, researchers have increasingly argued that age alone may not fully capture meaningful differences in employees' motives, experiences, or developmental priorities (De Boom & De Meulenaere, 2024; Kooij et al., 2011; Zacher, 2015). Constructs such as subjective age, career stage, job and task design, or leader-member age differences may better reflect the mechanisms through which age-related processes influence workplace outcomes (De Boom & De Meulenaere, 2024; Zacher, 2015). Therefore, future research should test alternative age conceptualizations, such as those listed above.

Second, lifespan theories suggest that age-related changes are often heterogeneous and shaped by contextual influences rather than occurring uniformly across individuals (Baltes &

Baltes, 1990; Heckhausen et al., 2010). As a result, employees of the same chronological age may differ substantially in their goals, resources, and developmental priorities, potentially reducing the likelihood of detecting age-based moderation effects using chronological age alone.

Beyond chronological age, contextual factors such as physical and social environments and socioeconomic status can substantially shape individuals' developmental trajectories (Baltes & Baltes, 1990; Heckhausen et al., 2010; Steverson, 2025). These factors influence the opportunities available to individuals and the adaptive strategies employed across the lifespan. Additionally, life transitions and accumulated personal experiences may produce non-linear changes in physical and psychological functioning, which may further contribute to variability in how age-related processes unfold across individuals (Baltes & Baltes, 1990; Steverson, 2025; Hertel & Zacher, 2018).

Finally, the findings may indicate that the relationships between ADL, BPNS, and motivation are relatively robust across employees of different ages. Rather than operating differently for younger and older workers, the positive associations between ADL, BPNS, and autonomous motivation were observed consistently throughout the sample. This pattern of findings may be encouraging, as it suggests that ADL behaviors are effective in supporting employees across the adult lifespan. Given that ADL is intended to recognize and accommodate employees' evolving needs and capacities, one would hope that its positive effects extend to workers of all ages rather than benefiting only specific age groups. Similar findings have been reported in SDT research, which suggests that the benefits of need-supportive environments tend to generalize across demographic groups because the needs for autonomy, competence, and relatedness are considered fundamental psychological requirements across the lifespan (Deci & Ryan, 2000, 2008; Ryan & Deci, 2017). In this manner, age may not represent a particularly

strong boundary condition of the relationships examined in the present study, at least when operationalized using chronological age. Therefore, the present findings suggest that ADL behaviors may effectively support employees' psychological needs and promote autonomous work motivation regardless of employees' age, rather than benefiting certain chronological age groups over others.

Theoretical Implications

This study advances theoretical understanding in leadership, lifespan development, and motivational science by integrating empirical findings with major theoretical frameworks. First, by empirically testing basic psychological need satisfaction (BPNS) as the mediating mechanism between age-differentiated leadership (ADL) and work motivation, this research directly addresses the gap identified by De Boom & De Meulenaere (2024) regarding the lack of mechanism-focused leadership studies. These results demonstrate that ADL operates through SDT's universal needs of autonomy, competence, and relatedness, offering robust support for SDT's core proposition that these needs are central to motivation across the lifespan (Deci & Ryan, 2000; Van den Broeck et al., 2016).

Second, the absence of age moderation in any direct or indirect pathway provides an important contribution to lifespan theories such as selective optimization with compensation (SOC; Baltes & Baltes, 1990) and motivational theory of life-span development (MTLD; Heckhausen et al., 2010). Although these frameworks propose that employees' goals, motives, and developmental needs change across the lifespan, the present findings suggest that effective implementation of age-differentiated leadership may successfully accommodate these differences. Because ADL is explicitly designed to recognize and respond to age-related changes in employee needs and priorities, the lack of age-based differences in outcomes may indicate that

employees across age groups experience comparable levels of need satisfaction and autonomous motivation when leaders engage in age-differentiated behaviors. Thus, rather than challenging lifespan theories, the findings may provide preliminary support for the underlying assumptions of ADL by demonstrating that a leadership approach grounded in age-related differences can produce similarly positive outcomes across employees of different ages. From this perspective, the absence of moderation may reflect the successful enactment of age-sensitive leadership rather than evidence that age-related differences are unimportant in the workplace.

Third, these results contribute to a growing body of evidence (Zacher, 2015; Boehm et al., 2013/2014; Zellman et al., 2025) suggesting that chronological age alone is a limited moderator, and that more nuanced constructs, such as subjective age, career stage, or relational age gaps, may be required to meaningfully capture variation in leadership processes. The current study's null findings for age moderation reinforce the need for future models to move beyond age as a crude proxy for developmental differences and instead focus on mechanisms and boundary conditions that better reflect employees' lived experiences.

Fourth, the distinction between satisfaction and frustration of needs, as articulated in recent SDT extensions (Van den Broeck et al., 2016), receives empirical support here: ADL and BPNS robustly predict positive (autonomous) motivation, but not controlled motivation. This suggests that positive and negative motivational processes travel through distinct pathways, with need frustration (rather than just lack of satisfaction) likely to drive negative outcomes. This insight further refines SDT, highlighting the importance of dual-process models for understanding the full motivational impact of leadership.

Finally, the consistency of findings across ADL subsets and exploratory analyses may have broader conceptual implications for how ADL itself is understood. Although ADL was

originally conceptualized around age differentiation, the positive associations across younger-focused, older-focused, and balanced ADL subsets suggest that differentiated leadership may not necessarily produce divergent motivational outcomes when employees perceive these behaviors as supportive. This may indicate that ADL's practical and theoretical value lies less in rigid age group tailoring and more in adaptive responsiveness to employee needs. Consequently, this study may help refine future ADL scholarship by suggesting that effective age-responsive leadership may be better conceptualized as flexible, inclusive, and psychologically supportive rather than narrowly age-differentiated.

Practical Implications

These findings offer important practical guidance for organizations seeking to lead age-diverse workforces effectively. A key finding of this study is that ADL significantly predicted BPNS and autonomous motivation across employees, while age did not meaningfully alter these relationships. As a result, organizations can implement ADL-informed leadership practices with greater confidence that their core motivational benefits may apply broadly across age groups.

First, these findings suggest that organizations may benefit from focusing less on rigid age-based leadership segmentation and more on broadly fostering leadership behaviors that support autonomy, competence, and relatedness. Rather than assuming that younger and older workers necessarily require fundamentally different leadership systems, organizations may be better served by training leaders to flexibly recognize and support diverse employee needs while consistently emphasizing universal motivational principles. This approach may reduce the risk of age stereotyping while still preserving ADL's adaptability. In practice, leaders may be especially effective when they provide meaningful choice, developmental support, role clarity, skill-building opportunities, and interpersonal inclusion across employees.

Second, the absence of age moderation suggests that organizations may not need entirely separate leadership interventions for different age cohorts to improve BPNS and autonomous motivation. This may make ADL-informed interventions more scalable, practical, and cost-effective. Instead of creating leadership systems that strictly follow chronological age as a differentiation method, organizations can implement broader strategies that emphasize inclusive responsiveness, flexibility, and need support. Where possible, leaders can individualize support based on these more nuanced characteristics rather than chronological age alone.

Finally, the lack of association between ADL and controlled motivation highlights a practical limitation: leader behaviors that satisfy needs may not be sufficient to diminish controlled forms of motivation (e.g., compliance, external rewards, or pressure). With this in mind, organizations should consider strategies in addition to ADL that specifically target sources of need frustration or need thwarting to reduce controlled motivation

Fourth, the exploratory findings suggest that competence may represent a particularly meaningful practical intervention point. If competence consistently emerged as a strong predictor within motivational pathways, organizations may especially benefit from emphasizing leadership practices that improve employee efficacy, mastery, confidence, and developmental progression. For example, providing feedback, professional development opportunities, mentoring, and role clarity may substantially strengthen employees' autonomous motivation.

Limitations

Several limitations should be acknowledged to put these findings in perspective. First, the cross-sectional design fundamentally restricts our ability to make strong claims about causality or temporal sequence. This is an issue that has been widely discussed in the literature (Kline, 2023; Olafsen et al., 2018). While the associations observed here are informative, it's important

to recognize that without longitudinal or experimental data, we are left with a snapshot rather than a developmental trajectory. Therefore, the relationships observed could differ over time, and any claims about directionality or change remain speculative until tested in more robust designs.

Second, all study variables were assessed using employee self-report measures collected at a single time point. For constructs such as BPNS and work motivation, self-reports are appropriate because they capture individuals' subjective experiences, perceptions, and internal motivational states. However, measuring both predictor and outcome variables from the same source may increase the potential for common method variance and shared source bias, which can artificially inflate observed relationships. Although employees are well positioned to report on their own needs and motivation, future research could strengthen confidence in these findings by incorporating multiple sources of data, such as supervisor ratings, peer reports, observational measures of leadership behavior, or longitudinal designs that separate measurement across time.

Third, the sampling approach may have inadvertently limited the variability of needs and experiences represented in the sample. Because the data were collected online, there's a risk that participants were more homogenous. Perhaps participants were more comfortable with technology, more likely to be knowledge workers, or more aligned in their motivational profiles, than would be the case with an in-person, workplace-based sample. This homogeneity might blunt the ability to detect true moderation effects, especially those linked to age or career stage. It also raises the question of whether subjective age, rather than chronological age, might better capture the diversity of experiences relevant to ADL.

Finally, the sample characteristics may also limit broader generalizability. Since the sample was predominantly White, the findings in this study may have limited replicability across more racially diverse populations. Future research should therefore prioritize more

demographically diverse samples to better determine whether the current findings replicate across broader employee populations and organizational contexts.

Future Research

Reflecting on the current findings and drawing from the broader literature, several nuanced directions emerge for advancing ADL research. First, future work should move beyond simplistic demographic categories and rigorously test subjective age, career stage, and nuanced leader–member age differences as potential moderators. Mounting evidence suggests that the relational age gap between leaders and followers may be a more sensitive and theoretically meaningful moderator than chronological age alone (De Boom & De Meulenaere, 2024; Zacher, 2015; Zellman et al., 2025). In addition to age differences, future research should examine age similarity and dissimilarity between leaders and followers, as perceptions of shared age-related experiences or generational differences may influence how leadership behaviors are interpreted and received. This approach could help clarify why some studies find age moderation effects while others do not, and would extend generalizability to more diverse populations and organizational contexts. Future studies should also consider how contextual factors regarding data collection (e.g., online versus in-person samples) might shape age-related effects, perhaps by influencing variability in need profiles across participants.

Second, there is a pressing need for methodological innovation. Longitudinal or time-lagged designs are essential for disentangling causality and clarifying how ADL influences motivation over time (Zacher, 2015; Olafsen et al., 2018). Future research should consider incorporating multi-source data (e.g., supervisor, peer, or objective ratings) to provide a richer, more robust understanding of leadership dynamics (Van den Broeck et al., 2016; Koziel et al., 2021).

Third, the dual-process framework of SDT should be more fully leveraged by explicitly testing need frustration as a unique predictor of controlled motivation and negative outcomes. While need satisfaction predicts positive forms of motivation, emerging evidence suggests that need frustration is a more potent driver of ill-being, exhaustion, and controlled motivation (Van den Broeck et al., 2016). Future studies should measure these constructs separately to fully capture the complexity of motivational pathways across different leadership styles.

Fourth, future research should directly compare ADL to established styles such as transformational leadership to determine whether ADL represents a distinct, incrementally valuable style or simply an age-sensitive extension of existing frameworks (Uhlmann et al., 2023; Zellman et al., 2025; Koziel et al., 2021). This comparative work is crucial for establishing ADL's conceptual boundaries and its unique contributions to the leadership literature.

Finally, there remains much to explore regarding boundary conditions and contextual moderators. Potential moderators, based on theoretical meaningfulness and empirical evidence, should consider including leader–member age difference and leader-member relationship quality, to better understand where, when, and for whom ADL is most effective. Future studies should examine whether age similarity or dissimilarity between leaders and followers influences the effectiveness of age-differentiated leadership, as age congruence may shape employees' perceptions of leader credibility, understanding, and responsiveness to age-related needs. Integrating insights from SDT, lifespan theories, and diversity models will be key to deepening the theoretical and practical impact of future work in this area.

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APPENDIX A

Recruitment Statement

Leadership for All Ages

Recruitment Statement: This online research study will ask you to answer questions regarding your workplace experiences and perceptions and how your age might shape these. You will also be asked to answer demographic questions.

Qualified Participants: Individuals over the age of 18 years old, fluent in English, who are employed full-time (at least 30 hours a week), who report to a direct supervisor/leader, and have worked under this supervisor/leader for at least three months.

Time Commitment: If you decide to consent to participate in this study, you can access the survey link below. The survey will take about 15 minutes of your time. After completing the survey, you will be compensated \$1.88 for your time.

Anonymity: This study is strictly anonymous meaning that no identifying information will be collected in connection with the research data. Once you have received credit for completing this study, CloudResearch Connect IDs will be removed from the electronic file. All information collected will be secured in a password protected file and all electronic information will be secured on a password protected computer. CloudResearch Connect IDs are not considered identifying information as Connect IDs are randomly generated number and letter sequences that are assigned to workers through Connect. The ID itself doesn't possess any personally identifiable information and as per Cloud Research's requester use policy, requesters aren't permitted to collect other potentially identifying information (e.g., email addresses, phone numbers, etc.) to protect the workers we're gathering information from. Also, through the use of an external site to house the survey (i.e., Qualtrics) this is a protective mechanism to protect the participant's identity as no one has access to the responses beyond the research team.

Participation: Participation in this study is voluntary. You may withdraw from the study at any point in time without any penalty.

Compensation: You will be provided \$1.88 in compensation for the completion of this survey. Completion will only be granted if the following have been met: 1) you qualify as a participant for this study, 2) you pass attention check questions embedded in the survey, 3) you provide your CloudResearch Connect ID when prompted, and 4) you provide the accurate completion code provided to you at the end of the survey.

Contact us: Interested participants are invited to contact us with any questions. If you have no questions, please proceed to the study link provided via this site.

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APPENDIX B

Informed Consent Form

Leadership for All Ages

You are invited to participate in a study that assesses your workplace experiences and perceptions and the role your age might play in shaping these.

Key Information

- This **voluntary** study evaluates your workplace needs, motivation, and the role leadership and age might play.
- This study should **take approximately 15 minutes** and will ask you to rate your workplace experiences, stereotypes, and provide demographics.
- The benefits of this study for you will be to see the research process. For the field, the benefit of this research will allow researchers to see the influence of age within the workplace.
- There are no reasonably foreseeable risks.

Eligibility

Only individuals 18 years and older, who are comfortable reading and understanding English, who are employed full-time (minimum of 30 hours a week), who report to a direct supervisor/leader, and have worked under this supervisor/leader for at least three months, are eligible for this study.

Description of Study

This study will take approximately 15 minutes of your time. You will answer multiple survey questions related to workplace needs, motivation, and perceptions of your leaders' behaviors. Then, you will answer demographic questions.

Risks and Benefits

There are no reasonably foreseeable risks associated with this study. Participation is also completely voluntary, and thus, you may choose not to continue at any point. The results of this study may be published in scientific research journals and presented at professional conferences. However, your records will remain anonymous. Your data will be used as part of a larger data set with no identifying information. The dataset, once de-identified, could potentially be posted to a scholarly, public online medium.

Anonymity

This study is strictly anonymous, meaning that no identifying information is being collected in connection with the research data. Once you have received credit for your participation in this study, CloudResearch Connect IDs will be removed from the electronic file. All information collected and all electronic information will be secured on a password-protected computer. CloudResearch Connect IDs are not considered identifying information as Connect IDs are randomly generated number and letter sequences that are assigned to workers through Connect. The ID itself doesn't possess any personally identifiable information, and as per CloudResearch's requester use policy, requesters aren't permitted to collect other potentially identifying information (e.g., email addresses, phone numbers, etc.) to protect the workers we're gathering information from. Also, using an external site to host the survey (Qualtrics in this case) provides

an additional layer of protection for participants' identities, as only the research team can access the responses.

Future Use of the Research Data

The results of this study may be published in scientific research journals and presented at professional conferences. However, your records will remain confidential. Your data will be used as part of a larger data set with no identifying information. The data set, once de-identified, could potentially be posted to a scholarly, public online medium (e.g., Open Science Framework).

Compensation

The results of this study may be published in scientific research journals and presented at professional conferences. However, your records will remain confidential. Your data will be used as part of a larger data set with no identifying information. The dataset, once de-identified, could potentially be posted to a scholarly, public online medium (e.g., Open Science Framework).

Right to Refuse or Withdraw

You may refuse to participate by choosing “No, Exit Survey” below. Participation is also completely voluntary and thus you may choose not to continue at any point. You may change your mind about being in the study and quit after the survey has started. You may skip any questions you do not feel comfortable answering. You do not have to be in this study. You are a volunteer. It is okay if you want to stop at any time and not be included in the study. You do not have to answer any questions you do not want to answer.

Questions

If you have any questions about your rights as a research participant, please contact the University & Medical Center Institutional Review Board (UMCIRB) at 252-744-2914. This research has been approved by the institutional review board of East Carolina University. If you have questions about this research study, you can contact the investigators below:

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Dr. Courtney Baker, PhD.
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East Caroline University
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By selecting “Yes, Continue with the Study”, you are acknowledging that you have decided to volunteer as a research participant for this study and that you have read and understand the information provided above. **It is advised that you save or print a copy of this form for your own records.**

I understand the above and grant my consent to participate:

- Yes, Continue with the Study
- No, Exit the Study

APPENDIX C

Measures

Age-Differentiated Leadership (*Koziel et al., 2021*)

Directions: Please read each of the following statements carefully and rate how much you agree with each statement. Although some of these items may appear very similar, they are all slightly different, so please respond to each statement carefully. Remember, there are NO “right” or “wrong” answers.

Strongly
disagree

Somewhat
disagree

Neither agree
nor disagree

Somewhat agree

Strongly agree

Basic Psychological Need Satisfaction at Work Scale (*Deci & Ryan, 2000; Deci et al., 2001; Ilardi et al., 1993; Kasser et al., 1992*)

Directions: Please read each of the following statements carefully and rate how much you feel each of the following statements has been true, given your experiences at your current job. Although some of these items may appear very similar, they are all slightly different, so please respond to each statement carefully. Rate how true you feel each statement is by selecting the circle underneath the response that you wish to select. Remember, there are NO “right” or “wrong” answers.

Very untrue

Somewhat
untrue

Neither true or
untrue

Somewhat true

Very true

Autonomous Motivation (*Multidimensional Work Motivation Scale; Gange et al., 2015*)

Directions: Please read each of the following statements carefully and rate the extent to which each statement reflects a reason why you would put effort into your job. Although some of these items may appear very similar, they are all slightly different, so please respond to each statement carefully. Remember, there are NO “right” or “wrong” answers.

Not at all

A little

Moderate

Strong

Very strong

Controlled Motivation (*Multidimensional Work Motivation Scale; Gange et al., 2015*)

Directions: Please read each of the following statements carefully and rate the extent to which each statement reflects a reason why you would put effort into your job. Although some of these items may appear very similar, they are all slightly different, so please respond to each statement carefully. Remember, there are NO “right” or “wrong” answers.

Not at all

A little

Moderate

Strong

Very strong

Demographics

1. What is your age? (in years)
2. What is your gender identity?
 - a. Female
 - b. Male
 - c. Transman/Transmale
 - d. Transwoman/Transfemale
 - e. Nonbinary/Gender Nonconforming
 - f. Custom Identify (specify)
3. Which of the following best represents your racial or ethnic heritage? Choose all that apply?
 - a. Non-Hispanic White or Euro-American
 - b. Black, Afro-Caribbean, or African American
 - c. Latinx or Hispanic American
 - d. East Asian or Asian American
 - e. South Asian or Indian American
 - f. Middle Eastern or Arab American
 - g. Native American or Alaskan Native
 - h. Other (please specify)
 - i. Prefer not to answer
4. Are you a student ??
 - a. Yes, full-time
 - b. Yes, part-time
 - c. No
5. Please indicate your employment status.
 - a. Full-time
 - b. Part-time
 - c. Not employed
 - d. Retired
 - e. Self-employed
6. On average, how many hours do you work per week at your job?
7. Which of the following best describes your occupation?
 - a. Architecture and Engineering
 - b. Arts, Design, Entertainments, Sports, or Media
 - c. Building and Grounds Cleaning and Maintenance
 - d. Business and Financial Operations
 - e. Community and Social Services
 - f. Computer and Mechanical
 - g. Construction and Extraction
 - h. Education, Training, and Library
 - i. Farming, Fishing, and Forestry
 - j. Food Preparation and Serving Related
 - k. Healthcare Practitioners and Technical
 - l. Healthcare Support
 - m. Installation, Maintenance, and Repair
 - n. Legal

- o. Life, Physical, and Social Science
 - p. Management
 - q. Military
 - r. Office and Administrative Support
 - s. Personal Care and Services
 - t. Production
 - u. Protective Services
 - v. Sales and Related
 - w. Transportation and Material Moving
 - x. Other (please specify)
8. What is your job title?
9. How long have you been at your current job? (in months)
10. How long have you worked under your current supervisor/manager? (in months)

APPENDIX D

Debriefing

Thank you for completing this study! This study examined how different leadership behaviors relate to employee motivation and how the specific needs satisfied to motivate employees differ as individuals' age. Specifically, the purpose of the research was to evaluate age-differentiated leadership behaviors and how these behaviors may influence basic psychological need satisfaction (autonomy, competence, and relatedness) and subsequent work motivation. To do this, you responded to questions about your experiences with your supervisor, your work environment, your basic psychological needs at work, and your work-related motivation. You were also asked demographic questions (e.g., work status, age) to help us understand how these relationships may differ across the adult lifespan.

If you're interested in this topic, you can look at the article:

1. Koziel, R. J., Friedrich, J. C., Rudolph, C. W., & Zacher, H. (2021). Age-differentiated leadership and healthy aging at work: Evidence from the early stages of the covid-19 pandemic. *International Journal of Environmental Research and Public Health*, 18, 12509. <https://doi.org/10.3390/ijerph182312509>
2. Deci, E. & Ryan, R. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227 –268. https://doi.org/10.1207/S15327965PLI1104_01

We would appreciate it if you would refrain from discussing any parts of this study with other individuals who may have the chance to participate in this study.

You are welcome to contact Courtney Baker (bakerco22@ecu.edu) or Gabriella Lane (laneg24@students.ecu.edu) with any questions regarding this study.

Also, if you have any questions about your rights as a research participant, please contact the University & Medical Center Institutional Review Board (UMCIRB) at 252-744-2914.

Now that you've completed the study. Is there anything else you'd like to tell us? (open-ended)

APPENDIX E

IRB Approval

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
 Willis Building · Mail Stop 682
 Office 252-744-2914 · Fax 252-744-2284 · redc@ecu.edu · redc.ecu.edu/umcirm/

Notification of Exempt Certification

From: Social/Behavioral IRB
 To: [Courtney Baker](#)
 CC:
 Date: 2/16/2026
 Re: [UMCIRB 25-002213](#)
 Leadership for All Ages

I am pleased to inform you that your research submission has been certified as exempt on 2/15/2026. This study is eligible for Exempt Certification under category # 2A.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

Document	Description
Debriefing.docx(0.01)	Additional Items
Informed_Consent.docx(0.01)	Consent Forms
LANE_Thesis_Proposal_1.6.26.docx(0.01)	Study Protocol or Grant Application
Measures.docx(0.01)	Surveys and Questionnaires
Recruitment_Statement.docx(0.02)	Recruitment Documents/Scripts

For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.