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The Role of Cognitive-Motivational Traits in Leader Identity Development: An Expectancy Theory Perspective

Thesis presented by

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for the degree of

Doctor of Philosophy

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Declaration of Originality

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property.

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Abstract

Leader identity is the aspect of the self that is viewed as being and behaving as a leader. The development of leader identity is an important process to understand as it guides multiple facets of an individual's leadership from affect to cognition and behavior, ultimately influencing leader and leadership development. However, there is little knowledge of how leader identities develop. While motivation is theorized to be integral to catalyzing leader identity development, no research has yet viewed leader identity development through a motivational lens. In not discerning the essential role of motivation in this process, complete understanding of leader identity development remains unclear, disallowing the practical application of this foundational leadership phenomenon.

The purpose of this study is to understand the role of cognitive-motivational traits in instigating leader identity development. To clarify the antecedent relationship of motivation on leader identity development, this study develops a conceptual expectancy model which posits that self-efficacy, goal orientation, and perceived prototypicality instigate leader identity development through enhancing the motivation to engage in identity work.

The conceptual model is tested by employing a three-wave, longitudinal, quantitative research design to track the rates of leader identity development of 109 individuals engaged in leadership development programs. Utilizing structural equation modeling and cross-lagged panel analyses, the findings reveal that self-efficacy and perceived prototypicality are the most influential in the development of a leader identity. However, these relationships weaken over time, suggesting that leader identity development experiences a plateauing effect.

This study makes a significant theoretical contribution by advancing understanding of leader identity development as a function of expectancy perceptions. Self-efficacy and perceived prototypicality predict individual expectancies, which motivate active engagement in identity work, resulting in leader identity development. A critical methodological contribution is made through identifying a new factor structure within the currently accepted global measure of leader identity.

This study suggests that to harness the power of leader identity development, it is important for organizations and practitioners to approach every stage of designing and implementing leadership development initiatives from an identity perspective. In doing so, organizations can begin to develop more effective leaders through placing a greater focus on the foundational role of leader identity within the broader leadership development process. This will have effects from the intrapersonal level of leader identity to the collective level of organizational leadership.

1. Introduction

1.1 Introduction

Developing effective leaders remains an elusive goal for many organizations, who report high failure rates (Kwok *et al.* 2020) and unreliable returns on investment (Avolio *et al.* 2010) of leadership development initiatives. Partially, this problem stems from a lack of understanding of how to develop leaders. As noted by Day *et al.* (2021), this could be a result of the innumerable development practices and methods employed by organizations, many of which lack theoretical backing and empirical validation of their efficacy.

In seeking a solution to the problem of developing effective leaders, an area with great potential is that of leader identity development, which is the process of how leaders come to define themselves as such (Day and Harrison 2007). Leader identity development is important as it is the cornerstone on which individuals develop more complex definitions of their leader-selves, influencing every aspect of the individual- their cognitions, emotions, behaviors, social interactions, motivation, and ability (Markus and Nurius 1986; Lord and Hall 2005). The benefits of this form of development are that individuals with strong leader identities can handle more cognitively complex challenges (Lord and Hall 2005). They are also seen as more effective leaders (Day and Sin 2011) and are more likely to emerge as leaders (Acton *et al.* 2019). Additionally, when developing a leader identity, leaders concomitantly increase their skills (Lord and Hall 2005; Schwartz *et al.* 2021), the outcome of which extends proximally to the leaders themselves and distally to the organization's collective leadership capabilities (Lord and Hall 2005; Schwartz *et al.* 2021). Therefore, as leader identities affect every aspect of leadership, the shaping of individuals' leader identities must be an integral focus in leadership development efforts (Ayoobzadeh and Boies 2020), to create a leadership pipeline capable of meeting the challenges

in today's markets, while simultaneously positioning leaders to tackle society's wicked problems (Rittel and Webber 1974; Day *et al.* 2021).

However, in the current state of research, "it remains unclear as to how individuals (develop) during training, including whether there are meaningful forms (i.e., trajectories) of development" (Kwok *et al.* 2020, p.1). This indicates that there remains much ambiguity about the process of leader identity development, which disallows the practical application of the phenomenon, preventing organizations from harnessing the holistic benefits afforded from this 'whole-person' form of development (Hammond *et al.* 2017; Clapp-Smith *et al.* 2019).

There is broad agreement that leader identity development is a cognitive process that is thought to occur over time (Day 2000; Liu *et al.* 2021), across multiple domains (Hammond *et al.* 2017), as a function of motivation (Brown 2015; Guillén *et al.* 2015). Therefore, to adequately examine this phenomenon, temporal research utilizing a motivational process lens is required. However, research has yet to explore the development of one's leader identity from this perspective (Vogel *et al.* 2020), producing a stasis in knowledge creation and practical application. To rectify this problem, this study explores cognitive-motivation as an antecedent of the leader identity development process through a focus on cognitive-motivational traits, as the enduring nature of such traits, existing on the same cognitive-motivational dimension as leader identity development, are likely commensurate predictors of this ongoing process. Utilizing the motivational process theory, expectancy theory (Vroom 1964), the traits considered in this study are self-efficacy, goal orientation and perceived prototypicality, as each of these traits has cognitive-motivational properties that likely influence the process of leader identity development, despite not yet being linked to this process.

In considering the antecedent effect of cognitive-motivation on leader identity development, the field of leadership studies will benefit from increased knowledge as to what a leader identity is and how it develops. As leader identity is the underexplored foundation upon which the distal outcomes of leader and leadership development are built, this knowledge can then be expanded through additional research and ultimately applied in practical settings to address the deficiency of leaders who are able to competently handle complex leadership challenges. Through increased understanding of this foundational, cognitive phenomenon, leadership development efforts can be tailored to focus on the development of one's leader identity, thus affecting the whole person as a leader, creating positive distal effects on collective organizational leadership capabilities (Schwartz *et al.* 2021).

1.2 Research Questions and Objectives

Through the development and testing of a conceptual motivational process model detailed further in Chapter 2, a study is designed to discern the role of cognitive-motivational traits, namely self-efficacy, goal orientation and perceived prototypicality, in the process of leader identity development. This study occurs in the context of leadership development programs, which are primed to instigate leader identity development as they act as safe holding spaces for those engaged in development. By returning to the foundational aspect of leader identity, this study contributes to the literature by providing an understanding of how specific motivational antecedents interact to predict engagement in this process, resulting in leader identity development. In achieving this, the primary research question asks:

How do individual leader identities develop during a leadership development program?

In answering this main research question, several sub-questions were identified:

1. *How does individual self-efficacy influence leader identity development during a leadership development program?*
2. *How does individual goal orientation (learning and performance) influence leader identity development during a leadership development program?*
3. *How does perceived prototypicality influence leader identity development during a leadership development program?*
4. *How do these traits interact to influence leader identity development during a leadership development program?*

Stemming from the research questions, two core objectives of the study were established:

1. *Determine change in leader identity during participation in a leadership development program*
2. *Understand how cognitive-motivational traits influence leader identity development*

A longitudinal quantitative study was employed to answer these research questions. This study occurred within the leadership development programs of three organizations over a nine-month period. Utilizing a survey-based methodology, each variable was measured three times, before, during, and after participation in the leadership development programs. This research

design allowed for the analysis of the change in individual leader identities as a function of cognitive-motivational traits using structural equation modeling and cross-lagged panel analyses.

1.3 Contributions

This study makes theoretical and methodological contributions to leader identity by addressing both the lack of temporal focus in the area and the under explored role of motivation in the leader identity development process. Specifically, it furthers our understanding about the antecedent influence of cognitive-motivational traits on leader identity development as well as how this process unfolds.

Theorization regarding leader identity development has rarely considered personal antecedents of this process (Lord and Hall 2005; Ibarra *et al.* 2008, 2014). This is problematic as leader identity development is considered a highly individualized process, occurring uniquely across individuals (Hammond *et al.* 2017). Therefore, in its current state, the predictive ability of this process remains indeterminant. As such, this study utilizes expectancy theory (Vroom 1964), to predict leader identity development. This theory is appropriate to predict the process of leader identity development as it exists on the same cognitive-motivational, intrapersonal level as leader identity. Thus, through employing expectancy theory, this study contributes theoretically to leader identity by proposing that cognitive-motivational traits act as key antecedents of leader identity development by determining individual expectancy perceptions of this process which then motivates the individual effort applied throughout the leader identity development process.

Specifically, this study explains how entrance to an identity workspace (i.e., the liminal or physical space where identity work occurs) (Petriglieri and Petriglieri 2010), activates one's leader identity, thereby triggering the motivation to further develop this identity. The cognitive-

motivational traits of self-efficacy, goal orientation and perceived prototypicality are then isolated, to predict how motivation will result in differential engagement in identity work (Sveningsson and Alvesson 2003) through predicting positive or negative identity spirals (DeRue and Ashford 2010). Self-efficacy is particularly important as it determines an individual's belief in their ability to succeed in development (Badura *et al.* 2020). Goal orientation, which influences individual's ability to self-regulate in a goal attainment setting, (Dweck 1986; Middleton *et al.* 2019), should also be influential in determining expectancy perceptions during identity work. Finally, individual's perceived prototypicality, which determines their perceptions of their fit and acceptance in their context (Guillén 2021), is likely to significantly effect individual's motivation to engage in the process of leader identity development.

In addition to their singular effects, the interaction of these variables should also affect motivation (Chen *et al.* 2000; Guillén 2021) to create engagement in identity work. Research must consider the interaction of specific variables to further clarify the process of leader identity development as its inherent complexity (Hammond *et al.* 2017) and effects on all aspects of the leader-self (Lord and Hall 2005) makes it unlikely to be driven by a single trait. This is evidenced by the predominant assessment that leader identity development is a dynamic and non-linear process (Day and Sin 2011; Day and Dragoni 2015) occurring across multiple life domains (Hammond *et al.* 2017). In considering the interactive effects of these traits, this study is able to predict the specific antecedent effect of multiple traits. Through meeting this objective, the process of leader identity development can be actively and intentionally instigated and applied in real-world settings, thus capitalizing on the untapped potential of this form of development.

Upon testing these assertions throughout the study, it is found that indeed, cognitive-motivational traits do influence leader identity development. However, the traits related to self-

perception, self-efficacy and perceived prototypicality, were the only traits which were predictive of leader identity development, both singularly and in their interaction. This indicates that how one views their ability to achieve as well as their perception of fit and acceptance in their environment is most influential in creating positive expectancy perceptions toward identity work. One's goal orientation, or approach to the development setting, did not influence leader identity development, indicating that the self-regulatory nature of this trait does not determine expectancy perceptions toward identity work. Importantly, of the traits considered, perceived prototypicality was the most influential in predicting leader identity development. This indicates that overall, those who feel that they fit and are accepted as leaders in their organizational context are most likely to be motivated to engage in identity work.

Furthermore, little is known about the form and rate of leader identity development. Research has proposed linear rates of development (Middleton *et al.* 2019), as well as different forms of curvilinear development (Day and Sin 2011; Kwok *et al.* 2020). However, current empirics are limited to grounded-theory studies (Zheng *et al.* 2020), small sample qualitative designs (Lanka *et al.* 2020), quantitative methods that span only a few weeks (Kwok *et al.* 2020), or time-lagged research designs (Day and Sin 2011), with little temporal consideration (Martin *et al.* 2021). Due to the complex nature of development, it is important for theorization to consider this process more holistically to better predict how leader identities develop, as the dearth of longitudinal research exploring leader identity development is stunting the growth of knowledge in this area (Vogel *et al.* 2020). This is because as leader identity development involves incorporating new thinking, feeling and behaviors into one's self-definition (Markus 1977; Lord and Hall 2005), it is unlikely that existing studies have been able to truly capture the long-term temporal and variable effects that are inherent in the process of leader identity development.

Therefore, as leader identity development is theorized to consist of a series of losses and gains which occur over long periods of time (DeRue and Ashford 2010), more detailed longitudinal theorization is needed to fully discern this process, as provided in this study.

Consequently, this study contributes methodologically to the field by adopting a longitudinal research design which spans months rather than weeks. This quantitative research design allows increased understanding of this temporal process in a more causal manner than previous research designs. The extended exploration into the process of leader identity development, using a pre-test, post-test, three-wave research design, provides a more protracted view of this extensive process than has previously been explored. Therefore, it contributes methodologically by providing predictive ability to a phenomenon which innately requires, yet has rarely received, longitudinal attention.

Through exploring leader identity development in a longitudinal manner, this study supports the dynamic and non-linear conception of leader identity development. This study found that although there was growth in leader identity, the rate of development slowed over time, displaying a plateauing effect. This finding is similar to that of Kwok *et al.* (2020) and indicates that the effect of cognitive-motivational traits on leader identity development weakens over time, likely due to the increasing cognitive challenges that result in cognitive overload (Sweller 1988) throughout the identity work process.

In addition to the longitudinal research design, this study made an unexpected methodological contribution to the measurement of leader identity. Since its inception, the most common measure of leader identity, the Leader Self-Identity measure (Hiller 2005), has yet to be re-examined for validity. This is despite multiple forms of the measure, including a commonly used short form (Day and Sin 2011; Miscenko *et al.* 2017; Middleton *et al.* 2019; Ayoobzadeh and

Boies 2020), a single factor structure measure and a three-factor structure measure (Hiller 2005). In preparing the data for longitudinal analysis, a new three-factor structure was uncovered. Through repeated reliability and validity testing, this new three-factor structure was continually supported. This indicates that the Leader Self-Identity measure (Hiller 2005) must be revisited to ensure that quantitative research on leader identity is using the most accurate instrument to capture this intraindividual phenomenon.

Practically, the results from this study allow organizational practitioners to harness and apply knowledge of leader identity development when designing leadership development initiatives. While leadership development is a focal goal for many organizations (Prokopeak 2018), there are large failure rates for these initiatives (Kaiser and Curphy 2013; Kwok *et al.* 2020). Through the identification of the role of motivation in leader identity development, particularly perceived prototypicality and self-efficacy, organizations can be better positioned to craft more effective leadership development initiatives as there will be increased awareness of not only who may be more engaged in this process, but also how this process unfolds overtime. In approaching the design, selection, and implementation of leadership development efforts from a leader identity framework, practitioners may be able to create leaders with stronger leader identities. Considering the benefits afforded to individuals with strong leader identities (Lord and Hall 2005; Day and Sin 2011; Acton *et al.* 2019), it is essential that organizations develop a talent pipeline of leaders who can handle the complex problems pervasive in today's business landscape.

1.4 Preview of Thesis

The following chapters are structured in the traditional monograph format. Chapter 2 presents the literature review where relevant constructs, variables of interest and hypotheses are delineated.

This chapter begins with a review of expectancy theory. Then, intrapersonal leader identity is discussed as well as the role of identity work and identity workspaces in the leader identity development process. Leadership development programs are highlighted as key identity workspaces for individuals undertaking identity work. Next, the cognitive-motivational traits of self-efficacy, goal orientation and perceived prototypicality are discussed in how they influence leader identity development. The key interactions between these variables are then acknowledged. This chapter culminates in the creation of a conceptual process model of leader identity development.

Chapter 3 discusses the research design of the study. First, the philosophical research position, which guides the methodology, is considered. This ontology provides the justification for the longitudinal, quantitative research design. The next section further details the research design and methodology by explaining the study context, participants, measurements, and procedures. Finally, to aid in answering the research questions, the proposed data analysis plan is detailed.

Chapter 4 enumerates the data analysis process and presents the findings of the study. First, a summary of the cross-sectional data at each of the three data collection points is presented. This aids in preliminary hypothesis testing. Second, the longitudinal data analysis and results are presented. This section highlights within and between-person change in leader identity over time. Chapter 4 concludes with a discussion of the hypotheses.

The results are further discussed in Chapter 5. The key findings are presented in how they relate to the research questions and objectives identified in Chapter 1. This includes the theoretical implications of each finding. After discussing the theoretical and methodological contributions, limitations of the study are highlighted, then recommendations for future research are presented.

This chapter concludes with a discussion of practical implications for organizations regarding the utilization of leader identity development.

2. Literature Review

2.1 Introduction

This chapter critically reviews the extant literature on leader identity and leader identity development. Centered on expectancy theory (Vroom 1964), the areas of leader identity, identity work and identity workspaces are reviewed to explain the causal connection between engagement in identity work and leader identity development. Leadership development programs are then presented as effective identity workspaces for identity work. The role of intraindividual cognitive-motivational traits and their interaction within this process are highlighted through the delineation of the antecedent relationships of self-efficacy, goal orientation and perceived prototypicality on engagement in identity work. Through this examination of the literature three hypotheses are introduced which result in the presentation of a conceptual expectancy process model of the role of motivation in leader identity development.

2.2 Expectancy Theory

Expectancy theory (Vroom 1964) is a seminal motivational theory of work performance. It falls under the domain of process theories of motivation, which seek to answer the question of how motivation functions (Isaac *et al.* 2001). Often depicted in mathematical formulas (Lawler III 1973), it is a multiplicative process of internalized cognitive calculations aimed at maximizing rewards for an individual. These rewards, or motivators, were originally considered to be external rewards such as pay and promotion (Vroom 1964; van Eerde and Thierry 1996). However, later theorization indicates that these rewards may be anything that maximizes the self-interest of the individual (Shamir 1990), extending to intrinsic outcomes (Lawler III 1973; Chopra 2019). Also termed VIE theory, expectancy theory relies on three facets to predict the process of motivation. There is expectancy, also termed the effort-performance (E-P) link, which is based on an

individual's perception that applied effort will lead to a certain level of performance. This is followed by instrumentality, also known as the performance-outcome (P-O) link, the thought that this performance will result in a reward. Finally, valence indicates an individual's desire or preference for this reward or outcome (Vroom 1964; Isaac *et al.* 2001).

Displayed mathematically, the formula is:

M=E*I*V.

Further delineated mathematically, expectancy can be considered to have values of 0 and 1, indicating the probability that effort will lead to performance. The same values are assigned to instrumentality, where performance is perceived to lead to a reward. Finally, valence is assigned values of -1 and 1. When multiplied, the values assigned to expectancy, instrumentality, and valence result in either positive motivation, negative motivation, or no motivation (Lloyd and Mertens 2018).

Since its inception in the 1960s, expectancy theory has been used to predict motivation in a variety of settings, such as; occupational choice (Wheeler 1983), training effectiveness (Mathieu *et al.* 1992), leadership (Isaac *et al.* 2001), participation in either training (Tharenou 2001) or organizational decision-making processes (Purvis *et al.* 2015), performance management (Lee 2019), the use of artificial intelligence (Chopra 2019), and travel decisions during the Covid-19 pandemic (Fan *et al.* 2022). Scholars have also aimed to add to the theory, by specifically linking it with attitudes (Porter and Lawler 1968) and job satisfaction (Lawler III and Porter 1967) or offering additional aspects of the theory related to ability (Lawler III 1973) and social context (Lloyd and Mertens 2018). However, many of these attempts have received mixed empirical support, raising concerns about the external validity of the theory, with some scholars arguing that the simplicity of the theory, which does not consider context, is problematic, making it unreliable

(Lawler III 1973; Lloyd and Mertens 2018). As a result, after its initial popularity in the 1960s and 1970s, use of expectancy theory waned.

However, in the 1990s, van Eerde and Thierry (1996) sought to revive the theory by comprehensively exploring the application and operationalization of existing expectancy theory research. Their meta-analysis highlights significant inconsistencies in the measurement and definition of expectancy theory research from the 1960s through the 1990s, providing an alternative explanation to the validity concerns associated with the theory (van Eerde and Thierry 1996). While originally conceived to be a cognitive-motivational theory functioning on a temporal, intraindividual level, most researchers have used expectancy theory to predict behavior, using cross-sectional, between-subjects research designs (van Eerde and Thierry 1996). This led to the conclusion that the validity concerns regarding expectancy theory have likely arisen from methodological error and are therefore largely unfounded. The scholars then recommended a return to expectancy theory research that strictly adheres to the initially intended levels of theorization with consistent operationalization.

Nevertheless, despite the almost 30 intervening years, research relating to expectancy theory is still beset by the issue of improper conceptualization and operationalization. Many researchers still use cross-sectional research designs and theorizations (Karriker and Hartman 2019), despite expectancy theory being designed to predict processes which are inherently temporal. Additionally, most research is focused on examining behavioral outcomes, often in interpersonal settings (Isaac *et al.* 2001; Hoyle and Sherrill 2006; Purvis *et al.* 2015; Fan *et al.* 2022), without accounting for the cognitive, intrapersonal nature of the theory. Furthermore, despite expectancy theory requiring the inclusion of expectancy, instrumentality and valence, research rarely includes all three aspects. For example, both Hoyle and Sherrill, (2006), and Steel

and König (2006) focus almost exclusively on expectancy perceptions in the creation of their models of motivation, largely excluding valence and instrumentality. In their meta-analysis on training motivation, Colquitt *et al.* (2000), highlight the useful nature of expectancy theory in motivational situations under a learner's control, but fail to include perceptions of instrumentality.

Additionally, although expectancy theory has been related to leadership (Isaac *et al.* 2001) and training (Tharenou 2001), the problems associated with expectancy theory research are present in each of these studies as they apply the theory to behavioral (Tharenou 2001) and interpersonal processes (Isaac *et al.* 2001). Moreover, expectancy theory has only been minimally referenced in relation to the self-concept (Leonard *et al.* 1999) and has not yet been applied to leader identity development. This is despite a conclusion from van Eerde and Thierry (1996) that research into identity, when paired with expectancy theory, is likely to explain greater variance in workplace outcomes than expectancy theory alone. In considering these shortcomings, this study responds to calls to focus on the temporal, processual nature of expectancy theory (Noe and Wilk 1993) at its initially conceived intrapersonal level (van Eerde and Thierry 1996) by applying it to leader identity development.

In applying expectancy theory to leader identity development, the problems in both the expectancy theory literature and leader identity development literature are addressed. At its foundational level, leader identity development is considered a cognitive, intraindividual phenomena (Lord and Hall 2005), therefore existing on the same level as expectancy theory and accounting for the improper theorization pervasive in current research. As leader identity development is an inherently temporal process, driven by motivation (Miscenko *et al.* 2017), it requires temporal, processual-motivation frameworks. However, no known research has applied a

process motivation theory to leader identity development. Therefore, there remains a black box in understanding the connection between motivation and leader identity development.

2.3 Leader Identity

Identity and the meaning of the self is a ripe area of research that has captured the attention of researchers for close to a century (Mead and Schubert 1934). Across multiple academic disciplines from social and cognitive psychology to human resources (van Knippenberg *et al.* 2004), it is often explored through a myriad of theoretical lenses and levels of conceptualization (Day and Harrison 2007; Day and Dragoni 2015; Miscenko and Day 2016). While this provides an opportunity for evolution of the construct (Day and Harrison 2007), it also creates a problem in synthesis and agreement on exactly what identity is and particularly how it is constructed (Caza *et al.* 2018; Vogel *et al.* 2020).

Broadly speaking, scholars agree that identities are domain-specific aspects of an individual's self-concept, which is the overall holistic frame that provides understanding and definition of an individual as a unique entity (Gecas 1982). The self-concept is organized by a series of cognitive schemas that act as mental scaffolding used to store and process information about the self (Markus 1977). Identities are then established by attaching meaning to a cognitive schema focused on a specific domain (e.g., leadership) to build a coherent understanding of the self in this area (Lord and Hall 2005; Miscenko and Day 2016). These identities become situationally activated through environmental and contextual cues, coming to the foreground, and acting as the working self-concept (Lord *et al.* 1999). When this activation occurs, identities then guide individual's affect, behavior, and cognitions (Gecas 1982; Markus and Nurius 1986; Lord and Hall 2005).

However, apart from the broad definitions of the basic constructs which interact to create the self, there is little else in which leader identity scholars have found consensus (Brown 2015; Epitropaki *et al.* 2017; Vogel *et al.* 2020). This lack of general agreement has contributed to the many divergent meanings, levels of study and theoretical backgrounds from which leader identity is explored (Miscenko and Day 2016). In considering this disparity, this study adopts the definition by Day and Harrison (2007), who sought to address the divergence of definitions in leadership studies to instigate growth and evolution within the field. They define leader identity as "the sub-component of one's identity that relates to being a leader or how one thinks of oneself as a leader" (Day and Harrison 2007, p. 365). This definition has since gained traction in research on leader identity (Epitropaki *et al.* 2017; Kwok *et al.* 2020), thus introducing a commonly held understanding of what leader identity is and creating a platform on which shared knowledge can now evolve.

Initially, leader identity was viewed as a static phenomenon defined solely by one's work role, with development only occurring during major shifts in one's career (e.g., role transitions) (Ibarra 1999; Miscenko and Day 2016). However, an opposing and more recent stream of research proposes that identity must be considered as a dynamic and constantly evolving phenomenon as it is created within the context of multiple life-domains (Hammond *et al.* 2017), over the course of adult development (Ibarra *et al.* 2014), in a constantly changing social and organizational environment (Alvesson *et al.* 2008). In considering the need for increased research into exactly how leader identities are constructed (Brown 2015; Caza *et al.* 2018; Vogel *et al.* 2020), this study adopts the dynamic perspective of leader identity to acknowledge the inherently temporal nature of this process.

Along with the static and dynamic perspectives, leader identity has been explored from the individual, relational, and collective levels (Day and Harrison 2007). The individual level is the foundational aspect of a leader identity which is focused around self-views of the individual as a leader (Miscenko and Day 2016). Increasing in complexity, the relational level of leader identity involves interpersonal relationships between a leader and their follower(s) (DeRue and Ashford 2010). This level is most often aligned with social identity theory (Tajfel and Turner 2004), as it considers identity to be a function of self-perceptions created through social feedback within a group. The final level of conception for leader identity is the collective level. This level involves how one defines themselves and their leadership as part of a larger organization (Alvesson *et al.* 2008). As theorized by Lord and Hall (2005), it is the most cognitively complex form of identity, presenting the greatest level of skill and ability in a given domain.

Miscenko and Day (2016), highlight that the relational level of leader identity is the most often studied, causing the foundational, intrapersonal level of leader identity to be overlooked. This perpetuates the fractured nature of this discipline, because, as postulated by Lord and Hall (2005), relational and collective leader identities are formed upon the base of an individual level leader identity. Therefore, in not understanding the deepest aspect of leader identity, it is not possible to fully understand its more complex levels. This is problematic because despite those with strong leader identities being more likely to emerge as leaders (Acton *et al.* 2019) and be perceived as more effective by their peers (Day and Sin 2011), there remains a gap in the practical application of leader identity within organizations. As a result, both scholars and organizations remain unable to harness and guide the creation of a leader identity to improve leader development (Schwartz *et al.* 2021). This can be seen in the talent-leader gaps (Kwok *et al.* 2020) and leadership competency issues facing organizations and society (Kaiser and Curphy 2013; Harris Poll 2021).

To rectify this problem, Miscenko and Day (2016) concluded that it is essential to return to the foundational and individual level of leader identity. In doing so, they posit that the diverse streams of research that characterize the field can be blended to inform a more cohesive picture of leader identity across all levels and conceptions (Miscenko and Day 2016). This study synthesizes these disparate streams of leader identity research, (i.e., leader identity, identity work and identity workspaces), to develop a process model of leader identity development. This will result in greater understanding of how individuals create and revise their leader identities, laying the groundwork for additional empirical research which will enhance cohesion within the discipline. As highlighted by Lanka *et al.* (2020), an important piece of this puzzle is the inclusion of specific conditions that catalyze and sustain leader identity, particularly in relation to the contexts and antecedents of identity work.

2.3.1 Identity Work

Similar to the nature of leader identity, the process of identity work remains an obscured phenomenon, marred by fracturing and confusion (Brown 2015). Most commonly, this process is thought to be the "forming, repairing, maintaining, strengthening or revising" of an identity (Sveningsson and Alvesson 2003, p. 1165). However, apart from this broad definition, there is little consensus as to how this process occurs. Some research has declared identity work to be a form of experiential learning in which, over time, cognitive schemas dedicated to leadership become more complex, culminating in a more sophisticated leader identity (Lord and Hall 2005). Additional research posits that identity work is a process based on social cues which cause individuals to enter positive or negative identity spirals, where leader identities are either strengthened and solidified or fractured and diminished depending on social feedback (DeRue and

Ashford 2010). These identity spirals, which have been empirically supported at the intrapersonal level (Lanka *et al.* 2020), cause individuals to apply effort to identity work based off of perceived grants or denials of one's leader-self from referent others (DeRue and Ashford 2010). Adopting a narrative approach, other scholars state that identity work is any process where individuals undergo a cycle of sense breaking followed by sensemaking (Ashforth and Schinoff 2016). More comprehensively, some scholars have developed stage-like models of identity work, however, these are also fragmented in nature, stating that identity work occurs in phases of noticing, interpreting, authoring, and enacting (Hammond *et al.* 2017), preparation, orientation, experimentation, and integration (Petriglieri 2011), or presenting, adapting, challenging, and exploring (Gjerde and Ladegård 2019).

Despite the array of conceptualizations, scholars have broadly agreed on a generalized process of identity work (Sveningsson and Alvesson 2003; Petriglieri 2011; Ibarra *et al.* 2014; Hammond *et al.* 2017; Caza *et al.* 2018). This process begins with the activation of one's leader identity. Through entry to an identity workspace, which is any triggering event that highlights connections and disconnections within the individual's understanding of the self as a leader, this identity is brought to the foreground for examination and reflection (Hammond *et al.* 2017). Then, due to challenges presented to the self, individuals are motivated to experiment with provisional identities (Markus and Nurius 1986). This experimentation takes place by engaging with new behaviors and cognitions. Based on self-reflection and perceived feedback, individuals will either apply or cast-off new facets of their identities (DeRue and Ashford 2010; Lanka *et al.* 2020). If individuals feel that these provisional identities are accepted, they will enter a positive trajectory of development in which they are continually motivated to undertake identity work to further solidify the self-concept (DeRue and Ashford 2010; Day and Sin 2011). However, if individuals

perceive rejection or failure during this experimentation process, they will enter a negative developmental trajectory in which their self-concept experiences either no change or even fracturing due to demotivation (Day and Sin 2011; Nicholson and Carroll 2013). In this manner, over time, individuals who enter positive trajectories will come to develop more complex cognitive schemas of leadership, resulting in leader identity development. In considering this broad process, this study aims to clarify the role of identity work in leader identity development as a function of motivation. However, before this is possible, many focal questions remain, particularly, where does identity work occur? (Petriglieri 2011).

2.3.2 Identity Workspaces

Identity work is theorized to occur in an identity workspace (Petriglieri 2011), which is any stimulating situation that activates a leader identity and allows for individualized self-reflection, spurring the process of identity work (Petriglieri and Petriglieri 2010). Similar to learning processes, which can range from formal to informal spaces and occur both consciously and subconsciously (Maurer *et al.* 2003; Noe, Clarke, *et al.* 2014), prominent examples of identity workspaces include leadership development programs (Nicholson and Carroll 2013), university courses (Day and Sin 2011), or entrance to a new role (Petriglieri 2011). However, despite acknowledgment in the literature that identity work is likely 'triggered', many scholars note that the context that triggers this process has been almost entirely overlooked (Brown 2015; Caza *et al.* 2018).

Of the limited endeavors into the understanding of identity workspaces, the work of Petriglieri and Petriglieri (2010) and Petriglieri (2011) has sought to consider the role of context in the process of identity work by situating it within organizations. In their conceptual work, they

highlight that effective identity workspaces must act as 'holding environments' (Sveningsson and Alvesson 2003) and provide safe spaces for the process of self-reflection and change involved in identity work (Petriglieri 2011). These workspaces can be physical or liminal, closely mirroring the cognitive process of learning within the workplace (Noe, Clarke, *et al.* 2014). However, they propose two fundamental assumptions characteristic of all identity workspaces. First, they cannot exist in isolation. This means that identity work is ultimately embedded in some context or domain (e.g., organizations, teams, families, etc.) (Petriglieri and Petriglieri 2010; Hammond *et al.* 2017). Second, identity workspaces motivate individuals to engage in identity work by presenting challenges to one's currently held identity, resulting in self-reflection that ultimately catalyzes identity work (Petriglieri and Petriglieri 2010). However, little research has theorized about the process of identity work while considering these assumptions.

2.3.3 Leadership Development Programs as Identity Workspaces

While this research acknowledges that identity development, like other developmental processes, can occur in a variety of environments, both formal and informal (Noe, Clarke, *et al.* 2014) and across multiple levels of consciousness (Fisher 2010), this study utilizes leadership development programs as a form of identity workspace due to their ideal nature for catalyzing and examining one's leader identity. Leadership development programs act as holding environments for individuals engaged in identity work (Sveningsson and Alvesson 2003; Petriglieri 2011) as they have the ability to remove individuals from their day-to-day roles, provide feedback, create safe spaces for action, and stimulate self-reflection (Hernez-Broome and Hughes 2004; Middleton *et al.* 2019), all essential requirements for identity work. However, despite their potential to be

effective identity workspaces, these programs often fall short of achieving this deep foundational form of development (Avolio *et al.* 2010; Kwok *et al.* 2020).

Specifically, Petriglieri (2011) notes that due to the changing nature of psychological contracts (Rousseau 1990), employee-organization relationships are also changing, creating a shift in organizations' efficacy as identity workspaces. A result of this shift in psychological obligations between employees and employers as well as increasing organizational resource constraints (Gurdjian *et al.* 2014), is that development is increasingly placed in the direct control of the employee (Boyce *et al.* 2010) or outsourced to business schools (Petriglieri and Petriglieri 2010). This presents two problems. First, the outsourcing of leader development can be an extremely expensive investment (Kaiser and Curphy 2013; Gurdjian *et al.* 2014), yet the return on this investment is difficult to calculate, with estimates of -150% to +200% (Avolio *et al.* 2010). In addition to the fiscal outcomes of external leadership development, there are also human and social capital outcomes with programs stimulating either positive or negative results throughout organizations like retention or turnover (Gagnon and Collinson 2014).

The second problem that occurs when organizations choose to outsource this development to the employees themselves or other providers is that they may remove participants from their typical context, excising individuals from organizational norms and cultures that could guide and strengthen their development. This is particularly important as a consistent finding across research into the effectiveness of leadership development is that the context in which one learns has a significant effect on the application of new skills and transfer of learning (Hernez-Broome and Hughes 2004; Petriglieri 2011; Schwartz *et al.* 2021). Therefore, when programs are outsourced and physically or psychologically remove individuals undergoing identity work from the context

in which they will enact their leader identities, the potential effectiveness of these initiatives may be limited.

Another reason for exploring leadership development programs as identity workspaces is that although they are primed to activate one's leader identity by acting as a trigger to bring this identity to the foreground for examination, thus cultivating identity work, the limited ability and attention given to evaluating these initiatives has hindered their progress. For example, the reactive criteria of Kirkpatrick's four-part evaluation model (Kirkpatrick 1975), which assesses surface-level emotional reactions to training and development, is easily applied and therefore still widely utilized by organizations (Aguinis and Kraiger 2009; Kaiser and Curphy 2013), often due to resource constraints (Gurdjian *et al.* 2014). This is despite recommendations to evaluate deep learning, such as identity development, by approaching the design and implementation of development initiatives with a specific theory or framework that extends beyond standard leadership knowledge, skills and abilities (KSAs) (Day and Harrison 2007; Riggio 2008; Petriglieri 2011). While the most successful and effective leadership development programs adopt such frameworks, they appear to be outliers rather than the norm (Church *et al.* 2015). In acknowledging the characteristics of leadership development programs that prime them to act as identity workspaces, this study examines leadership development programs and the process of development through an identity lens, thus addressing concerns about the lack of frameworks and consideration of context in leader development. (Arthur Jr *et al.* 2003; Reichard and Johnson 2011).

2.3.4 Leader Identity Development

There is some evidence that active engagement in identity work within an identity workspace aids individuals in brokering a revised leader identity, resulting in leader identity development (Carroll and Levy 2010; Miscenko *et al.* 2017; Zheng *et al.* 2020). While empirical research, particularly longitudinal research, into this phenomeon is scant, it appears that overall, leader identity develops in a non-linear manner, further supporting the adoption of the dynamic perspective of leader identity. For example, over a 6-week period, Kwok *et al.* (2020) explored the change in leader efficacy and leader identity of a group of developing leaders. They found that leader identity developed in a quadratic, non-linear manner, with an initial positive growth rate that slowed over time. Additionally, Day and Sin (2011) examined leader identity as a time-varying covariate of leader effectiveness ratings over a semester in a student sample and found additional evidence of non-linear development, resulting from entry to identity spirals. However, it is important to highlight that leader identity was not a focal outcome variable of the study, but was rather a predictor of peer ratings of leader effectiveness. Therefore, the evidence of leader identity development provided in their study is indirect. Finally, Miscenko *et al.* (2017) found that leader identity develops in a J-shaped curve as a function of increasing leadership skill. However, as this study occurred over 7-weeks (Miscenko *et al.* 2017) and leader identity is postulated to occur slowly over a lifetime (Eva *et al.* 2021; Liu *et al.* 2021), additional longitudinal assessment of this process is necessary. Furthermore, while each of these studies makes great strides in uncovering the process of leader identity development, none of them approach the concept from a motivational perspective, despite motivation being theorized as a core antecedent of identity work (Brown 2015; Guillén *et al.* 2015; Ashforth and Schinoff 2016).

In considering the longitudinal findings of the non-linear aspect of leader identity development, this study highlights the essential antecedent role of motivation to further explicate this process. Leader identity development should occur as follows: upon entering an identity workspace, an individual's current leader identity will be activated and brought to the foreground to act as the working self-concept (Lord *et al.* 1999). Then, individuals will experience varying expectancies toward the process of identity work. These expectancy perceptions will determine an individual's belief in their ability to successfully engage in the process of identity work to develop a leader identity. Based on these expectancy perceptions, individuals will form instrumentality perceptions of the identity workspace, viewing it as either helpful or unhelpful in aiding their development. Finally, individuals will experience varying levels of valence toward identity work, ultimately determining the level of motivation and engagement in this process. This valence is formulated around the innate human need to attain positive and cohesive self-construal (Gecas 1982; Brown 2015; Ashforth and Schinoff 2016).

Individuals who hold positive expectancy and instrumentality perceptions of identity work and the identity workspace are likely to believe they can develop a stronger leader identity. This will lead to active engagement in identity work as these individuals will experience high levels of valence to attain positive self-construal. In attaining this cohesive self-perception, individuals will 'try on' and experiment with new leader behaviors and cognitions within an identity workspace. This effort will instigate entry to a positive identity spiral (DeRue and Ashford 2010) resulting in a revised leader identity. However, individuals holding negative expectancy and instrumentality perceptions of identity work and the identity workspace are likely to disengage from identity work. Due to their weak valence perceptions, they believe that they are unlikely to attain a more cohesive sense of self and by withdrawing from an environment where they perceive negative feedback and

challenge to be likely, these individuals preserve their current self-perceptions. However, this inaction also results in entry to flat or negative identity spirals which results in little to no leader identity development (DeRue and Ashford 2010). Overall, this expectancy process will predict one's level of engagement with identity work, which will ultimately result in differential levels of leader identity development. Therefore the first hypothesis states:

Hypothesis 1: Individual motivation will result in differential levels of leader identity development.

However, within the identity work process, there is extremely limited knowledge as to the antecedent effects of specific traits (Lanka *et al.* 2020). Subsequently, this study turns next to delineating a process model of leader identity development as a function of individual cognitive-motivational traits to provide increased clarification of this phenomenon.

2.4 Motivational Traits: The Catalyst for Engagement in Identity Work

Intraindividual cognitive-motivational traits are likely to influence one's perception of their ability and ambition to develop, affecting individual expectancy perceptions of development and engagement in identity work (Maurer *et al.* 2003; Sveningsson and Alvesson 2003; Petriglieri and Petriglieri 2010; Miscenko *et al.* 2017; Zaccaro *et al.* 2018). These perceptions should result in the motivation to either engage in identity work and cause individuals to enter a positive identity spiral, or cause them to shy away from this process, resulting in entry to a negative identity spiral (DeRue and Ashford 2010).

Cognitive-motivational traits should influence the process of leader identity development as they are enduring characteristics that sustain individual's cognitions and motivations over time, thus mirroring the long-term and intrinsic cognitive-motivational process of identity work. This study aims to link individual self-efficacy, goal orientation and perceived prototypicality to leader identity development by proposing that these cognitive-motivational traits will act differentially to influence individual expectancies toward engagement in identity work. The reason for this is that self-efficacy effects an individual's belief in their ability to succeed at a task (Bandura 1977) while goal orientation influences how individuals approach learning situations (VandeWalle 1997). Additionally, perceived prototypicality influences motivation by determining one's perception of their fit and acceptance in their social context. This perception then signals if their actions in the pursuit of leadership will be efficacious in increasing their standing in their organization (Hogg 2001), influencing motivation. While these traits are known to strongly influence individual cognition, motivation, and overall leader development (Chen *et al.* 2000; van Knippenberg and Hogg 2003) they have been minimally linked to leader identity development (Middleton *et al.* 2019). Despite this, it is posited that these traits are essential in the process of identity work.

2.4.1 Self-Efficacy

Originally intended to describe behavioral change (Bandura 1977), self-efficacy is a core trait in directing human agency through influencing the application of individual's cognitive, social, and behavioral skills (Bandura 1982) in a specific setting. It refers to one's belief in their ability to succeed at a task (Bandura 1977). According to Wood and Bandura (1989, p. 364) it "captures one's confidence in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events…". Self-efficacy perceptions then determine the

degree of effort and level of persistence individuals will apply in the face of challenges (Bandura 1982). The degree of this self-belief then influences individual's self-regulatory behavior and overall level of engagement with said challenges (Schunk 1989).

In occupational settings, self-efficacy has been shown to be predictive of a variety of outcomes from overall performance (Stajkovic and Luthans 1998), engagement (Luthans and Peterson 2002), creativity (Huang *et al.* 2016) and learning and development (Chen *et al.* 2000). The influence of self-efficacy on workplace outcomes occurs through its catalyzation of motivation in pursuit of a goal (Schunk 1989; Guillén 2021). In focusing on leader development, research conceptualizes self-efficacy as a motivational construct that instigates participation in learning through enhancing expectancy toward development (Day and Harrison 2007; Day and Dragoni 2015; Campbell *et al.* 2019). For example, Chen *et al.* (2000) found that self-efficacy is highly predictive of learning performance, explaining additional variance beyond other state and trait-like motivational predictors. Providing additional support to self-efficacy's integral nature in development, Campbell and Evans (2016) found that in a qualitative study of developing managers, self-efficacy was essential in producing the motivation to participate in leader development. More recently, Hirschi *et al.* (2017) established self-efficacy as a motivational antecedent to holding a protean career orientation and vocational identity clarity, which stimulate a career path defined by self-directed learning.

As self-efficacy is known to have a high degree of explanatory power in motivating leader development (Chen *et al.* 2000), it is likely that this relationship will extend to the deeper foundational level of leader identity. However, despite a strong predictive relationship between self-efficacy and leader development, its specific connection to leader identity and the motivation to undertake identity work is just emerging. For example, while Day and Sin (2011) propose self-

efficacy and leader identity to be related, they do not test this relationship and instead only assess leader identity development as an antecedent of leadership effectiveness ratings. Additionally, Kwok *et al.* (2020) examine leader efficacy and leader identity, however, their study explores these variables as simultaneous outcome variables rather than using efficacy to predict leader identity development. Furthermore, leader efficacy is conceptually different from self-efficacy and is a more state-like variable than trait-like (Guillén *et al.* 2015). Similarly, Ayoobzadeh and Boies (2020) identify that during mentoring, increases in leader identity occurred concomitantly with increases in self-efficacy.

There is currently a tenuous link between self-efficacy and leader identity development with no known research exploring the role of self-efficacy as an antecedent of this process. This is problematic as leader identity development is known to arise due to the presentation of challenges to one's currently conceptualized self within an identity workspace (Petriglieri 2011). As this process then requires motivation and self-regulation of cognitions and behavior in the persistence of development (Miscenko and Day 2016), self-efficacy is arguably appropriate to explain individual engagement in identity work. However, this relationship remains unexplored.

For example, in a recent meta-analysis reviewing the tripartite model of motivation to lead, Badura *et al.* (2020) found that self-efficacy is a direct antecedent of affective-identification to lead. Within motivation to lead (Chan and Drasgow 2001), affective-identification refers to the degree that an individual enjoys enacting leadership and holds a leader identity. However, leader identity development itself was not isolated in the study, so the relationship between self-efficacy and leader identity development remains unclear. Schyns et al. (2020) demonstrate a mediating effect of self-efficacy between an individual's implicit leadership theories and motivation to lead. However, this study again did not focus on leader identity, so any conclusions drawn about the

effect of self-efficacy's antecedent relationship to leader identity development are tenuous at best. Nevertheless, this previous research highlights the potential importance of self-efficacy in motivating the development of a leader identity, as a strong motivation to lead (a sub-facet of which is leader identity) is highly correlated with the emergence and perceived effectiveness of leaders (Badura *et al.* 2020).

As self-efficacy is known to be a highly motivational trait with an antecedent relationship to leader development and tangential connection to leader identity, it is proposed that self-efficacy is a direct motivational antecedent for engagement in identity work, resulting in leader identity development. This relationship can be delineated using expectancy theory (Vroom 1964). When individuals enter an identity workspace, their self-efficacy will influence their motivation to undertake identity work because self-efficacy influences one's belief in their ability to harness the cognitive resources and motivation to be successful in the face of a challenge (Dadaboyev *et al.* 2019). Therefore, upon entering an identity workspace and being presented with challenges to the self, an individual's self-efficacy will determine overall expectancy perceptions of the individual's likelihood to develop.

Individuals with high self-efficacy believe in their ability to develop, resulting in strong expectancy perceptions toward identity work. When placed in an identity workspace, these individuals will apply more effort and persist in the face of challenges (Bandura 1982) because of their heightened expectancy perceptions (Bandura 1978). These strong expectancy perceptions will cause them to view identity work within the identity workspace as instrumental to the development of their leader-self. This will result in increased valence toward identity work as these individuals believe in their ability to achieve and therefore desire increased cohesion of the self (Gecas 1982). This will culminate in the motivation to engage in identity work, causing individuals

with high self-efficacy to enter a positive identity spiral (DeRue and Ashford 2010) as they are motivated to persist through and engage with the challenges that become increasingly complex during identity work. This increased engagement and effort over time will result in positive leader identity development.

However, those with low self-efficacy will not likely experience the same rate of development as those with high self-efficacy as these individuals do not hold an internal belief in their ability to succeed in development. This results in decreased expectancy perceptions of their likelihood to develop causing these individuals to shy away from applying concerted effort toward this process (Bandura 1982). As a result, they will view the identity workspace as less instrumental for identity work, decreasing their valence for development to preserve self-esteem (Leonard *et al.* 1999). This will likely result in a flat or negative identity spiral (DeRue and Ashford 2010; Day and Sin 2011) as individuals will not actively engage with the process of identity work (Epitropaki *et al.* 2017). Through not applying persistent effort or harnessing the cognitive resources necessary for identity work, these individuals will experience little to no leader identity development.

By exploring the effect of self-efficacy on the trajectory of leader identity development this study will establish a direct connection between these concepts. This is important because while self-efficacy is primed to explain differential trajectories of leader identity development due to its influence on expectancy perceptions (Bandura 1978), no known research has tested this relationship. In testing the relationship between self-efficacy and leader identity, there will be greater predictive ability of exactly how leader identities develop, and which traits are essential to catalyze the motivation to engage in identity work. This leads to hypothesis 2A:

Hypothesis 2A: Individual self-efficacy will be positively related to leader identity development.

2.4.2 Goal Orientation

While self-efficacy determines an individual's belief in their capacity to succeed, one's approach to learning is also key to development (Sackett *et al.* 2017). Goal orientation refers to the actions that one takes in pursuit of goals and how they approach a learning environment (Dweck 1986; VandeWalle 1997). However, within this broad definition, there has been much debate regarding the conceptualization of this construct, with scholars arguing that it is a trait, a quasi-trait, a cognitive schema, or a belief (DeShon and Gillespie 2005). To maintain parsimony and cohesiveness, this study adopts the most common perspective that goal orientation is a trait that at times may be situationally influenced (Preenen *et al.* 2014) and is a continuum, with individuals characteristically holding a dominant orientation (VandeWalle 1997; Middleton *et al.* 2019). Therefore, this conceptualization acknowledges that individuals may hold degrees of both learning and performance orientations during the identity work process. However, it follows previous theorization that an individual's dominant orientation will be the most influential for motivation (Day and Sin 2011; Middleton *et al.* 2019).

In their review of a century of research on individual differences, Sackett *et al.* (2017), concluded that goal orientation broadly influences performance outcomes through motivation. Within this higher-order construct, Hurtz and Williams (2009) found that learning orientations strongly influenced positive attitudes toward participation in employee development when compared to performance orientations. A learning orientation is characterized by the need to develop oneself by mastering new abilities (Dweck 1986; VandeWalle 1997). Learning oriented

individuals are highly motivated to develop, view feedback and errors as learning opportunities, and seek out informal, on the job learning experiences (DeRue and Wellman 2009; Day and Sin 2011; Hammond *et al.* 2017). Research in this domain has found that holding a learning orientation is strongly correlated with motivation to engage in self-development (Boyce *et al.* 2010), and the willingness to actively approach challenges (Day and Sin 2011). This is because learning orientations stem from an intrinsic need for self-improvement (Leonard *et al.* 1999), which allows for greater self-regulation in the goal attainment process. This then extends individual effort and persistence in the face of challenges (Dweck 1986) while ensuring that the individual is resilient to negative feedback (Johnson *et al.* 2018). As identity work is characterized by the need to use motivation to overcome challenges to the self to attain a more developed self-concept (Petriglieri 2011; Epitropaki *et al.* 2017; Hammond *et al.* 2017), the active engagement and self-regulation stemming from holding a learning orientation is essential to this process.

Of the constructs of interest in the study, learning orientation is the only one that has been directly tested as an antecedent of leader identity. Middleton *et al.* (2019, p. 497) explored the role of learning orientation in leader identity development and noted that "missing from the current literature on leader identity development are empirical inquiries into specific motivational processes that could explain why some leaders might develop at different rates than others". Overall, they reported a positive linear growth trajectory between learning orientation and leader identity development. However, only 39 participants were included in the sample of the study, a relatively low number when analyzing data using multilevel modeling. Therefore, although there is some preliminary evidence that learning orientation is an important antecedent to leader identity development, this relationship needs to be explored further. This need is echoed by Day and Sin (2011) who found that learning orientations predicted leader effectiveness ratings as a function of

leader identity and motivation. While they did not test the direct, antecedent relationship between learning orientation and leader identity, they suggest that learning orientations be explored further in relation to motivation and identity development as this orientation's self-regulating and motivating nature is likely to assist individuals throughout the longevity of the identity work process.

Returning to expectancy theory (Vroom 1964), those holding dominant learning orientations should have strong expectancy perceptions of leader identity development as they are characterized by holding a mastery orientation, predisposing them to self-regulate their behaviors to sustain motivation (VandeWalle 1997; Payne *et al.* 2007; Middleton *et al.* 2019). Individuals with learning orientations will hold strong expectancy perceptions toward identity work because they believe that with concerted effort, they can master their leader-selves. In turn, they are more likely to view an identity workspace as instrumental for their learning and development as it will be considered a safe space in which to 'try on' new leader behaviors, therefore experimenting with provisional identities (Markus and Nurius 1986; Ibarra 1999) and receiving feedback (VandeWalle 1997) to construct a revised leader identity.

This will culminate in increased valence for the identity work process as these individuals are driven by an internal desire to better themselves (Johnson *et al.* 2018). Those with learning orientations will sustain high levels of valence throughout the identity work process as they will not suffer the ill effects of diminished self-esteem when faced with challenges due to an intrinsic belief in their ability to master new skills (Johnson *et al.* 2018). Therefore, those with learning orientations will likely be more motivated to actively engage in identity work, resulting in entry to positive identity spirals as challenge fuels their motivation, resulting in increased dedication and effort throughout this process. This will result in the development of a revised leader identity.

Conversely, performance-oriented individuals are likely to avoid situations where they perceive failure to be an option while engaging in tasks only when they are confident in their ability to demonstrate proficiency (VandeWalle 1997; Day and Sin 2011). Within the performance orientation domain, there are approach and avoid orientations (VandeWalle 1997). Approach orientations are characterized by a desire to display competence to receive positive evaluation, whereas avoid orientations cause individuals to shy away from situations where their competence may be threatened, and negative evaluation is possible (VandeWalle 1997; Preenen *et al.* 2014). When this orientation is dominant for an individual, they are likely to be extrinsically motivated, or motivated to perform or avoid a situation based on the perceived social expectations of others (Leonard *et al.* 1999).

Significantly, performance orientation has been neglected in the leader identity development literature. For example, Middleton *et al.* (2019) did not include this facet of goal orientation in their study of learning orientation and leader identity. Due to the intrinsic and challenging nature of leader identity development, it is proposed that holding a dominant performance orientation will hinder development. This is because individuals with performance orientations will be extrinsically motivated by positive reinforcement and feedback from referent others (Day and Sin 2011), which opposes the internalized, authentic nature of developing a cohesive sense of self during identity work.

Individuals with performance orientations are less likely to hold strong expectancy perceptions of identity work because their motivation lies firmly in the external perceptions of others rather than on internalized motivation and action (VandeWalle 1997; Day and Sin 2011). Therefore, their expectancies will only lead to surface level performance to display leader skills rather than extending to the deep form of development required by identity work. These individuals

will view the identity workspace as instrumental only to the extent that they can confidently perform skills well, instead of internalizing a new definition of their leader-selves. Therefore, as the identity work process becomes more complex (Lord and Hall 2005), these individuals will apply less effort in order to avoid negative feedback while maintaining competency perceptions (VandeWalle 1997), which will decrease their engagement in identity work. This will diminish their ability to actively incorporate new aspects of the leader-self into the self-concept. Similarly, their valence perceptions will be more focused on displaying parts of their leader-selves in which they already have skill rather than internalizing, challenging, and developing their leader identities. As the valence perceptions of these individuals are based on the need to avoid ego-depletion, they will be less motivated to apply effort to this process when compared to their internally driven, resilient, learning oriented peers.

In further explicating the motivation toward identity work for performance-oriented individuals, when they receive positive reinforcement from referent others, they may enter a positive identity spiral because they experience positive affirmation of their leader-selves from others and are motivated to act to attain further positive reinforcement. However, they are more likely to succumb to the ego-depleting effects of challenge and negative feedback (VandeWalle 1997; Leonard *et al.* 1999), which may result in a downward shift to a negative identity spiral. This is because this form of feedback will result in these individuals shying away from future engagement with identity work to preserve self-esteem and external perceptions (Dweck 1986; Day and Sin 2011). As a result, these individual's entry into positive and negative identity spirals will likely be mixed, resulting in less leader identity development than those with learning orientations. The overall identity work process for those with performance orientations will be

much more surface level and superficial, unlike the deep level form of development required to change one's leader identity (Lord and Hall 2005). This culminates in hypothesis 2B:

> *Hypothesis 2B: Learning orientations will be positively related to leader identity development while performance orientations will be negatively related to leader identity development.*

2.4.3 Perceived Prototypicality

Despite self-efficacy and goal orientation catalyzing intrinsic engagement in identity work, individuals do not exist in a vacuum. Perceptions of one's social context must be considered in explaining the identity work process. Therefore, this study includes perceived prototypicality as an additional antecedent of motivation to engage in identity work. In doing so, this study addresses long-dated criticisms of the lack of consideration of social factors in expectancy theory (Lloyd and Mertens 2018).

Originally an aspect of the social identity theory of leadership (Hogg 2001), perceived prototypicality postulates that through the internalization of social cues, groups come to incorporate a perception of the 'ideal leader' into a shared cognitive schema of leadership (van Knippenberg and Hogg 2003). Individuals who are highly prototypical of this schema then emerge as leaders in these groups as they are endorsed by the group for displaying characteristics that match the group prototype (Hogg 2001; van Knippenberg and Hogg 2003). Traditionally established at the relational level, the more prototypical an individual is of this collective cognitive schema, the more grants of leadership (i.e., acceptance of one's leader-self from others) will be

given, supporting their emergence into this role, and creating a positive identity spiral (DeRue and Ashford 2010; van Knippenberg 2011; Ibarra *et al.* 2014).

Conversely, less prototypical leaders will receive denials of their leadership in their social context, resulting in negative identity spirals (DeRue and Ashford 2010). At the relational level, perceived prototypicality has been linked to many workplace outcomes such as leadership effectiveness, leader emergence, trust, and perceived fairness (van Knippenberg 2011). However, the construct suffers from a similar problem to leader identity in that there is much knowledge about the social and relational aspect of the concept but there is limited knowledge about the intraindividual processes that create these socialized perceptions.

Recent theorization has begun to conceptualize perceived prototypicality at the intrapersonal level (Hoffmann *et al.* 2020; Guillén 2021) to explore how individual's cognitive schemas of leadership influence perceptions of the self, resulting in motivation (Guillén 2021). In this dimension, it is proposed that based on individual's cognitive schema of leadership, individuals reflect on their own characteristics and perceive their level of fit with their leader prototype (Guillén 2021). The more an individual views themselves as prototypical in their environment, the more motivated they should be to act as a leader (van Knippenberg and Hogg 2003; Guillén 2021). The sole study conducted on individual-level perceived prototypicality found that higher levels of this conception led to heightened career success through increased resilience (Guillén 2021). However, more work is required to understand the influence of perceived prototypicality at the intraindividual level.

The conceptualization of perceived prototypicality at the internal, cognitive-motivational level is particularly well-positioned to explain engagement in identity work. It is posited that this internalized comparison should influence the motivation to engage in identity work as individuals

compare themselves to their cognitively constructed leader prototype and are motivated to adjust their leader-selves to mirror this ideal. Supported by expectancy theory (Vroom 1964), it is proposed that the more prototypical one perceives themselves to be, the more likely they are to engage in identity work, resulting in leader identity development. When one views themselves as being prototypical, they believe they 'match' the characteristics of an ideal leader in their context. The degree of this match then causes individuals to act in accordance with their idealized version of what they believe a leader should be, instigating identity work and development. The greater the level of perceived prototypicality, the more positive expectancy perceptions an individual will hold toward identity work as they will believe that they can act and be accepted as a leader in their context.

When a leader then enters an identity workspace, their level of perceived prototypicality will cause them to view this workspace as instrumental in honing and crafting their prototypical self because they are motivated to receive positive reinforcement from their peers when acting as a leader, increasingly confirming their perceptions of perceived prototypicality (van Knippenberg 2011) and solidifying their leader identity. This will ultimately lead to greater valence toward development as these individuals will be moving toward a positive, cohesive sense of self (Gecas 1982; Hoffmann *et al.* 2020). Therefore, those individuals who perceive themselves as highly prototypical will enter a positive identity spiral in which they act to confirm their developing identities, strengthening them and instigating further leader identity development (DeRue and Ashford 2010).

Although there is almost no work on non-prototypical leaders, as noted by Hoffmann *et al.* (2020) the process of development for highly prototypical individuals can be extrapolated and applied to non-prototypical individuals. These individuals will be characterized by a mismatch

between their cognitive schema of an ideal leader and their perceptions of their leader identities. This mismatch will result in low expectancy perceptions of development as they are less likely to feel supported and perceive less fit in their context (Guillén 2021) and will therefore experience more denials of their leader-selves (DeRue and Ashford 2010). When this individual perceives denials of their leader-self, it will call into question their feelings of prototypicality, resulting in a negative identity spiral, where expectancy of success as a leader weakens. When placed in an identity workspace, their instrumentality perceptions will also be weaker as they will not view the setting to be conducive to development due to perceived denials of the leader-self. Finally, to protect their self-esteem and current sense of self, these individuals will have little valence to engage in identity work and will shy away from this process. This will result in a stasis of leader identity or even entry to a negative identity spiral, culminating in little or no identity work and therefore little or no identity development. This leads to hypothesis 2C:

> *Hypothesis 2C: Individual perceived prototypicality will have a positive relationship with leader identity development.*

2.5 The Interactive Effects of Motivational Traits on Engagement in Identity Work

While self-efficacy, goal orientation and perceived prototypicality should singularly influence leader identity development, these traits should also interact (Chen *et al.* 2000; Guillén 2021) to further determine the motivation to undertake identity work. Leader identity development is an extremely complex process (Hammond *et al.* 2017), and therefore research needs to consider the effect of multiple traits to better predict and understand how individuals craft their leader identities.

This conceptualization proposes significant interactions between these cognitive-motivational variables to predict engagement in identity work.

However, although there are clear benefits of high perceived prototypicality (van Knippenberg 2011), research has rarely explored the effects of non-prototypicality (Rast III *et al.* 2012; Hoffmann *et al.* 2020). Due to the nascent stage in this line of inquiry, this conceptualization did not seek to propose how low levels of perceived prototypicality would interact with other motivational variables to predict engagement in identity work.

2.5.1 Self-Efficacy and Goal Orientation

Literature on occupational learning demonstrates that self-efficacy and learning orientation interact to enhance motivation during development (Chen *et al.* 2000). For example, Payne *et al.* (2007) found a strong, positive correlation between self-efficacy and learning orientation in their meta-analysis on the nomological network of goal orientation. Similarly, Sackett *et al.* (2017) note that self-efficacy and learning orientation are often examined in tangent when studying motivation and development. In addition, Johnson *et al.* (2018) found that learning orientations add to individual self-efficacy during development programs.

While the link between self-efficacy and learning orientation in relation to motivation and leader development appears to be strong, it is important to consider the concomitant relationship to leader identity development. Maurer (2002) posited that both self-efficacy and a learning orientation are essential in the development of the self-concept, supporting the motivation to learn. Also, Day and Sin (2011) posited that self-efficacy and learning orientations are both essential to entering positive leader identity spirals, although they did not test this relationship. They conclude their study with recommendations to further explore the effect of each variable on leader identity

development, but neglect to highlight the likely interaction between the two. Additionally, although Kwok *et al.* (2020) did explore the connection between leader efficacy, leader identity and learning orientation, leader efficacy and identity were both utilized as outcome variables moderated by learning orientation.

Together, this illustrates the longevity of the neglect of the process and antecedents of leader identity development (Middleton *et al.* 2019; Lanka *et al.* 2020) in favor of determining the more distal effects on leader development (Schwartz *et al.* 2021). Therefore, this study aims to address this gap by uncovering the more proximal effect of these traits on leader identity development. In extrapolating from these theorizations and extending upon the findings in the leader development literature, it is proposed that self-efficacy and learning orientation should function concomitantly (Chen *et al.* 2000) because "self-efficacy increases initiative, effort and persistence in goal-directed behaviors" (Hirschi *et al.* 2017, p. 210). As learning orientations function in a similar manner (Dweck 1986; VandeWalle 1997), the combination of these traits should increase individual expectancy toward identity work and therefore the motivation to engage in this process beyond the singular effects of either trait. This is due to the additive nature of these traits (Chen *et al.* 2000), which both drive motivation during development (Payne *et al.* 2007; Hirschi *et al.* 2017).

Individual self-efficacy should influence the belief in one's ability to successfully engage in identity work (Johnson *et al.* 2018; Kwok *et al.* 2020). If an individual also holds a learning orientation, this should augment the effect of self-efficacy, as they approach the identity workspace with a mastery mindset (Middleton *et al.* 2019). Together, these traits will increase individual's expectancy toward development by enhancing their persistence, resilience, and self-regulation (Bandura 1982; Dweck 1986; Day and Sin 2011) during the identity work process, beyond the

singular effects of either trait. Individuals with high levels of self-efficacy who also hold a learning orientation will then view the identity workspace as instrumental in refining their leader identities as they view this as a safe space for exploring and testing new identities (Petriglieri 2011), allowing for the active incorporation of provisional identities into the leader cognitive schema. These individuals will also experience higher valence toward identity work as they are unlikely to experience ego-depletion from negative feedback (Leonard *et al.* 1999) and instead will be driven by an innate desire to master the leader-self and attain cohesion within the self-concept. This will result in entry to positive identity spirals during the identity work process, resulting in leader identity development.

Despite evidence connecting learning orientation and self-efficacy, there is little empirical evidence regarding the relationship between self-efficacy and performance orientation. This may be because of their theoretical differences. Since self-efficacy is a result of an intrinsic belief in one's ability (Bandura 1977) and performance orientation stems from a need for positive extrinsic evaluation (VandeWalle 1997), some argue this relationship is incompatible. For example, in their study of trait and state-like differences and performance, Chen *et al.* (2000) did not test the relationship between performance orientation and self-efficacy, stating their incompatibility. The omission of performance orientation in the goal orientation and self-efficacy literature is still common. In the conceptual paper on the role of the self-concept in continuous learning by Maurer (2002), and the longitudinal exploration by Johnson *et al.* (2018), goal orientation is treated as a single factor construct.

However, it is possible that these constructs are not incompatible, but simply have a bipolar nature. Specifically, VandeWalle (1997) conceptualizes and finds empirical support for the proposition that goal orientation is the higher-order level of a multi-factor construct in which

individuals hold varying levels of both learning and performance orientations, with one orientation being dominant (Day and Sin 2011). This foundational piece of work directly refutes the exclusion of performance orientation when examining goal orientation. The meta-analysis by Payne *et al.* (2007) provides further support for this by finding that self-efficacy and performance orientation are negatively, but significantly, correlated.

Therefore, it is posited that self-efficacy may act as a buffer against the expectancy-decreasing effects of performance orientations in the identity work process. For example, while individuals with performance orientations may avoid situations where negative feedback is likely (Day and Sin 2011), individuals with high self-efficacy believe in their ability to succeed at a task (Bandura 1977), and therefore perceive less chance of failure. As a result, despite individuals being predominantly performance oriented, their self-efficacy may enhance their belief that they can appear competent, which will cause them to actively approach and engage in identity work to display this competence. Therefore, while those with performance orientations would typically have lower expectancy perceptions of identity work, if they have high levels of self-efficacy, their expectancy perceptions will increase. This may cause these individuals to then perceive the identity workspace as instrumental in developing to the extent that these individuals will be able to attain the positive evaluation that catalyzes their motivation to perform. This will then enhance their valence toward the identity work process, as their extrinsic motivational needs will be met. This will increase engagement with identity work to continually display competence, which will result in entry to a positive identity spiral and leader identity development.

However, if individuals have both performance orientations and low self-efficacy, they will not believe that they have the capability to develop and will shy away from identity work to preserve self-esteem by avoiding negative evaluation. These beliefs will result in low expectancy

perceptions of the identity work process. In turn, this will create low instrumentality perceptions of the identity workspace because these individuals will perceive their chance of failure to be high and therefore the chance of negative evaluation will also be strong. This will result in inaction and demotivation. To maintain self-esteem and positive self-construal, these individuals' valence perceptions of identity work will be extremely limited. They will at best experience no leader identity development and they could enter a negative identity spiral where their current leader identity is challenged and becomes fractured and diminished (DeRue and Ashford 2010; Nicholson and Carroll 2013). Overall, the combination of individual self-efficacy and goal orientation held by individuals within an identity workspace should lead to differences in the motivation to engage in identity work, resulting in different levels of leader identity development. This leads to hypothesis 3A:

> *Hypothesis 3A: Self-efficacy and learning orientation will act in an additive manner to predict leader identity development while self-efficacy will moderate the negative effects of performance orientation on leader identity development.*

2.5.2 Self-Efficacy and Perceived Prototypicality

In an initial conception, van Knippenberg and Hogg (2003, p. 251) stated that, "prototypicality-based status may feed into feelings of … self-efficacy as a leader". Although little empirical research has been conducted, particularly on leader identity, there is evidence that perceived prototypicality interacts with self-efficacy to increase motivation (Guillén *et al.* 2015; Guillén 2021). Exploring the antecedents of motivation to lead, Guillén *et al.* (2015) found that perceptions of prototypicality, which they term self-to-exemplar comparisons, are mediated by self-efficacy to

predict motivation to lead. More recently, in the first study to measure the intrapersonal level of perceived prototypicality, Guillén (2021) found that when managers with low self-efficacy experience high levels of perceived prototypicality, they feel that they receive greater support in their role. This support stems from perceptions of increased trust and grants of leadership given to these individuals (van Knippenberg 2011), which offsets the demotivating nature of low self-efficacy (Guillén 2021). While this study lends preliminary evidence to the interactive relationship between self-efficacy and perceived prototypicality, neither of these studies examined this relationship in the context of leader identity development.

In applying these findings to the identity work process, it is proposed that high levels of perceived prototypicality will promote increased self-efficacy as those who perceive themselves as prototypical experience greater support in their environment, increasing the motivation to engage in identity work. This causes them to enter a positive identity spiral as the increased perceptions of support and acceptance in their environment lead to increased belief in their ability to develop. This effect should occur with either high or low levels of self-efficacy as perceived prototypicality is known to act in an additive manner with self-efficacy, offsetting any negative effects of low self-efficacy (Guillén 2021).

These variables should interact to increase the motivation to engage in identity work by increasing one's expectancy of the identity work process. Those with high perceived prototypicality will have greater expectancy toward the identity work process because of their belief in their fit as a leader in their context comingled with their perceptions of support and trust (van Knippenberg 2011). When coupled with high self-efficacy, these individuals will experience even greater expectancy perceptions as their belief in their fit and acceptance in their context will combine with their intrinsic belief in their ability to develop. In doing so, they will perceive the

identity workspace to be instrumental to their development as they believe by exploring new facets of the leader-self they can further enhance their fit and acceptance in their context. As a result, these individuals will apply effort to the identity work process, as they will experience high valence to confirm their self-beliefs and maintain cohesion in the self-concept. This will result in entry to a positive identity spiral and culminate in high rates of leader identity development.

The process of identity work should be much the same for individuals with low self-efficacy and high perceived prototypicality. However, in this circumstance, perceived prototypicality will act as a buffer against the negative effects of low self-efficacy to enhance expectancy perceptions to create active engagement in the identity work process because these individuals will perceive more grants of their leader-selves (DeRue and Ashford 2010) and support in their development (van Knippenberg 2011; Guillén 2021). Therefore, despite these individual's lack of an intrinsic belief in their capability to develop, the signals of support they receive within their environment will offset the demotivating effect of self-efficacy. This will enhance instrumentality perceptions within the identity workspace as individuals will view this as a safe and efficacious space to participate in development. In turn, this will result in entry to a positive identity spiral as valence perceptions of attaining a more positive and cohesive self-construal also increase. Despite the demotivating nature of low self-efficacy, high levels of perceived prototypicality may still allow these individuals to experience leader identity development. Overall, the perception that one has of the alignment between their leader-self and the perception of what an 'ideal' leader is should result in greater belief in the ability to develop, increasing self-efficacy and therefore the motivation to engage in identity work.

Hypothesis 3B: Perceived prototypicality acts in an additive manner with self-efficacy. High perceived prototypicality will moderate the negative relationship between low self-efficacy and leader identity.

2.5.3 Goal Orientation and Perceived Prototypicality

While there is no known research linking perceived prototypicality and goal orientation, it is likely that these variables will interact during the process of leader identity development. As learning oriented individuals seek feedback with mastery mindsets (Johnson *et al.* 2018), when these individuals receive positive reinforcement, their perceptions of prototypicality should increase, as they are receiving grants of their leader-selves (DeRue and Ashford 2010). When applied via the process of expectancy theory, these variables should act in a bolstering manner with one another, causing individuals to hold strong expectancy perceptions of identity work. This is because signals of prototypicality should be interpreted as positive feedback, indicating to these individuals that they are successfully developing.

These perceptions will cause individuals to approach the identity workspace with high instrumentality perceptions and be motivated to continually act to receive positive reinforcement in the pursuit of mastering their leader-selves. As the valence perceptions of these individuals are based on achieving this goal, the positive perceptions of the self that derive from perceived prototypicality should result in entry to a positive identity spiral. This is because these individuals will be motivated to act to receive continual positive reinforcement, driven by the increased self-esteem that arises from achieving a positively perceived holistic sense of self (Gecas 1982; Markus and Nurius 1986). The attenuation to self-improvement and feedback from those with learning

orientations should act in an additive manner with perceived prototypicality, ultimately leading to leader identity development.

However, this interaction is likely even more important for those with performance orientations because for these individuals, the development of their leader-self is strongly guided by organizational cues as they desire external reinforcement that they are 'doing leadership right'. When individuals who hold performance orientations receive positive reinforcement, their leader identities will be affirmed, entering a positive development spiral (Day and Sin 2011). When these individuals are also highly prototypical, they will perceive more grants in their 'doing' of leadership (DeRue and Ashford 2010). This perception of acceptance as a leader in their context will interact positively with their performance orientation to drive the motivation to continually develop a leader identity. This is because despite these individual's proclivity to evade the challenges associated with identity work to avoid negative feedback to preserve self-esteem (VandeWalle 1997), high levels of perceived prototypicality will diminish the likelihood of receiving negative evaluation.

When a developing leader holds a performance orientation and high prototypicality perceptions, their expectancy toward development will increase as their desire for positive evaluation will be met. This will cause these individuals to actively approach the identity workspace as they view it as highly instrumental in displaying competency of their leader-selves. In doing so, the valence driven desire of these individuals to receive positive feedback is likely to be met, catalyzing entry to a positive identity spiral. Therefore, these traits will interact to instigate the motivation to engage in identity work, resulting in leader identity development. Overall, as performance-oriented individuals rely on extrinsic motivation more so than learning oriented individuals (VandeWalle 1997), their moderate to low valence toward identity work is likely to

increase when their perceived prototypicality is high as they will experience more support and reinforcement in their development (Ibarra *et al.* 2014), increasing their motivation to engage in identity work. This leads to hypothesis 3C:

> *Hypothesis 3C: Perceived prototypicality will act in an additive manner with learning orientation to predict leader identity development. However, it will moderate the negative relationship between performance orientation and leader identity.*

2.6 A Conceptual Model of Leader Identity Development

After detailing each hypothesis in the creation of the conceptual model of the role of cognitive-motivational traits in leader identity development, the visual of this model is presented in *Figure 1*. This visualization acknowledges that identity work and leader identity development occur within an identity workspace, which in this study is a leadership development program. Based on individual cognitive-motivational traits, the level of engagement in the identity work process can be predicted through an expectancy process. These cognitive-motivational traits will have antecedent effects on the expectancy perceptions of identity work both singularly and in their interaction. Individual expectancies then determine the instrumentality perceptions of the identity workspace as a functional tool in assisting in leader identity development, resulting in differential levels of engagement in the identity work process. As the first hypothesis states, an individual's engagement in the identity work process is posited to lead to distinct levels of leader identity development. This occurs as individuals experience positive or negative valence to seek greater self-construal by acting to develop their leader identities. The expectancy process leads to entry to either positive or negative identity spirals where over time, individuals continually approach and

engage with identity work to further develop their identities or disengage from this process to maintain their current self-construal and protect their egos. In this manner, leader identity development functions as a dynamic expectancy process guided by cognitive-motivational traits.

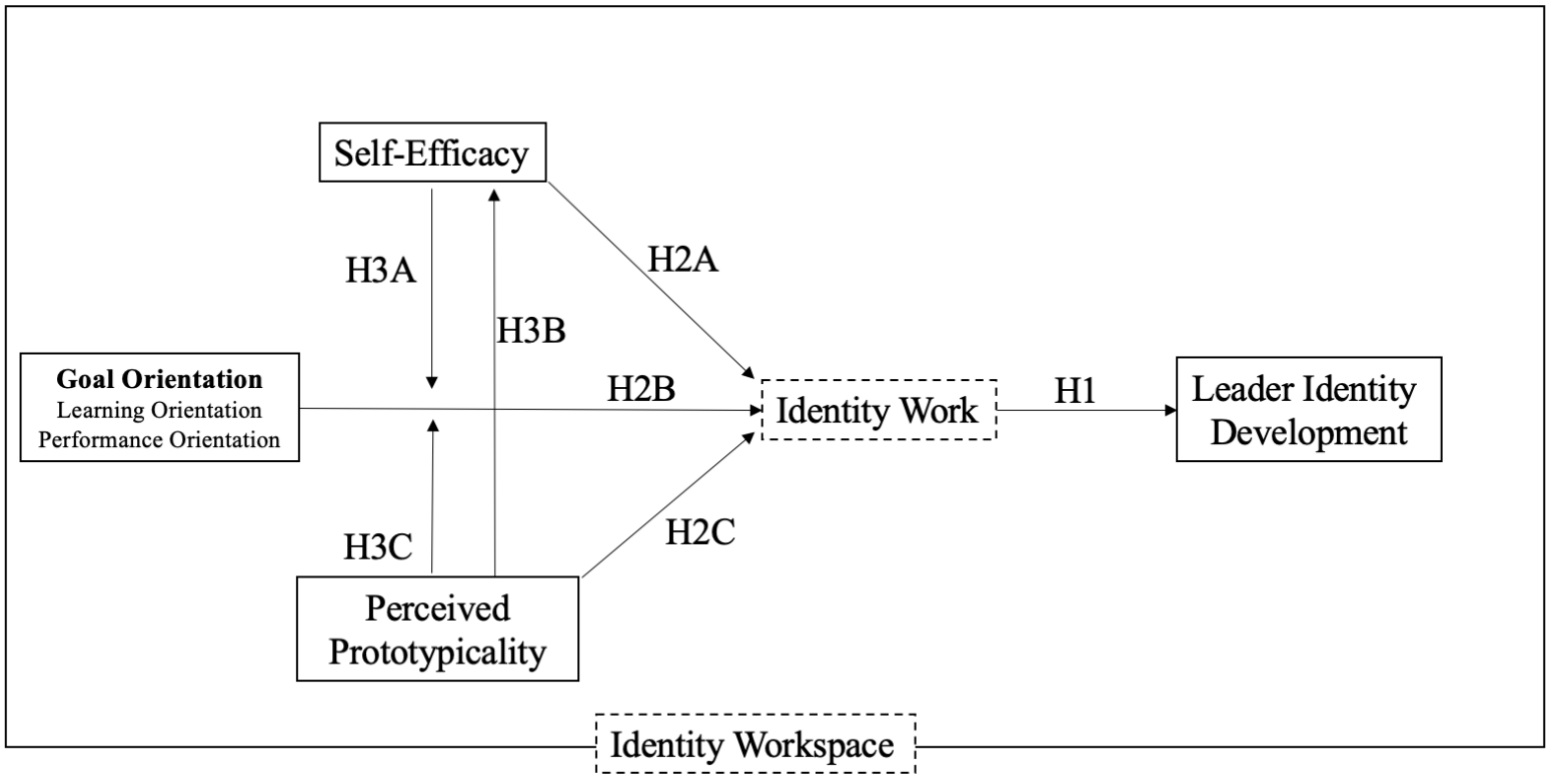


Figure 1: Conceptual Model

An expectancy process model of leader identity development

*Dashed lines indicate untested theoretical assumptions

2.7 Conclusion

The primary purpose of this chapter was to review the relevant literature on leader identity development and develop a conceptual process model of the role of motivation in individual-level leader identity development. Identities guide individual behavior, affect, cognition, motivation, and socialization in a given context (Markus and Nurius 1986). They are dynamic and require identity work to maintain or revise this part of one's self-concept throughout life (Sveningsson and Alvesson 2003). Specifically, leader identity development is a form of development that shapes every aspect of an individual's perception of the self as a leader (van Knippenberg *et al.* 2004) which is integral to leader development efforts (Ayoobzadeh and Boies 2020).

While there is general agreement that motivation plays an essential role in leader identity development, little research has explored this process (Miscenko *et al.* 2017). This study aims to contribute to this area by providing a process-based conceptualization considering how self-efficacy, goal orientation and perceived prototypicality may influence the motivation to engage in identity work, affecting leader identity development. This conceptualization is unique in that it utilizes expectancy theory, a motivational process theory, to focus on internal cognitions influencing motivation to engage in development.

The conceptual model developed in this chapter aids in understanding how individual characteristics interact to predict expectancy perceptions of partaking in the identity work process. If an individual holds strong expectancy perceptions of the identity work process, then they will likely view the identity workspace as instrumental to development. These individuals will then have increased valence for development to attain high self-esteem and cohesion of the self-concept. Therefore, they will enter a positive identity spiral, actively engaging in identity work and in turn, developing their leader identities. However, if an individual experiences little

expectancy toward development, they will not be motivated to partake in identity work as both their instrumentality perceptions of the identity workspace and valence toward the development process will diminish. Therefore, they will enter a flat or negative identity spiral, and experience limited or negative leader identity development. Through uncovering the role of individual cognitive-motivational traits in development and how they interact, this study moves toward a greater understanding of how leaders become who they are.

3. Methodology

3.1 Introduction

To test the inherently temporal process of leader identity development, longitudinal research is necessary. Therefore, a quantitative longitudinal research design (Creswell and Clark 2017) was employed to examine the change in leader identity development. Participants were sampled from the leadership development programs of three organizations. As leader identity development is an internal, cognitive phenomena (Lord and Hall 2005) the study relies on self-report surveys to test the hypotheses. This data was collected at three time points during the leadership development programs, with a pre, mid and post-test research design.

This chapter explains the rationale behind this research design. First, the theoretical justifications for the methodological choices, including the research process and guiding philosophy are explained. Then, the key research questions and objectives are reviewed. Next, the quantitative methodology is delineated, including how organizations were sourced and participants were recruited as well as the measures and procedures employed in the study. This is followed by an overview of the data analysis plan. Finally, limitations of the study are noted.

3.2 Overview of the Research Process

The research process is intended to provide organization across a scientific field, allowing scholars to come to converging or diverging conclusions through the utilization of similar methods (Johnson *et al.* 2007). As stressed by Lee (1989), this can be done in the social sciences through the application of the natural scientific method to ensure that rigorous methods are applied in the pursuit of knowledge creation. This appraisal guides this study in its core objective of uncovering the motivational process underpinning leader identity development.

The natural scientific method, applied in social science is as follows: a research question is posed based on an observation (e.g., observing a gap in the literature). Then the research enters the conceptualization stage where previous theoretical and empirical work relating to the phenomenon is reviewed (Teddlie and Tashakkori 2006) to formulate hypotheses. Next, a specific paradigm is selected to direct the methodological choices of the study in pursuit of answering the research question (Smith 1998; Morgan 2007; Park *et al.* 2020). Based on the research design crafted in the conceptualization stage, this process enters the experiential stage where data is collected and analyzed (Teddlie and Tashakkori 2006). The research process culminates in the inferential stage (Teddlie and Tashakkori 2006), where conclusions are drawn which either support or refute the hypotheses, providing an answer to the research question. The new knowledge created from the study then allows the research process to begin anew with the formulation of a new research question, as seen in *Figure 2*.

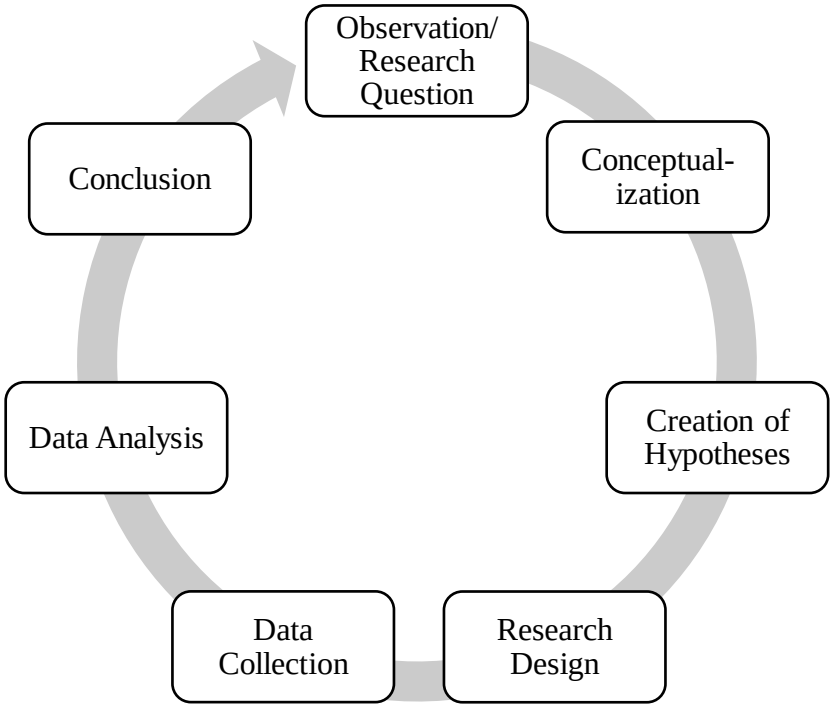


Figure 2: The Cyclical Research Process

This cyclical process, which is rigorous yet flexible in nature, allows for knowledge creation among a group of scholars (Gauch Jr and Gauch 2003). Through its continued application, theory is built and falsified through empirical testing (Gauch Jr and Gauch 2003). This ultimately leads to the forward advancement of scientific knowledge, paving the way for its practical application in society (Lee 1989; Johnson *et al.* 2007; Morgan 2007). The following sections detail the choices made throughout this study, as guided by this research process, to answer the research questions and meet the objectives posed in Chapter 1.

3.3 Implications of Research Design

In applying the natural scientific method to explain social phenomenon (Lee 1989), the guiding paradigm for this study stems from the philosophy of positivism (Comte 1975). As this study seeks to better understand the generalized process of leader identity development, positivism is well-suited to guide the research design as it asserts an epistemological stance of a single, objective reality (i.e., a generalizable reality). In the search for this reality, it argues that "no real observation of any kind of phenomena is possible, except insofar as it is first directed and finally interpreted by some theory" (Comte 1975, p. 241). Thus, the principles of this paradigm are well-suited to direct hypothetic-deductive research where prior theory assists in delineating hypotheses which are then operationalized and tested to cyclically inform developing theory (Park *et al.* 2020).

As advised by positivism, the decisions made in this research design are visualized in *Figure 3*. This figure is adapted from the research onion (Saunders *et al.* 2009), which explicates the research process and assists in guiding researchers from the selection of an overarching philosophical orientation through the data analysis phase of a study. In making these decisions, previous theorization on leader identity development was first reviewed, identifying areas that

remain unexplored. Guided by the key axiom of Comte's positivism, hypotheses were deductively delineated in Chapter 2. Then, adhering to the ontology of positivism, that mathematics and numerical evaluation are the pillars of generalizable discovery (Comte 1975, p. xlix) in the measurement of an objective truth (Smith 1998), quantitative measures were selected to assess and falsify the proposed hypotheses. Discussed in greater detail in section 3.5, the application of quantitative measures will aid in extending the generalizability and understanding of the process of leader identity development.

In further applying positivist thinking to answer the research questions, the inherently individualized and temporal nature of leader identity development (Day *et al.* 2021) was considered. As the focus of this work is on the intrapersonal conceptualization of the development of the leader-self, longitudinal, self-report measures were deemed to be the most appropriate tool for measuring participant's leader identities throughout the study. The selection of this method allowed for greater exploration into this cognitive phenomenon, accounting for the lack of empirical investigation into intraindividual leader identity development (Miscenko and Day 2016). Through the application and analysis of this research design, knowledge of this motivational process is created, contributing to the greater understanding of leader identity and how it develops.

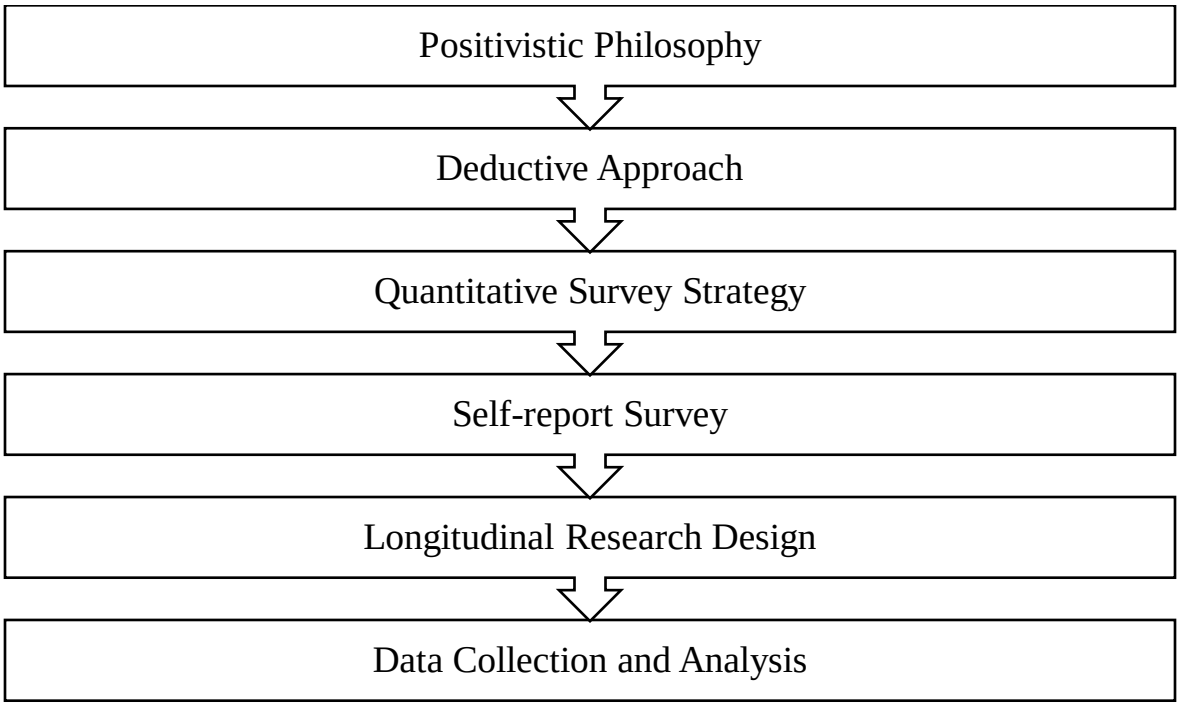


Figure 3: Methodological Choices of The Study

3.4 Research Questions and Objectives

The application of the longitudinal, quantitative research design seeks to answer the following research questions:

How do individual leader identities develop during a leadership development program?

Within the main research question of the study, there also relevant sub-questions:

1. *How does individual self-efficacy influence leader identity development during a leadership development program?*
2. *How does individual goal orientation (learning and performance) influence leader identity development during a leadership development program?*

3. *How does perceived prototypicality influence leader identity development during a leadership development program?*
4. *How do these traits interact to influence leader identity development during a leadership development program?*

Arising from these questions, the objectives for the study are as follows:

1. *Determine change in leader identity during participation in a leadership development program*
2. *Understand how cognitive-motivational traits influence leader identity development*

After detailing the specific research questions and objectives guiding this study, the chosen methods are discussed in greater detail.

3.5 Overview of Methodology

Currently, the area of leader identity development is experiencing rapid conceptual advancement with little confirmatory empirical evaluation (Vogel *et al.* 2020). This is evidenced by the existence of multiple theories of the process of leader identity development (Sveningsson and Alvesson 2003; DeRue and Ashford 2010; Petriglieri 2011; Hammond *et al.* 2017), which remain untested. This is problematic as without empirical falsification of theorization, the cyclical nature of the research process cannot be achieved, disallowing knowledge advancement within a field (Gauch Jr and Gauch 2003).

While there are some empirical studies focusing on leader identity development, few are truly longitudinal in nature. This is paradoxical as time is an important factor in examining

development of the self (Antonakis *et al.* 2012; Day and Dragoni 2015), so longitudinal research should be a prerequisite in exploring leader identity development. However, of the few longitudinal studies of leader identity development, most have occurred over a matter of weeks (Miscenko *et al.* 2017; Kwok *et al.* 2020). As this process is theorized to occur over long periods of time (Liu *et al.* 2021), the current research has likely not allowed adequate time to truly uncover the process of this deep form of development (Wallace *et al.* 2021). For example, Day and Sin (2011) acknowledge that while research with a specific focus on clarifying the role of time in leader identity development has not yet occurred, their 13-week study is an initial indicator that this process likely requires much longer data collection periods. Therefore, to add to this burgeoning body of knowledge, more expansive longitudinal research, lasting months, should be undertaken. In balancing this conclusion with the practical constraints of organizational research (Miscenko *et al.* 2017), this study improves upon the longevity of previous research by collecting data over a period of nine months.

Additionally, the existing empirical research on leader identity development has mostly utilized qualitative methodologies (Komives *et al.* 2005; Hatmaker 2013; Ryan *et al.* 2021). While this has allowed the field to advance by creating theory, little quantitative research has been undertaken to falsify this theory in a more generalizable population (for exceptions see, Middleton *et al.* 2019 and Kwok *et al.* 2020). Therefore, while the field is making advancements in theory building and the understanding of the experiences of particular populations, there remains an inability to apply this knowledge more broadly. This perpetuates a problem across the social sciences in that there is a misalignment between academic knowledge creation and its practical application (Vosburgh 2022), which disallows important research to aid in providing solutions to

practical problems. As a result, more quantitative research is necessary to understand the process of leader identity development from a more generalizable standpoint.

In expanding upon the nature of the quantitative, longitudinal methodology, a three-wave survey design was chosen to allow pre-test and post-test scores to be compared. This aids in understanding what changes are occurring during leader identity development while accounting for threats to both internal and external validity (Dimitrov and Rumrill Jr 2003), which ultimately increases the rigor of the findings by reducing bias in the research. As a result of the pre-test post-test design, it can reasonably be concluded that changes that occur in the sample are occurring because of engagement in identity work rather than because of random effects. The use of more than two data collection points creates the ability to examine development as a non-linear function (Preacher *et al.* 2008), which when considering the dynamic nature of development (Day and Dragoni 2015), is essential to truly understand how leader identities change over time.

3.6 Quantitative Methodology

The quantitative methods used were designed to capture individual change in leader identity within an identity workspace. To allow for the examination of within and between-person change in leader identity while controlling for demographic and context effects, data collection occurred across five cohorts of developing leaders within three organizations. Leadership development programs were isolated as relevant identity workspaces in the study due to their unique ability to act as holding environments for developing leaders (Sveningsson and Alvesson 2003), bringing one's leader identity to the foreground for examination and revision (Petriglieri 2011). These programs are ideal field-based research settings to determine within and between-person growth with minimal threats to validity as the participants engaged in leadership development programs

receive the same learning materials as their peers. Therefore, participants undergo similar developmental activities and challenges on an identical timeline. As such, organizational leadership development programs inherently control for confounding variables like delivery format which can influence developmental trajectories (Noe, Wilk, *et al.* 2014).

3.6.1 Participants

Participating Organizations

Access to the three participating organizations was obtained through convenience sampling (Etikan *et al.* 2016), which is further detailed in the 'Procedures' section of this chapter (section 3.6.3). While there are pitfalls in the generalizability of this sampling technique, the efficiency of the method was ideal for accessing the largest possible population (Alvi 2016, pp. 29-30), which was necessary for the proposed data analysis plan. Three organizations from different contexts were selected for examination to increase generalizability in the study (Auvinen *et al.* 2020). In selecting organizations that exist across multiple industries, the study accounted for bias created from the convenience sampling. For example, the inclusion of multiple organizations allowed the exploration of differences in leader identity development between the public and private sectors. This created the ability to control for the effect of the different motivational systems across these sectors (DeSantis and Durst 1996; Buelens and van den Broeck 2007; van der Wal *et al.* 2008). Another benefit of including multiple organizations in the study is that bias from context effects (Dimitrov and Rumrill Jr 2003) of a single organization are likely to be diminished.

All organizations were located in Ireland. Organization A is a large public university employing over 2,700 people. The development program extended throughout the entire data collection process, occurring in two, two-day sessions, for a total of four training sessions.

Organization B is a medium-sized technology multinational headquartered in The United States providing digital business to business marketing and customer service solutions. It employs over 290,000 people across more than 40 countries. This development program was similar in length to that of Organization A, except it consisted of monthly exercises and training sessions as well as a group project. Finally, Organization C is one of Europe's largest food wholesalers, predominantly comprised of family-owned businesses. Organization C operates over 1,400 stores across its 11 brands in Ireland and Spain, employing over 41,000 people. This development program occurred on a similar timeline to the previous two and was similar in structure to Organization B, with monthly or bi-monthly development sessions ranging from self-reflection to coaching. The inclusion criteria for these organizations were that they had ongoing formal leadership development programs occurring within the organization.

Participants

Purposive total population sampling was used to recruit all participants engaged in the leadership development programs in each organization (Etikan *et al.* 2016). This technique was targeted to buffer the negative effects of attrition (Goodman and Blum 1996), by sampling the entire population to attain as many responses as possible. Due to the different structures and time intervals of each organization's program, multiple cohorts within organizations were included within the study.

The first data collection point occurred from December 2019 to January 2021. The demographics for each wave of data collection can be found in *Table 1*. The total population consisted of 141 participants. There were 109 respondents to the first wave of the study, for an initial response rate of 77%. Of this, 76 were male and 33 were female (69.7/30.3%). Participants ranged from 18-55+ years old with most respondents being between 45-54 years of age

(N=39/35.8%). The sample was almost entirely White (N=89/81.7%). Most participants indicated they worked in the public sector (N=71/65.1%). Finally, the sample was almost entirely Irish (N=79/72.5%).

To maintain equivalent data collection points for each cohort, data collection at the mid-program point occurred from June 2020 to May 2021. In total there were 77 participants in the second wave, resulting in a 29% attrition rate. The gender distribution was slightly more equal than in Time 1, with 50 respondents identifying as male and 27 identifying as female (65/35% respectively). Like Time 1, ages ranged from 18-55+ with most participants being between 45-54 years of age (N=30/39%). The sample was still mostly White, with the proportion of White respondents to People of Color being greater at Time 2 (N=66/85.7%). Most participants were Irish (N=59/76.6%). Finally, the public to private sector employment rate remained constant with 51 respondents working in the public sector (66%) and 26 working in the private sector (34%).

As seen in *Figure 4*, data collection at the conclusion of the programs took place from November 2020 through October 2021. In total, there were 55 participants, resulting in a 50% attrition rate throughout the entire study. The gender distribution remained somewhat constant from mid-program to post-program with 37 participants identifying as male and 18 identifying as female (67.3/32.7% respectively). The age range remained from 18-55+ with most participants being between 45-54 years of age (N=22/40%), which is consistent with data collection at the pre- and mid-program points. Eighty percent of participants were White (N=44), and most participants were again Irish (N=41/74.5%). The ratio of private to public sector employees remained about constant from the previous data collection phase with 35 participants working in the public sector (63.6%) and 20 working in the private sector (36.4%).

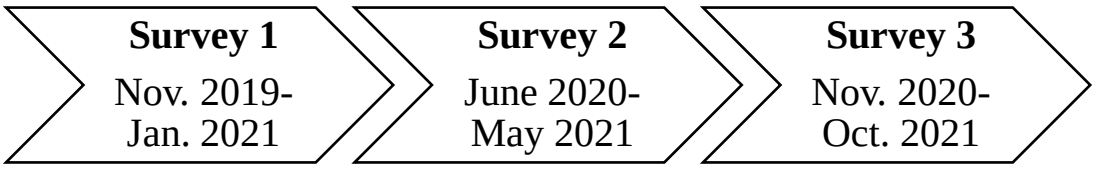


Figure 4: Timeline of Data Collection

Table 1: Sample Size and Demographics

	T1	%	T2	%	T3	%
N	109	-	77	Attrition (29%)	55	Attrition (50%)
Gender						
Male	76	69.7	50	65.0	37	67.3
Female	33	30.3	27	35.0	18	32.7
Age						
18-24	15	13.8	7	0.9	7	12.7
25-34	14	12.8	9	11.6	8	14.5
35-44	35	32.1	28	36.4	17	30.9
45-54	39	35.8	30	39.0	22	40.0
55+	3	5.5	3	3.9	1	1.8
Ethnicity						
White	89	81.7	66	85.7	44	80.0
Black	4	3.7	2	2.5	2	3.6
Asian	2	1.8	1	1.3	1	1.8
Mixed	5	4.6	2	2.5	2	3.6
Hispanic	1	0.9	0	0.0	0	0.0
Prefer not to specify	8	7.4	6	7.8	6	10.9
Sector						
Public	71	65.1	51	66.0	35	63.6
Private	38	34.9	26	34.0	20	36.4

3.6.2 Measures

In keeping with the positivistic standard of the researcher maintaining as much distance as possible from participants (Park *et al.* 2020), each survey was delivered online. The surveys were created and distributed through Qualtrics, an online survey platform that supports a myriad of surveying

techniques to allow its users to obtain accurate data in an efficient and creative format (Qualtrics 2022). In utilizing Qualtrics, previous participant responses were able to be associated with future responses, allowing the data to be analyzed longitudinally to determine within-person growth. Each survey consisted of four measures designed to assess participant levels of leader identity, self-efficacy, goal orientation and perceived prototypicality throughout their experience in their leadership development program. All measures included in the survey were previously examined for validity and reliability to ensure that relevant constructs were accurately measured (Glasow 2005). The initial survey also collected demographic information. All survey items can be found in *Appendix A.*

Leader Identity: Change in leader identity was measured with the Leader Self-Identity Measure (Hiller 2005). This measure is the only validated, domain-specific leader identity measure. It is designed to capture latent cognitive perceptions of the self as a leader. This measure is commonly used in empirical examinations of leader identity (Day and Sin 2011). It contains three components of self-rated identity: importance, certainty, and descriptiveness. On a seven-point Likert scale, participants rate how descriptive, important, and certain they are of a series of four repeating leader-identifying statements (a total of twelve statements). An example statement is, “If I had to describe myself to others, I would include the word leader”. The overall reliability for this measure is (α=.962).

Self-Efficacy: To capture individual leader self-efficacy the Occupational Self-Efficacy Scale- Short Form (Schyns and von Collani 2002) was used. This measure is ideal as it is one of the only occupational-based self-efficacy measures and specifically targets the motivational facets of self-efficacy in the workplace. The short form is an eight-item, previously validated, six-point Likert scale survey ranging from one (not at all true) to six (completely true). An example item is,

"I feel prepared to meet most of the demands in my job". The overall reliability for this measure is (α=.937).

Goal Orientation: In determining individual's levels of learning orientation and performance orientation in their roles, the Work Domain Goal Orientation Scale (VandeWalle 1997) was utilized. This measure specifically targets the work-domain (VandeWalle 1997). It consists of 16 seven-point Likert scale items ranging from one (strongly disagree) to seven (strongly agree). An example item is, "I often look for opportunities to develop new skills and knowledge". The overall reliability for learning orientation is (α=.873) and the overall reliability for the performance orientation items is (α=.924).

Although this measure targets three facets of goal orientation (learning, performance-approach, and performance-avoid orientation), approach and avoid orientations are commonly collapsed into a single performance orientation facet, both theoretically and empirically (Day and Sin 2011). As this study adopted the prevalent theoretical conception that performance orientation consists of both avoidance and approach behaviors (Dweck 1986), it was measured empirically as a single factor. To ensure the validity of this theorization, a confirmatory factor analysis (CFA) was conducted on this measure. The results showed that the measure used in this study was best fit as a two-factor measure of learning and performance orientation and therefore the approach and avoid items were collapsed into a single factor of performance orientation.

Perceived Prototypicality: Individual's perceived fit into their environment was measured with the Perceived Prototypicality Scale developed by Platow and van Knippenberg (2001). This validated, five-point Likert scale measure consists of three items relating to individual's perceived leader prototypicality from one (strongly disagree) to seven (strongly agree). Items were slightly altered to reflect individual working environments. An example item for the public university is,

"As a leader I represent what is characteristic about my college". This item would be "As a leader I represent what is characteristic about my team" in the other firms. The overall reliability for this measure is (α=.734).

Non-Scale Items: The demographic variables assessed in the study were captured using non-scale measures. These variables ranged from dichotomous to nominal. They consisted of gender, age, nationality, ethnicity, marital status, number of dependents, education level, and tenure. These items allowed the assessment of a variety of demographic characteristics and control variables that may influence leader identity development.

3.6.3 Procedures

The first step in the research process was to attain approval for the study from the Social Research Ethics Committee (SREC) within University College Cork, after which convenience sampling was employed to secure organizational participants. Based on existing organizational contacts, four organizations were approached and given information about the study, its purposes, and benefits of participation. Of the four organizations, three agreed to engage with the study. Within these three organizations, the director of the leadership development programs became the primary point of contact to introduce the study to potential participants. They did this by contacting participants via email three to four weeks before the commencement of the study. This email contained a PDF pamphlet that summarized the purpose of the study, the conditions of participation, the timeline of the study, and stated the organization's support and encouragement of individual's participation. Participants were also given the researcher's contact information and were encouraged to reach out with any questions relating to the study.

One to two weeks before the commencement of the program, the program director provided a list of participant emails to the researcher who then emailed the link to survey one, which captured pre-program levels of each variable, to each potential participant. The introductory page of the survey acted as the consent form which detailed the purpose of the study, ensured confidentiality, and ended with a question asking participants if they understood all information and agreed to participate in this study. If participants selected 'Yes', they were directed to survey one. If 'No' was selected, participants were thanked for their time and the survey ended immediately. The survey was entirely online, anonymous and took about ten minutes to complete. As Galesic and Bosnjak (2009) found that surveys that are ten minutes or shorter received higher response rates, the length was intended to increase participant engagement.

After one week, reminder emails were sent to encourage individuals to complete survey one before the commencement of their program. All individuals who completed survey one were contacted at the appropriate time interval for survey two. Survey two contained the same questions as survey one, except it omitted the demographic questions in consideration of survey length and redundancy (Glasow 2005). The remaining surveys continued on the same timeline as survey one, with individuals being contacted by email to alert them that survey two would be sent out within the next two weeks. A week after the links were emailed out, a reminder email was sent to participants to complete the survey before the next phase of their program. This procedure was repeated for survey three, the post-program data collection point. Specific dates of each wave's commencement can be seen in *Table 2*.

Table 2: Timeline for Survey Data Collection

	Survey 1	Survey 2	Survey 3
Organization A			
Cohort 1	25.11.2019	15.06.2020	20.11.2020
Cohort 2	15.06.2020	20.11.2020	15.03.2021
Cohort 3	15.03.2021	06.07.2021	04.10.2021
Organization B	12.11.2020	15.03.2021	06.07.2021
Organization C	18.01.2021	07.05.2021	04.10.2021

3.6.4 Data Analysis

To begin analysis, all data was exported from Qualtrics into the statistical analysis software, SPSS (version 28.00), to be cleaned and to create the study variables. Each organization and data collection point were analyzed separately in SPSS and then compiled into a larger SPSS file where this procedure was repeated for the entire sample at each wave of the study. A significance criterion of alpha (α) 0.05 was used throughout all phases of data analysis.

For each data collection point, analysis began with basic descriptive statistics and correlations. Then, to further explore the relationship between the variables of interest, independent samples t-tests, ANOVAs (analysis of variance) and moderation analyses were conducted. Independent samples t-tests are ideal to test the strength of the relationship between a dichotomous independent variable (IV) and continuous dependent variable (DV) that emerge from different groups (Field 2013, p. 446). Therefore, these tests served to assess the confounding effects of attrition in the second and third waves of the study. ANOVAs report similar results to t-tests, except they analyze independent variables with three or more groups (Field 2013, p. 521).

Therefore, the specific relationships between the motivational variables of interest and leader identity were analyzed using ANOVAs. As moderating interactions between the motivational variables included in the study were also hypothesized, Model 1 of the PROCESS macro in SPSS (Hayes 2012) was used to test these assertions. This model demonstrates a standard moderating relationship in which one variable, variable M, moderates the relationship between two other variables, variables X and Y. During data analysis this model was used to determine if certain levels of motivational traits interacted in a buffering manner to influence leader identity.

After conducting the basic statistical analyses in SPSS, the compiled file of all survey responses at each time point was imported to R (version 4.0.2) to run structural equation modeling (SEM) analyses. Commonly used in psychological research (Martens and Haase 2006), SEM analyzes data to compare the relationships within a proposed theoretical model to other alternative models. The unique advantage of SEM is that it allows the testing of latent variables (i.e., unobservable, and intangible variables) (Martens and Haase 2006; Schumaker and Lomax 2016). Since all variables included in the study were latent, structural equation modeling was essential for the data analysis as it allows for the examination of these relationships in a causal manner (Ullman and Bentler 2013). By employing SEM, hypothesis testing among the variables of interest was conducted with the greatest validity possible (Schumaker and Lomax 2016).

The lavaan package was used for hypothesis testing in R (Rosseel 2012). This package was ideal for the proposed data analysis plan as it is designed to test structural relationships between latent psychological variables. As lavaan also has the ability to explore growth and development (Rosseel 2012) it was essential to examine the hypothesized relationships within the model developed in Chapter 2. To begin SEM, confirmatory factor analyses (CFA) were conducted to assess the validity of the factor structure of each quantitative measure (Schumaker and Lomax

2016). In this study, all measures were either single-factor measures (i.e., self-efficacy and perceived prototypicality) or have been previously and rigorously validated (i.e., goal orientation), except for The Leader Self-Identity Measure (Hiller 2005). As such, an ordinal CFA was conducted on this dependent variable to determine its factor structure. Next, as all data was collected using Likert-scale measures and was therefore ordinal in nature, robust ordinal structural equation modeling was utilized to most accurately test these relationships (Schumaker and Lomax 2016, p. 18). This allowed for the examination of the fit of the theoretical model against the data (Schumaker and Lomax 2016), thus providing empirical falsification of the model. These steps were repeated to assess the structural models within each data collection point of the study.

To assess change in leader identity, latent growth modeling (LGM) (Duncan and Duncan 2004; Preacher *et al.* 2008) was initially intended as the method of analysis due to its ability to determine quadratic change. Specifically, "some of the strengths of the LGM approach include an ability to test the adequacy of the hypothesized growth form, to incorporate both fixed and time varying covariates, to correct for measurement error in observed indicators, to incorporate growth on several constructs simultaneously, and to develop from the data common developmental trajectory, thus ruling out cohort effects" (Duncan and Duncan 2004, p. 4). Noting these strengths, LGM was selected to determine non-linear within-person change in leader identity throughout the programs.

However, due to the small sample size at Time 3, this method was not feasible for analysis because it requires large sample sizes for valid results. Therefore, cross-lagged panel analyses were selected for longitudinal analysis in the study because they are still able to determine longitudinal relationships between latent constructs over time, however, they do not require the large sample sizes of latent growth modeling (Little 2013, pp. 180-205). While this method disallowed the

analysis of quadratic or curvilinear growth, it still allowed for the examination of change in leader identity over time, without sample size drastically increasing statistical error, thus ensuring more accurate results. The specific steps of this method are detailed further in section 4.11.

3.7 Limitations and Methodological Issues

There are three primary limitations to this study. Firstly, data collection commenced just before the outbreak of the Covid-19 pandemic. As a result, both the timeline of the study and nature of the leadership development programs had to be adjusted. This means that while the first session for Organization A cohort one was delivered in-person, the remaining sessions were delayed and moved online. All other programs were also delivered virtually. While unable to be controlled, it is important to acknowledge that these changes could have introduced a variety of methodological issues within the study.

First, the change in learning format could have influenced participant's development as virtual and in-person learning have been shown to have differences in their outcomes (Noe, Wilk, *et al.* 2014). Second, participant's lives could have changed drastically because of Covid-19, rendering their identity as a leader null if they experienced a great increase in caretaking responsibilities or isolation. This may have introduced history and maturation effects into the study (Martens and Haase 2006; Park *et al.* 2020), which can increase bias and measurement error, skewing results. A final problem caused by the disruption of Covid-19 is that it was impossible to collect data on the exact interval for all cohorts. This means that the artefacts of time and recency effects could have influenced participant's responses and recollections (Davelaar *et al.* 2005).

The changes necessitated by Covid-19 were accounted for through the addition of three survey questions about the effects of Covid-19 on participant's transition to working from home

and change in caring responsibilities. These questions were introduced in survey one for all cohorts except cohort one in Organization A, where they were introduced in survey two. The responses to these questions were examined against each variable across time to explain any unexpected changes occurring during the study due to confounding influences. Interestingly, the questions concerning Covid-19 had no significant relationship with any of the variables of interest. Therefore, Covid-19 is not considered to be a major confounding variable within the study.

A second limitation, that exists within any longitudinal study, is that of attrition (Goodman and Blum 1996; Twisk and de Vente 2002). When participants withdraw from an ongoing longitudinal study before completion of the study it results in missing data. Missing data is particularly problematic when utilizing structural equation modeling as this method is highly sensitive to sample size and missingness (Duncan and Duncan 2004). However, a growing body of methodological research is focused on accounting for missing data and attrition in longitudinal research as well as finding solutions to this problem (Twisk and de Vente 2002; Twisk *et al.* 2013). Studies have analyzed the utility of multiple imputation and pairwise deletion as effective methods to replace missing data to best prepare it for SEM (Twisk and de Vente 2002). Researchers have concluded that both pairwise deletion and multiple imputation are acceptable for combatting attrition in longitudinal studies (Twisk and de Vente 2002; Twisk *et al.* 2013) as neither method results in large decreases in sample size. Based on the recommendations of Twisk *et al.* (2013) pairwise deletion was used to account for missing data in the structural equation analyses.

The final limitation of the study stems from using self-report measures to examine the variables of interest. Self-report measures are often criticized for various issues with construct validity. Critics of self-report measures focus on the operationalization of psychological constructs and question their validity due to potential contamination and deficiency in either the wording or

understanding of items (Chan 2009). However, as the phenomenon of interest is intrapersonal in nature and therefore necessitates the use of self-reports, steps were taken in the research design to counterbalance these potential confounds. Particularly, the utilization of previously validated questionnaires (Glasow 2005) and factorial invariance assessments (Little 2013) provided a buffer against common method bias as it allowed for the assessment of consistency across time, increasing the reliability and validity of the self-report measures.

3.8 Conclusion

Chapter 3 has outlined the theoretical and philosophical underpinnings that guided the research design. This chapter began by providing a general overview of the research process and how the research philosophy informed the research design. It then revisited the research questions and objectives, delineating each step in the methodology that aided in meeting these objectives. As informed by the positivist paradigm, a longitudinal, quantitative research design consisting of self-report surveys was selected to test the hypotheses. Participants in the leadership development programs of three organizations were given an online survey across three-waves of data collection. To explore both within and between-person change in leader identity overtime, the proposed analyses for the data are structural equation modeling and cross-lagged panel analyses. Finally, the limitations associated with the study were addressed. The following chapter details the findings of the study.

4. Findings

4.1 Introduction

It is hypothesized that motivational traits are integral to leader identity development (van Knippenberg *et al.* 2004). Upon entering an identity workspace, individual's unique combination of self-efficacy, goal orientation and perceived prototypicality will determine expectancy perceptions which result in instrumentality and valence to actively engage in identity work, culminating in differential levels of leader identity development. Particularly, it is hypothesized that greater levels of self-efficacy, learning orientation and perceived prototypicality will increase the motivation to engage in identity work as these traits will interact to create an expectancy within individuals that they are capable of successful development. This increased motivation will result in greater leader identity development for these participants as they will be more engaged in the identity work process. Conversely, those holding performance orientations, due to their increased reliance on social cues and extrinsic motivation (Day and Sin 2011), will have less leader identity development, as they will not experience a strong expectancy to engage in the identity work process without external support to stimulate valence toward this process. These traits should also interact to either increase leader identity development or moderate the negative effects of low levels of each variable.

The rest of the chapter will detail the statistical analyses and hypothesis testing undertaken to answer the research questions. For each time point of data collection, the results of the correlations, t-tests and ANOVAs will be presented for preliminary hypothesis testing. Next, the moderating interactions between the motivational variables will be assessed. Then, the results of the confirmatory factor analyses and model testing through ordinal structural equation modeling are delineated. Finally, the longitudinal structural equation analysis is presented to determine overall change in leader identity during the leadership development program.

4.2 Pre-Program Correlations

The following section displays the correlation matrix for the relevant variables for the first data collection point in the study in *Table 3*. More detailed descriptive statistics can be found in *Appendix B.* This data was collected before participants entered their leadership development programs to determine baseline levels of each variable. These tests were conducted after all data was cleaned and examined for multicollinearity issues and normal distribution.

It is important to highlight that perceived prototypicality only has 84 respondents for the first data collection point because it had not yet been identified as an essential variable in the model during the first data collection point for Organization A cohort one in December 2019. The reason for this is that perceived prototypicality was first conceptualized at the intrapersonal level after this time (Guillén 2021), with the previous relational conception not aligning with the level of leader identity examined in this study. Therefore, the results and relationships derived from perceived prototypicality should be interpreted with caution as with a smaller sample size than the rest of the variables, it is susceptible to greater standard error effects (Kang 2013).

Table 3: Correlation Matrix- Pre-Program

	Mean	SD	1	2	3	4	5	6	7
1. Gender	1.30 1 (Male) 2 (Female)	0.462	-						
2. Sector	1.36 1 (Public) 2 (Private)	0.482	-.367**	-					
3. Leader Identity	4.95	0.948	-.256**	.343**	(.917)				
4. Self-Efficacy	4.90	0.536	.019	.053	.189*	(.868)			
5. Perceived Prototypicality	3.83	0.723	-.096	.349**	.394**	.289**	(.841)		
6. Learning Orientation	5.67	0.666	.201*	-.217*	.056	.423**	.041	(.699)	
7. Performance Orientation	3.38	0.928	-.046	.093	.092	-.341**	.028	-.320**	(.844)

( )= reliabilities
*= p<.05
**=p<.01

The next section details independent samples t-tests, analysis of variance (ANOVAs) and moderation to better assess the relationships between the variables of interest at the pre-program data collection point.

4.3 Pre-Program T-Tests/ANOVAs/Moderation

4.3.1 T-Tests

As attrition was unable to be examined until the second data collection point in the study, no t-tests were conducted during the first phase of data analysis.

4.3.2 ANOVAs

The results of the ANOVAs further explained the correlation matrix. Self-efficacy was found to be a significant predictor of leader identity (F(19,89)=[1.908], p=.023), with those individuals reporting higher levels of self-efficacy also reporting stronger leader identities upon entry to a leadership development program. Perceived prototypicality displayed an even stronger relationship with leader identity, in that those with strong perceptions of their prototypicality held stronger leader identities (F(9,74)=[2.438], p=.017). Learning orientation did not have a significant effect on leader identity (F(17,91)=[8.060], p=.954), nor did performance orientation (F(37,71)=[1.020], p=.461).

4.3.3 Moderation

Specifically, it was proposed that self-efficacy and perceived prototypicality would individually offset the negative effects of performance orientation on leader identity. In addition, high levels of

perceived prototypicality should offset the detrimental effects of low self-efficacy on leader identity. The only significant interaction effect found was between performance orientation as the predictor, self-efficacy as the moderator and leader identity as the outcome variable (*b*=0.354, 95% CI [0.053, 0.655], *t*= 2.331, p=.022). As seen in *Figure 5*, this indicates that self-efficacy moderates the effects of performance orientation on leader identity to increase leader identity when self-efficacy is high rather than low. Despite the moderating effect of self-efficacy, perceived prototypicality did not moderate the relationship between performance orientation and leader identity or buffer against the effects of low self-efficacy on leader identity.

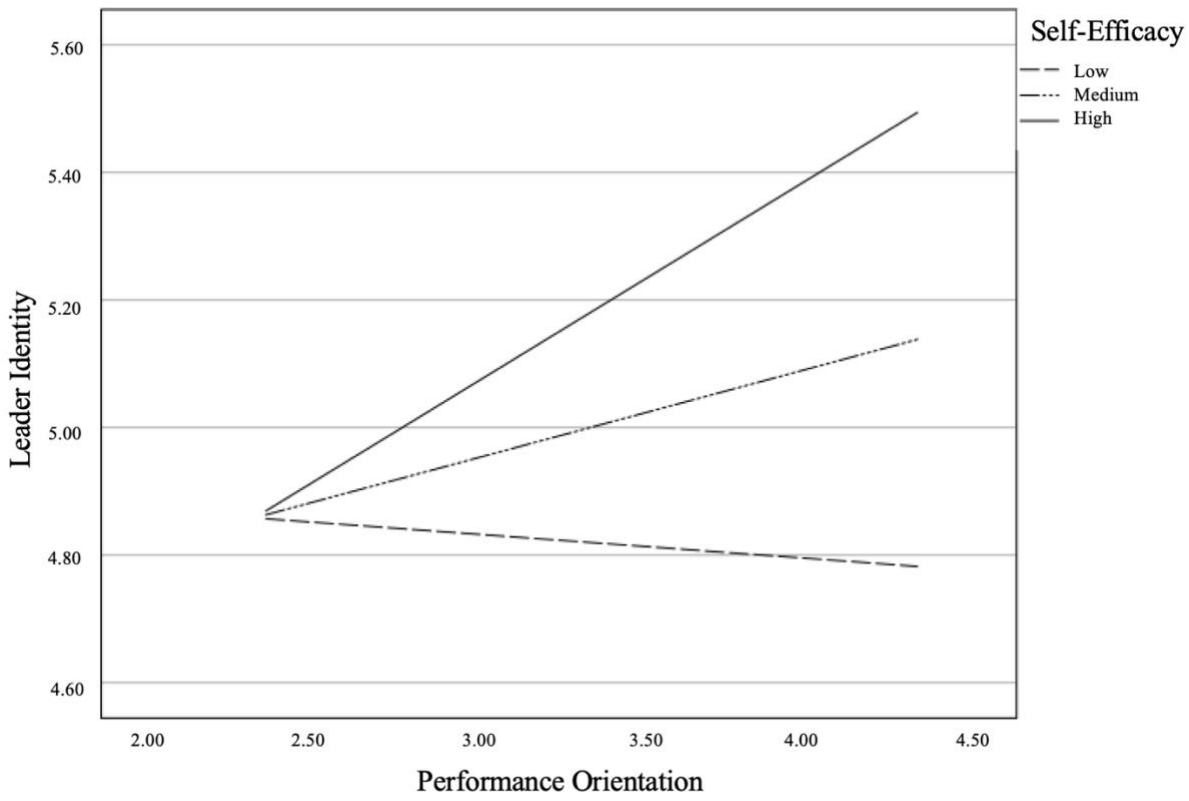


Figure 5: Pre-Program Moderation

The following section further details the interactions between the latent motivational variables and leader identity before commencement of the leadership development program. To

explain the predictive nature of motivational variables on leader identity, the best model fit for the data was able to be determined through the use of confirmatory factor analyses and robust, ordinal structural equation modeling.

4.4 Pre-Program Structural Equation Modeling

Structural equation modeling (SEM) was chosen as it allowed the testing of the structure of the latent variables in the proposed model (Schumaker and Lomax 2016). However, prior to conducting SEM, a confirmatory factor analysis (CFA) was employed to determine the correct factor structure of the leader identity measure. This is because this measure has been proposed and used as both a one and three-factor model (Hiller 2005), with no known empirical research exploring which factor structure is the most valid and reliable. Fit indices of the various models tested can be found in *Table 4*.

4.4.1 Confirmatory Factor Analysis

Table 4: Confirmatory Factor Analysis - Pre-Program

	Model 1 (Single Factor)	Model 2 (Original Three Factor)	Model 3 (Updated Three Factor)
Chi-square	577.97	522.10	206.10
CFI	.861	.875	.959
TLI	.830	.838	.947
RMSEA	.300	.292	.168
SRMR	.175	.153	.082

Interestingly, despite the single-factor model being the most commonly utilized in the literature (Day and Sin 2011; Miscenko and Day 2016; Kragt and Guenter 2018; Kwok *et al.* 2018; Middleton *et al.* 2019), this model had the poorest fit of all models tested. As such, the original

conception from Hiller (2005) was re-examined to find that this scale can also be used as a three-factor model of importance, certainty, and descriptiveness of one's leader identity. Importance refers to the degree that a leader identity is meaningful to an individual. The certainty factor of leader identity indicates how sure an individual is of this identity. Finally, descriptiveness refers to the degree that an individual feels that a leader identity defines them.

While this model (Model 2) had better fit than the global scale, the absolute fit indices were still poor. Therefore, an exploratory factor analysis (EFA) was conducted with orthogonal (varimax) rotation to maintain independence between factors while yielding a clearer output than a non-rotated EFA (Field 2013, p. 779). This aided in determining if another factor structure may be more appropriate for analysis. The results of the EFA displayed a new three-factor structure for the measure which made it necessary to return to the measure and item wordings to assess the content of the new factors. After re-examining the content of each item in the new factor structure to examine commonalities, this new structure was tested with a CFA, which reached acceptable fit levels for most fit indices as seen in Model 3.

The new three-factor structure still falls into the importance, certainty, and descriptiveness dimensions, however, unlike the original factor structure, these items are aggregated by item wording rather than the prompts used in the directions for the measure. It is argued that the item-wordings, rather than the directive prompts, indicate separate factors in the measure. For example, the declarative statement, "I am a leader" can be interpreted to denote certainty of self, despite following a directive prompt to participants to consider the importance of this statement to their self-understanding. For a visual comparison, the original three-factor structure can be found in *Table 5a* and the revised three-factor structure in *Table 5b.*

Table 5a: Original Three-Factor Model of Leader Identity

Importance	Certainty	Descriptiveness
I prefer being seen by others as a leader	I prefer being seen by others as a leader	I prefer being seen by others as a leader
If I had to describe myself to others, I would use the word "leader"	If I had to describe myself to others, I would use the word "leader"	If I had to describe myself to others, I would use the word "leader"
I am a leader	I am a leader	I am a leader
I see myself as a leader	I see myself as a leader	I see myself as a leader

Table 5b: Updated Three-Factor Model of Leader Identity

Importance	Certainty	Descriptiveness
I prefer being seen by others as a leader (originally descriptiveness dimension)	I am a leader (originally descriptiveness dimension)	If I had to describe myself to others, I would use the word "leader" (originally importance dimension)
I prefer being seen by others as a leader (originally certainty dimension)	I see myself as a leader (originally descriptiveness dimension)	If I had to describe myself to others, I would use the word "leader" (originally descriptiveness dimension)
I prefer being seen by others as a leader (originally importance dimension)	I am a leader (originally certainty dimension)	If I had to describe myself to others, I would use the word "leader" (originally certainty dimension)
I am a leader (originally importance dimension)	I see myself as a leader (originally certainty dimension)	
I see myself as a leader (originally importance dimension)		

It is acknowledged that the absolute fit indices of root-mean square error of approximation (RMSEA) and standardized RMR (SRMR) are not at ideal acceptable fit levels for any

confirmatory factor model. However, as the comparative fit index (CFI) and Tucker-Lewis Index (TLI) for Model 3 (the updated three-factor structure) are extremely well-fit and the RMSEA and SRMR are approaching acceptable levels, it is concluded that Model 3 is the best fit for the data. This is because the TLI and CFI are most utilized for factor analyses while the absolute fit index calculated by RMSEA and SRMR is best when comparing alternate latent models (Schumaker and Lomax 2016, pp. 114-115).

As a result of the discovery of the new factor structure for leader identity, the correlations were re-analyzed to include the newly emerged three factors of leader identity. The updated results can be seen below in *Table 6*.

Table 6: Revised Correlation Matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	1.30	0.462	-									
2. Sector	1.36	0.482	-.367**	-								
3. Leader Identity	4.95	0.948	-.256**	.343**	(.917)							
4. Self-Efficacy	4.90	0.536	.019	.053	.189*	(.868)						
5. Perceived Prototypicality	3.83	0.723	-.096	.349**	.394**	.289**	(.841)					
6. Learning Orientation	5.67	0.666	.201*	-.217*	.056	.423**	.041	(.699)				
7. Performance Orientation	3.38	0.928	-.046	.093	.092	-.341**	.028	-.320**	(.844)			
8. Leader Identity (Importance)	4.93	1.16	-.148	.219*	.884**	.079	.292**	-.002	.319**	(.917)		
9. Leader Identity (Certainty)	5.47	0.918	-.273**	.406**	.752**	.410**	.355**	.233*	-.273**	.475**	(.899)	
10. Leader Identity (Descriptiveness)	4.31	1.38	-.253**	.275**	.839**	.045	.349**	-.051	.046	.605**	.513**	(.871)

( )= reliabilities
*= p<.05
**=p<.01

The ANOVAs at Time 1 were also revisited to incorporate and determine the differences between the new leader identity factors. The results for each factor were somewhat different than the results for the global measure of leader identity. Despite significant correlations between perceived prototypicality, performance orientation and the importance factor of leader identity, there were no significant ANOVA outputs for this factor. This indicates that while these more externalized motivational traits tend to relate to levels of leader identity importance, there is no significant difference between groups holding strong, medium, and weak levels of importance of their leader identity.

This effect was also found in the certainty dimension of leader identity. It is interesting that perceived prototypicality and performance orientation were not significantly related to this dimension despite significant correlations. Closer inspection into the item wording of this factor highlights its internalized nature, theoretically supporting its empirical connections with the more internalized motivational variables of self-efficacy ($F(15,93)=[2.829]$, $p<.01$) and learning orientation ($F(15,93)=[1.804]$, $p=.045$) above the externalized variables of perceived prototypicality and performance orientation. It is also possible that there is little difference across groups in regard to this factor despite an overall trend, allowing the existence of a significant correlation, but disallowing the comparison across groups required for an ANOVA.

The final dimension of leader identity, the descriptiveness dimension, was only significantly related to perceived prototypicality ($F(17,66)=[2.087]$, $p=.018$). As this dimension relates to how one prefers to be seen by others, and perceived prototypicality relates to one's perception of their acceptance in their leader context, this finding is unsurprising. After revisiting the correlations, t-tests, and ANOVAs to analyze the updated factors in the leader identity model at Time 1, the moderation analysis was revisited.

The same interaction effects were tested, but on each individual factor of leader identity. Similar to the results for the global factor of leader identity, perceived prototypicality did not moderate either performance orientation or self-efficacy. While the relationship between performance orientation and the global factor of leader identity was moderated by self-efficacy, only the importance dimension displayed this significant interaction effect. As this effect was much stronger than the effect on the global factor of leader identity, (*b*= 0.456, 95% CI [0.105, 0.807], *t*= 2.57, p=.011), this result allows a clearer picture of this interactive effect. As seen in *Figure 6*, this finding indicates that self-efficacy offsets the negative impact of performance orientation specifically on the importance one places on their leader identity, rather than their certainty or its descriptiveness of themselves.

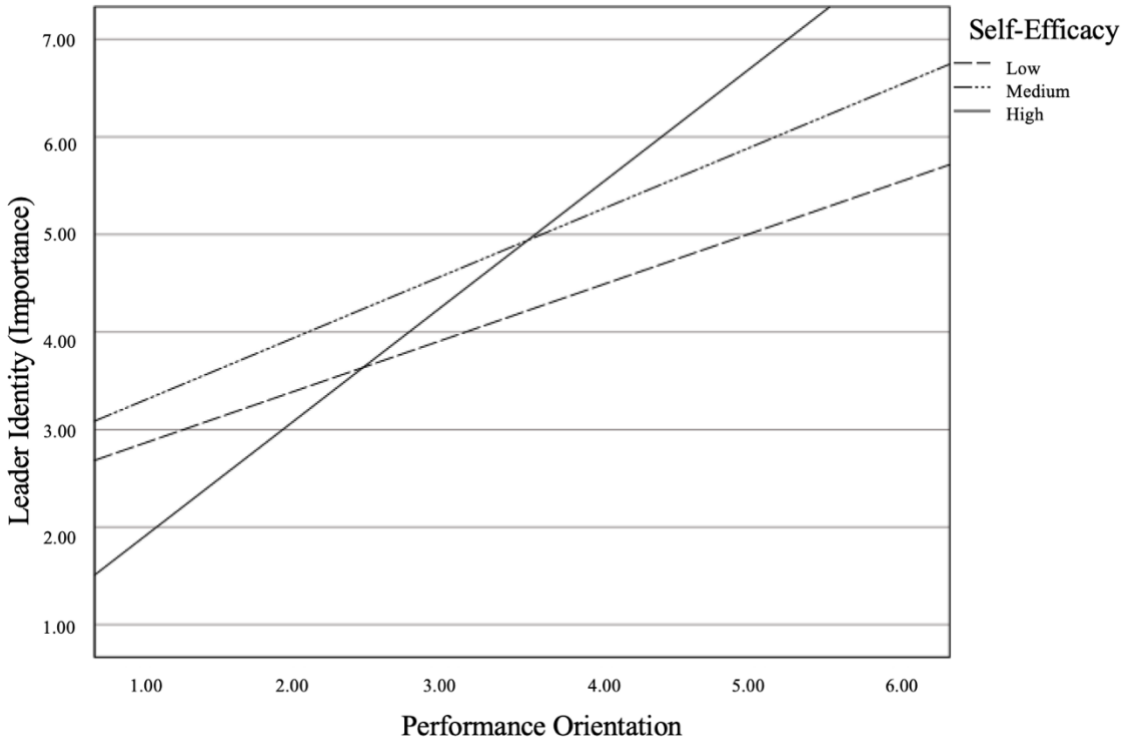


Figure 6: Pre-Program Moderation (Importance)

4.4.2 Structural Equation Modeling

After exploring the nature of each leader identity factor and following the CFA, robust, ordinal structural equation modeling was conducted as this method is best suited for Likert-scale ordinal variables (Schumaker and Lomax 2016). This analysis allowed for the testing of the interactive effects of motivational traits on leader identity. Four models were tested. Models 1 and 2 assessed the fit of the one-factor leader identity measure and Models 3 and 4 assessed the fit of the new three-factor measure. In acknowledging the diminished sample size of the perceived prototypicality variable, Models 2 and 4 did not include this variable. The independent and dependent variables for each model can be found in *Table 7*.

Table 7: Variables Included in SEM- Pre-Program

	Independent Variables	**Dependent Variable**
Model 1	Self-efficacy, Learning Orientation, Performance Orientation, Perceived Prototypicality	One-Factor Leader Identity
Model 2	Self-efficacy, Learning Orientation, Performance Orientation	One-Factor Leader Identity
Model 3	Self-efficacy, Learning Orientation, Performance Orientation, Perceived Prototypicality	Updated Three-Factor Leader Identity
Model 4	Self-efficacy, Learning Orientation, Performance Orientation	Updated Three-Factor Leader Identity

For the models with perceived prototypicality, pairwise deletion was used to handle missing data. This method was selected as it is the least likely to interfere with the overall sample size included in the model (Schumaker and Lomax 2016, p. 34), allowing the analysis of all variables. Due to the findings from (Twisk and de Vente 2002; Twisk *et al.* 2013) regarding insignificant magnitude of change in effect size when utilizing multiple imputation, pairwise deletion was selected as the method to address missingness. The fit indices of each model can be found in *Table 8*.

Table 8: Fit Indices of Structural Equation Models- Pre-Program

	Model 1	**Model 2**	**Model 3**	**Model 4**
Chi-square	1345.84	1251.39	920.96	814.99
CFI	.858	.853	.948	.948
TLI	.848	.843	.943	.943
RMSEA	.094	.102	.057	.061
SRMR	.132	.137	.093	.093

Model 1 relied on the single-factor leader identity measure and included perceived prototypicality. It displayed the highest chi-square (1345.84) and explained 20.3% of the variance in leader identity (R^2=.203). However, while it approached acceptable fit indices, it did not meet them. Therefore, this model was rejected as neither parsimonious nor a good fit of the latent variables. Model 2 also included the single-factor model of leader identity but without perceived prototypicality as a predictor. Although the chi-square of this model was lower (1251.39), the fit indices were further from acceptable, and it explained much less variance than Model 1 (10.1%, R^2=.101). This indicates that the single-factor model of leader identity, as indicated by the output of the CFA, is not a good fit to the data. The better fit scores in Model 1 compared with Model 2 highlight that despite the sample size problem with the perceived prototypicality variable, it is likely an important predictor of leader identity.

Models 3 and 4 used the updated three-factor model of leader identity as the outcome variable. These models had significantly lower chi-squares and met most fit indices. The CFI, TLI and RMSEA were in the acceptable range for a good-fitting structural equation model with the CFI and TLI approaching 0.95 and the RMSEA falling between .05 and .08 (Hu and Bentler 1999). The SRMR value was slightly high, but as it is nearing .08, it is concluded that both Models 3 and 4 meet acceptable criteria to explain the latent relationship between the motivational variables of interest and leader identity.

Each model also explained significant variance in leader identity. Model 3 had an r-square which explained 26%, 35% and 19% of the variance for the importance, certainty, and descriptiveness dimensions, respectively. The variance explained by Model 4 was slightly less than Model 3 with r-square being 19% for importance, 24% for certainty and only 4% for descriptiveness. The dramatic decrease in explanation of the descriptiveness factor in Model 4 indicates that perceived prototypicality is likely highly influential to this factor. Despite the increased variance explained in Model 3 and goodness of fit, as there is the potential for standard error effects from the pairwise deletion of perceived prototypicality, Model 4 is proposed as the best fit model to the data, as it is the most parsimonious. The visualization of Model 4 can be found in *Figure 7*.

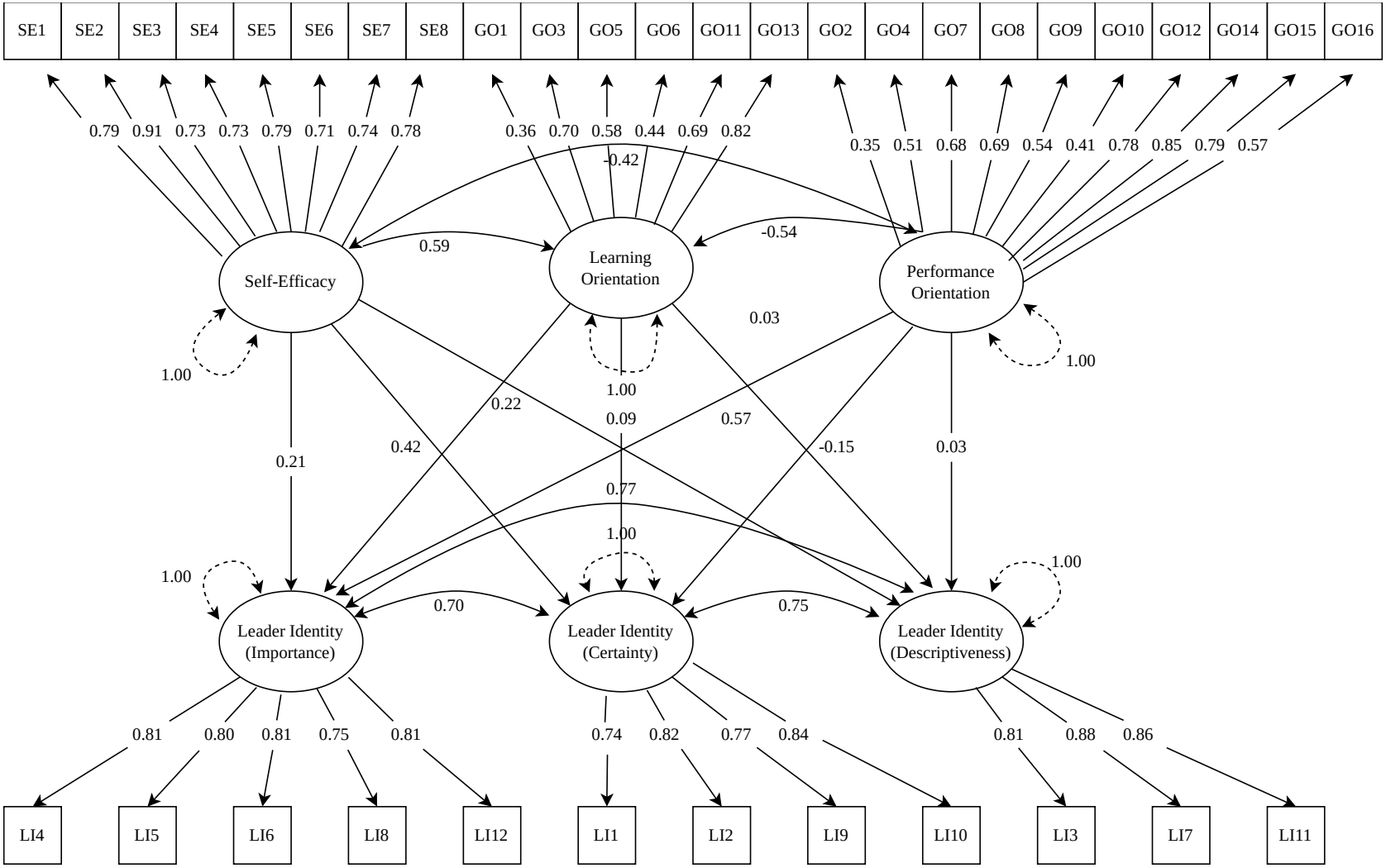


Figure 7: Pre-Program SEM (Model 4)

To summarize, before entering the leadership development program, it appears that self-efficacy and learning orientation singularly influence the certainty dimension of leader identity while perceived prototypicality is significantly related to the descriptiveness factor. The importance factor is not predicted by any of the motivational traits. There was also no evidence that performance orientation singularly affects leader identity.

Based on the results of the SEM, it appears self-efficacy, learning orientation and performance orientation interact to influence leader identity. This effect is particularly strong for the certainty dimension of leader identity, preliminarily indicating that it is strongly influenced by motivation. However, due to the nature of the sample for perceived prototypicality, conclusions could not be drawn about its influence on leader identity in the structural model. The next section details the results of data collection occurring at the mid-point of the programs.

4.5 Mid-Program Correlations

This section details the correlations at the second wave of data collection. This phase occurred during the mid-point of the leadership development programs. All correlations can be found in *Table 9*.

Table 9: Correlation Matrix- Mid-Program

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	1.35	0.480	-									
2. Sector	1.34	0.476	-.122	-								
3. Leader Identity	5.02	0.973	-.003	.334**	(.905)							
4. Self-Efficacy	4.91	0.584	-.057	.087	.365**	(.865)						
5. Perceived Prototypicality	3.76	0.860	.027	.449**	.354**	.291*	(.867)					
6. Learning Orientation	5.03	1.24	-.198	.362**	.058	.289	.530	(.740)				
7. Performance Orientation	3.56	0.912	.147	-.184	-.038	-.357**	-.008	-.354**	(.886)			
8. Leader Identity (Importance)	4.96	1.23	.053	.250*	.894**	.209	.293*	-.072	.136	(.921)		
9. Leader Identity (Certainty)	5.58	0.885	-.055	.455**	.731**	.512**	.405**	.253*	-.371**	.477**	(.880)	
10. Leader Identity (Descriptiveness)	4.38	1.43	-.044	.170	.831**	.271*	.211	.052	-.007	.598**	.486**	(.864)

reliabilities ( )
*p<.05
**=p<.01

4.6 Mid-Program T-Tests/ANOVAs/Moderation

After analyzing the correlations of the sample at Time 2, independent samples t-tests, ANOVAs and moderation analyses were conducted to further analyze the sample.

4.6.1 T-Tests

At the study mid-point, independent samples t-tests were utilized to assess the effects of attrition. As attrition is a problem in all longitudinal research (Twisk and de Vente 2002), an independent samples t-test was conducted with the pre-program data to uncover any differences between participants who left the study before the mid-point and those who remained. Using the data file from Time 1, participants who remained in the study were dummy coded as '1' and those who left the study were dummy coded as '2'. Then, the independent samples t-test was conducted with attrition as the independent variable and all other variables as the dependent variables. There were no significant differences in any variable between the two groups. This indicates that significant results and changes in the statistical analyses are not a function of attrition at this point in the study.

4.6.2 ANOVAs

Like Time 1, ANOVAs were conducted to further explore the relationships between the independent motivational variables and the dependent variables, the leader identity factors. Like the pre-program results, the importance dimension of one's leader identity was not related to any motivational variable. The certainty dimension of leader identity held more significant relationships than the importance dimension, however, these were slightly different than at Time 1. Despite self-efficacy and learning orientation being the only variables significantly related to certainty at Time 1, self-efficacy ($F(13,62)=[4.838]$, $p<.01$), perceived prototypicality

(F(13,62)=[2.562], p=.007) and performance orientation (F(12,62)=[2.079], p=.032) were all significantly related to certainty at Time 2. This may indicate an externalization of one's leader identity over time, as this factor showed increasing significance with the more externally valued variables. The descriptiveness dimension was only significantly related to self-efficacy at Time 2 (F(18,57)=[1.813], p=.046). This is a shift from Time 1, where this dimension was only related to perceived prototypicality. Overall, these findings provide preliminary support to the changing nature of the relationships between motivation and leader identity over time.

Finally, in order to determine the preliminary connection between leader identity pre-program to mid-program, an ANOVA was run to test this relationship for each leader identity factor. It appears that leader identity before program commencement was predictive of leader identity at the program mid-point for every factor (importance, (F(20,56)=[9.357], p<.001), certainty (F(15,61)=[4.966], p<.001) and descriptiveness (F(17,59)=[2.833], p=.002)). This finding indicates that leader identity did significantly and positively change between entrance to a leadership development program and its mid-point. This relationship was especially strong for the importance factor of leader identity, displaying the largest relationship of all factors. This is interesting as this factor was not related to the motivational variables, indicating that another process is likely influencing the importance one places on their leader identity.

4.6.3 Moderation

The same moderation analyses were employed utilizing Model 1 of the PROCESS macro (Hayes 2012) to explore interactive effects at the program mid-point. Identical to the pre-program findings, perceived prototypicality did not moderate either performance orientation or self-efficacy for the subfactors of leader identity. However, despite a significant interactive effect between

performance orientation, self-efficacy and the importance dimension pre-program, these effects disappeared at the program mid-point. No moderating effects were found between performance orientation and self-efficacy during this data collection phase. This is likely due to the lack of significant interactive relationships between leader identity and performance orientation, further indicating that one's approach to developmental settings and identity workspaces is not influential for leader identity development.

4.7 Mid-Program Structural Equation Modeling

The relationships between the latent variables were further tested by employing confirmatory factor analysis and robust, ordinal structural equation modeling. This allowed the exploration of the effects of motivational characteristics on leader identity at Time 2.

4.7.1 Confirmatory Factor Analysis

To assess potential change over time within the leader identity measurement, this phase of data analysis once again began with a CFA. Like Time 1, the global model, the three-factor model proposed by Hiller (2005) and the three-factor model uncovered during Time 1 data analysis of this study were all tested. Fit indices for each model can be found in *Table 10*.

Table 10: Confirmatory Factor Analysis- Mid-Program

	Model 1 (Single Factor)	Model 2 (Original Three Factor)	Model 3 (Updated Three Factor)
Chi-square	512.62	436.95	243.12
CFI	.905	.920	.960
TLI	.884	.897	.949
RMSEA	.334	.318	.224
SRMR	.224	.181	.109

Replicating the results from Time 1, the best fit factor model at Time 2 was also the updated three-factor model. This finding lends support to factorial invariance across measurement points (Little 2013), as well as supporting the newly proposed factor structure of the Leader Self-Identity measure (Hiller 2005), which focuses more on item-wording than prompt-wording to determine its measurement validity. The results from the CFA at Time 2, like Time 1, call for a re-examination of this commonly utilized measure.

While the CFI and TLI for Model 3 reach acceptable fit criteria, the RMSEA and SRMR are not at the acceptable fit level for most models. However, as this model was utilized as a confirmatory factor analysis, TLI and CFI are better measures of fit than the absolute measures of SRMR and RMSEA, therefore, Model 3 is accepted as a good fit to the measurement data.

4.7.2 Structural Equation Modeling

Once again, robust ordinal structural equation models were used to test the validity of the proposed model at the program mid-point. However, these models were slightly different than the models at Time 1. In Time 1, perceived prototypicality was missing a large portion of the sample and was therefore excluded from analysis in two models. However, as this was not a problem at Time 2, perceived prototypicality was included in all models. Additionally, as the global factor scale of leader identity was rejected at Time 1 and during the CFA at Time 2, only the updated three-factor model was tested. Three models were tested to examine the best fit to the data at Time 2. A summary of the three models can be found in *Table 11* and fit indices for each of the three models can be found in *Table 12*.

Table 11: Variables Included in SEM- Mid-Program

	Independent Variables	Dependent Variable
Model 1	Self-efficacy, Learning Orientation, Performance Orientation, Perceived Prototypicality	Updated Three-Factor Leader Identity
Model 2	Self-efficacy, Perceived Prototypicality, Performance Orientation	Updated Three-Factor Leader Identity
Model 3	Self-efficacy, Perceived Prototypicality	Updated Three-Factor Leader Identity

Table 12: Fit Indices of Structural Equation Models- Mid-Program

	Model 1	Model 2	Model 3
Chi-square	1079.74	771.70	355.73
CFI	.934	.941	.974
TLI	.928	.935	.970
RMSEA	.088	.089	.090
SRMR	.127	.120	.091

Model 1 used the updated three-factor model of leader identity as the dependent variable and all motivational variables as the independent variables. It had the largest chi-square (1079.74) and explained 22.3% of the variance in importance, 45.5% of the variance in certainty and 16.5% of the variance in descriptiveness. While Model 1 was approaching acceptable fit levels, the extremely high SRMR called the model fit into question and therefore was rejected.

Model 2 removed learning orientation from the predictor variables due to its lack of statistical significance in previous analyses. While the chi-square for this model was much lower (771.70), the fit indices were only marginally stronger, indicating that Model 2 was also not an

ideal fit to the data. Model 2 also explained slightly less variance in leader identity with r-square percentages of 20% for importance, 46% for certainty and 16% for descriptiveness.

Finally, Model 3 removed both goal orientation factors (performance and learning orientation) from the predictor variables of the updated three-factor model of leader identity. While Model 3 explained the least variance in leader identity, explaining 15.1% of importance, 40% of certainty and 13.7% of descriptiveness, this model was accepted as the best fit model to the data at the mid-program point. It had the lowest chi-square (355.73), exceeded minimum acceptable levels of fit for CFI and TLI and was closely approaching acceptable fit for the absolute indices of SRMR and RMSEA. Model 3 was also the most parsimonious, only using self-efficacy and perceived prototypicality as predictors. Therefore, Model 3, with an interaction of self-efficacy and perceived prototypicality predicting leader identity, is accepted as the best fit model at Time 2. Model 3 is displayed visually in *Figure 8*.

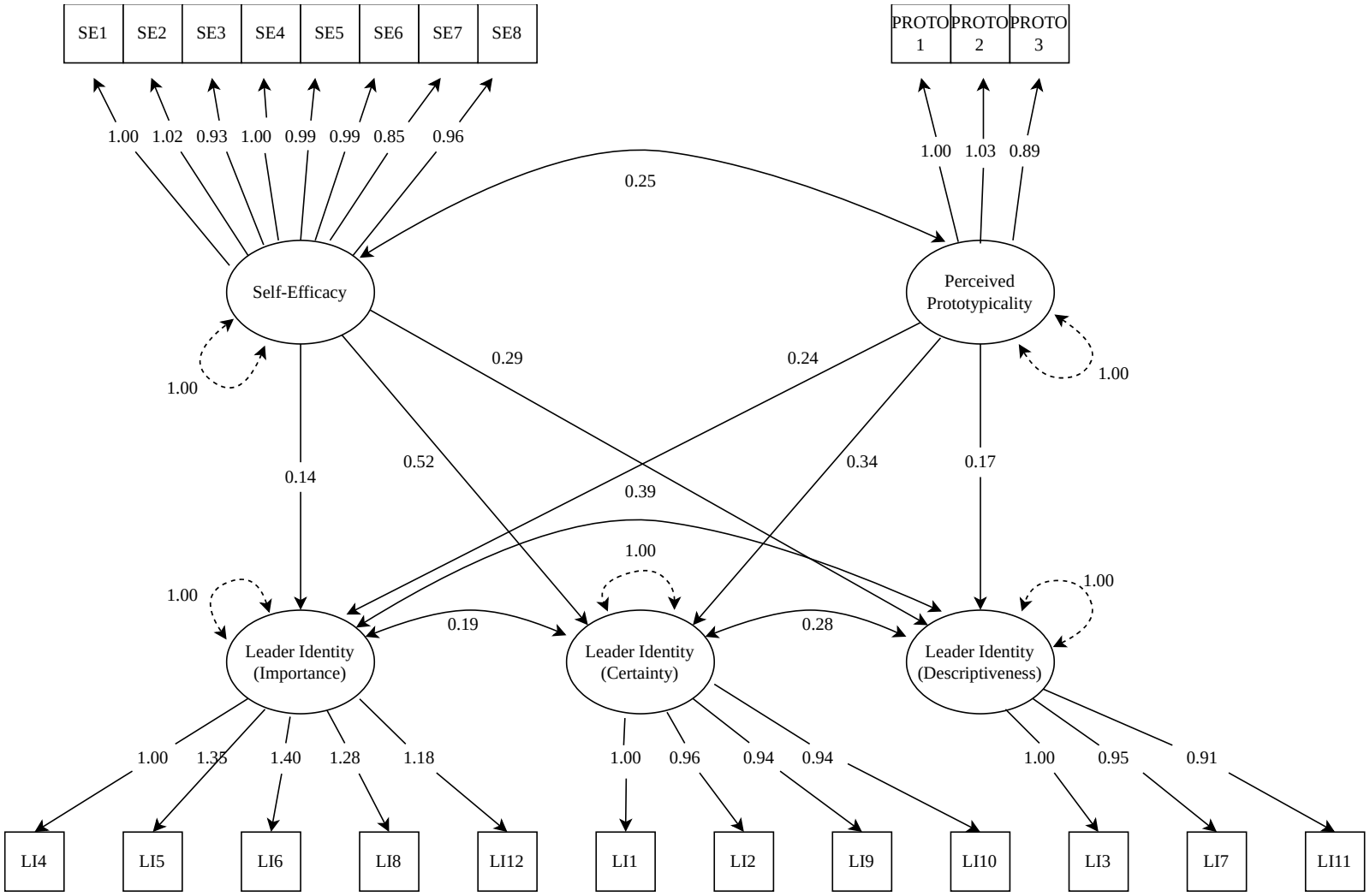


Figure 8: Mid-Program SEM (Model 3)

In summary, at the mid-point of data collection, self-efficacy was positively related to the certainty and descriptiveness factors of leader identity while perceived prototypicality and performance orientation predicted the certainty of one's leader identity. Learning orientation did not significantly predict leader identity. Again, the importance one places on their leader identity was not predicted by the motivational traits.

The SEM concludes that self-efficacy and perceived prototypicality interact to influence levels of leader identity in the sample. This differs from Time 1, when perceived prototypicality was unable to be tested due to missing responses, causing it to be excluded from the accepted model. This lends additional evidence to the previous statistical findings that self-efficacy and perceived prototypicality are strongly related to leader identity and are particularly suited to explain the certainty one has of this identity. The next section details the results of analysis at the third and final point of data collection.

4.8 Post-Program Correlations

The following section delineates the correlations at the final point of data collection, which took place at the end of the leadership development programs. The correlation matrix can be found in *Table 13*.

Table 13: Correlation Matrix- Post-Program

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Gender	1.32	0.474	-									
2. Sector	1.36	0.485	-.366**	-								
3. Leader Identity	5.22	0.847	-.208	.321*	(.909)							
4. Self-Efficacy	5.05	0.464	.054	.095	.344*	(.868)						
5. Perceived Prototypicality	3.85	0.793	-.129	.450**	.641**	.195	(.999)					
6. Learning Orientation	5.72	0.671	.046	-.056	.221	.556**	.138	(.796)				
7. Performance Orientation	3.35	0.895	.060	-.001	-.026	-.302*	-.025	-.362**	(.825)			
8. Leader Identity (Importance)	5.22	1.04	-.149	.225	.884**	.186	.503**	.260	.072	(.907)		
9. Leader Identity (Certainty)	5.69	0.776	-.224	.501**	.843**	.468**	.605**	.266*	-.209	.635**	(.822)	
10. Leader Identity (Descriptiveness)	4.58	1.23	-.173	.145	.792**	.291*	.544**	.017	.003	.486**	.583**	(.835)

( ) = reliabilities
*= p<.05
**=p<.01

4.9 Post-Program T-Tests/ANOVAs/Moderation

The next section details the results of the independent samples t-tests, ANOVAs, and moderation at the post-program data collection point.

4.9.1 T-Tests

Independent samples t-tests were conducted at the final data collection point to determine attrition effects. The same procedures from Time 2 were used to code a dummy variable for attrition from mid-program to post-program. Again, no differences were found between those participants who left the study and those who remained. This indicates that there were no distinct characteristics that defined either the remaining participants or those who left the study. Therefore, it is concluded that attrition effects have not influenced the results of the study.

4.9.2 ANOVAs

ANOVAs were again conducted at Time 3 to determine the relationships between the independent motivational variables of self-efficacy, learning orientation, performance orientation and perceived prototypicality, and the dependent variables of leader identity factors. Each dimension of leader identity was compared to the motivational variables of interest at Time 3. The importance dimension was significantly related to perceived prototypicality at Time 3 (F(17,37)=[1.096], p=.007), further supporting the influential nature of perceived prototypicality on one's leader identity. Self-efficacy (F(13,41)=[2.003], p=.046) and perceived prototypicality (F(13,41)=[2.796], p=.006) were each related to the certainty dimension of leader identity at Time 3. Finally, the descriptiveness factor related significantly to self-efficacy (F(15,39)=[2.194], p=.025) and perceived prototypicality (F(15,39)=[3.360], p=.001). There were more significant

relationships between the leader identity factors and motivational variables at the final time point than previous time points, indicating an increasing connection between motivation and leader identity. These findings support the overall conclusion that self-efficacy and perceived prototypicality are the most predictive of leader identity.

Finally, in order to determine if there was significant change in leader identity from mid-program to post-program, an ANOVA was conducted using the leader identity factors at the mid-point as the independent variable and leader identity factors at the final point as the dependent variable. The ANOVA results were significant (importance, ($F(19,35)=[3.979]$, $p<.001$), certainty, ($F(13,41)=[2.961]$, $p=.004$) and descriptiveness, ($F(17,37)=[2.722]$, $p=.004$)). However, this result was slightly weaker for each factor than the pre to mid-program growth. This may be evidence of a plateauing effect in development. This effect has been found in previous research (Kwok *et al.* 2020) and may be evidence of the lengthy timespan required for leader identity development (Day and Dragoni 2015; Clapp-Smith *et al.* 2019) or the effect of challenge on developmental trajectories (Lord and Hall 2005), which were not possible to examine in this study.

4.9.3 Moderation

The same procedures were employed as in previous time points utilizing Model 1 of the PROCESS macro (Hayes 2012) to explore moderating relationships at the program end. In line with the previous results, perceived prototypicality did not significantly interact with either performance orientation or self-efficacy for any aspect of leader identity. Like the mid-point findings, there were no significant interactive effects between performance orientation, self-efficacy, and leader identity. The next step in the analysis at Time 3 was to test the relationships between the latent variables through confirmatory factor analysis and robust, ordinal structural equation modeling.

This aided in determining the efficacy of the theoretical model at the end of the leadership development programs.

4.10 Post-Program Structural Equation Modeling

The same procedure used at pre- and mid-program data analysis points was again employed at the post-program point. At Time 3 the sample size was N=55. It is acknowledged that this sample size is quite small and may influence the validity of these results. However, there is still a large debate on the adequate sample size for SEM, with scholars arguing for Monte Carlo simulations, the 20:1 rule, the 10:1 rule, a priori power analyses and a myriad of other sampling techniques to ensure validity (Wolf *et al.* 2013; Kock and Hadaya 2018; Kyriazos 2018). Since there is no agreed upon way to determine sample size for SEM and because the sample size for Time 3 meets the 10:1 rule (e.g., there should be ten respondents for every latent variable analyzed), SEM was run at Time 3. However, it is highlighted that all results should be interpreted with caution.

4.10.1 Confirmatory Factor Analysis

The three potential factor models of leader identity were tested using confirmatory factor analysis. Model 1 is the global factor structure for the (Hiller 2005) Leader Self-Identity measure, Model 2 is the originally proposed three-factor model and Model 3 is the updated three-factor model, uncovered during pre-program analysis. Fit indices for each model can be viewed in *Table 14.*

Table 14: Confirmatory Factor Analysis- Post-Program

	Model 1 (Single Factor)	Model 2 (Original Three Factor)	Model 3 (Updated Three Factor)
Chi-square	442.34	292.44	220.87
CFI	.845	.904	.932
TLI	.810	.875	.912
RMSEA	.365	.296	.248
SRMR	.193	.156	.137

Again, the updated three-factor model (Model 3) was the best fit. The reliability across time of the updated three-factor model necessitates a review of the validity and structure of the original Leader Self-Identity measure (Hiller 2005). It is noted that while the CFI and TLI are decent fits, the RMSEA and SRMR are not at acceptable fit levels. However, due to the different nature of these fit indices and the small sample size, Model 3 is still accepted as the best fit to the data.

4.10.2 Structural Equation Modeling

Robust, ordinal structural equation models were conducted to test the fit of the theoretical model at Time 3. The models tested at the post-program point were the same as the mid-program point. A summary of the content of each model can be seen in *Table 15*. The fit indices for each of the three models can be found in *Table 16*.

Table 15: Variables Included in SEM- Post-Program

	Independent Variables	Dependent Variable
Model 1	Self-efficacy, Learning Orientation, Performance Orientation, Perceived Prototypicality	Updated Three-Factor Leader Identity
Model 2	Self-efficacy, Perceived Prototypicality, Performance Orientation	Updated Three-Factor Leader Identity
Model 3	Self-efficacy, Perceived Prototypicality	Updated Three-Factor Leader Identity

Table 16: Fit Indices of Structural Equation Models- Post-Program

	Model 1	Model 2	Model 3
Chi-square	966.43	728.76	384.43
CFI	.903	.908	.939
TLI	.894	.899	.929
RMSEA	.088	.098	.118
SRMR	.136	.139	.120

Model 1 explained 32.3% of the variance in the importance dimension, 56.1% of the variance in certainty and 65.7% of the variance in descriptiveness. Despite its explanatory power, this model had the greatest chi-square (966.43) and was the weakest fit, so was therefore rejected as a good fit to the latent variables. Due to the lack of evidence for a statistically significant relationship in the previous analyses between learning orientation and leader identity, learning orientation was removed from Model 2. This model explained 29% of the variance for importance, 54% of certainty and 50% of descriptiveness. The outputs for this model had a much lower chi-square than Model 1, however, the fit indices were only mildly improved from Model 1. This

indicates that Model 2 is not a good fit to the data, and it was rejected as well. Model 3 removed both learning and performance orientation from the analysis due to the lack of an influential relationship between these variables and leader identity. Using only self-efficacy and perceived prototypicality as predictors, Model 3 had the lowest chi-square. It also maintained its high explanatory power, with variances of 27.5% for importance, 53.5% for certainty and 47.5% for descriptiveness. It is interesting to note that the certainty dimension of leader identity was the most strongly explained by motivational variables throughout the entire study and that this variance increased over time. This model also had much better fit indices than either Model 1 or Model 2. However, the absolute fit indices are still slightly above the largely agreed upon acceptable levels of fit (Schumaker and Lomax 2016, p. 112). Due to the influence of the small sample size at Time 3 analysis, this model is still accepted as valid, due to theoretical guidance and the results from the previously significant statistical analyses. Model 3 can be seen in *Figure 9*.

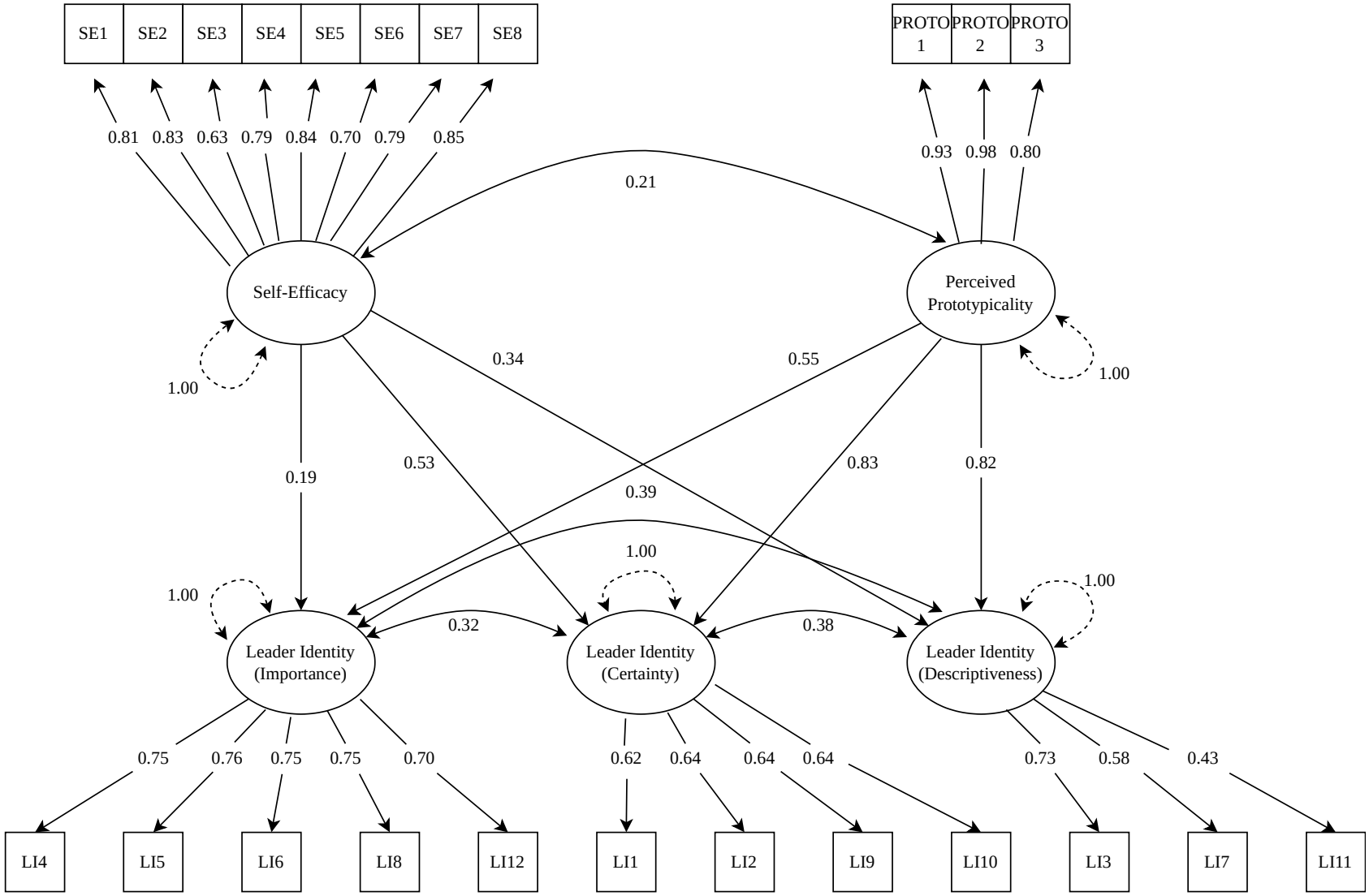


Figure 9: Post-Program SEM (Model 3)

In summary, after analyzing the data at the final data collection point, it appears that self-efficacy is significantly related to certainty and descriptiveness of one's leader identity. At Time 3, there was no evidence that learning or performance orientation are related to leader identity, further indicating that one's approach to a developmental setting is not predictive of leader identity. The final motivational variable, perceived prototypicality, was strongly significantly related to each leader identity factor, highlighting its predictive relationship to leader identity.

In relation to the SEM, only self-efficacy and perceived prototypicality appear to interact to predict the latent three-factor structure of leader identity, indicating an important interaction effect of motivational variables in predicting leader identity. This interaction is particularly predictive of the certainty one has of their leader identity, with the largest r-square existing at the post-program data collection point. The potential validity issues with SEM at Time 3 resulting from the decreased sample size should be acknowledged. The following section explains the factorial invariance and cross-lagged panel analyses to uncover the temporal nature of leader identity development.

4.11 Longitudinal Structural Equation Modeling

After analyzing the data from the individual time points, the longitudinal effects of the study were examined. All longitudinal data collection relies heavily on consistency in time across data collection points (Little 2013). Without consistency between measurement points, it is possible that a researcher is capturing unequal points in development or spurious growth effects (Little 2013, p. 186). Factorial invariance is used to determine the consistency of a measured latent variable over time, with factorially invariant models showing little change across measurement points. The goal of this analysis is to ensure consistency in a measure across time (i.e., construct

and measurement validity) (Little 2013, pp. 137-160). The following section reports results from the factorial invariance testing undertaken before the cross-lagged panel analyses. Then, the results of the cross-lagged panel analyses are reported.

4.11.1 Factorial Invariance Testing

First, the global measure of leader identity that is typically used in leader identity development research was tested. Like previous analyses using the global scale, the fit was very poor, indicating little consistency across measurement points. The model fit for the invariance model of the global scale can be found in *Table 17*. Due to the extremely poor fit, the global model was again rejected, and the updated three-factor model of leader identity was relied upon for further testing. Each factor of the updated three-factor model of leader identity was then tested individually for factorial invariance because each factor is latently representing a unique part of one's perception of themselves as leaders, (importance, certainty, and descriptiveness).

Table 17: Factorial Invariance for Leader Identity

	Model 1 (Importance)	**Model 2 (Certainty)**	**Model 3 (Descriptiveness)**	**Model 4 (Global Scale)**
Chi-square	215.78	906.47	426.76	1907.67
CFI	.871	.760	1.00	.544
TLI	.826	.641	1.01	.494
RMSEA	.127	.205	.000	.147
SRMR	.121	.137	.053	.163

As Model 1 for the importance factor was approaching acceptable fit indices, particularly for the comparative fit indexes, it is concluded that weak invariance is achieved, and that the importance factor can be reliably analyzed in the cross-lagged panel analyses. Regarding the certainty factor of leader identity, Model 2 shows support for partial invariance. While Model 2

does not appear to meet ideal fit indices, further exploration into the results show that one item ("I prefer being seen by others as a leader"- originally descriptiveness dimension) appears to strongly influence and skew the model fit overall, particularly from mid to post-program points. To test this assumption, this item was removed and retested for factorial invariance. The modified model showed much better fit to standardized fit indices with the CFI and TLI increasing to .908 and .862 respectively. However, per the recommendation of Little (2013, p. 159), the misfitting item was kept in Model 2 because it is possible that the interpretation of this item changed for respondents, potentially indicating that the way individuals prefer to be viewed as leaders changes overtime. Finally, Model 3 for the descriptiveness factor of leader identity displayed an almost perfect fit. This indicates that the meaning of these items did not change throughout measurement and therefore the reliability of this factor is consistent over time.

After determining the invariance of the leader identity factors, the invariance of the motivational variables was explored. Largely, the results reflected the outcomes throughout the study- self-efficacy and perceived prototypicality displayed better fit and more reliability than either performance or learning orientation. Both goal orientation factors were approaching acceptable fit levels but fell short. This indicates either measurement error or that the interpretation and nature of these constructs changed over time (Little 2013). Self-efficacy had stronger invariance, with the fit indices just short of acceptable levels. Finally, perceived prototypicality reported the best fit and consistency over time. The fit indices of each motivational variable can be found below in *Table 18*.

Table 18: Factorial Invariance of Motivational Variables

	Self-Efficacy	Perceived Prototypicality	Learning Orientation	Performance Orientation
Chi-square	433.10	30.05	733.32	738.59
CFI	.816	.992	.756	.697
TLI	.783	.984	.691	.656
RMSEA	.088	.074	.104	.092
SRMR	.110	.043	.113	.130

The next section explores the longitudinal relationships between the motivational independent variables and the dependent variable of leader identity throughout the study.

4.11.2 Cross-lagged Panel Analysis- Importance Factor of Leader Identity

The first factor in the updated leader identity factor structure describes how important one's leader identity is to themselves. This factor was analyzed with each of the motivational variables to determine longitudinal effects.

Beginning with self-efficacy, the cross-lagged panel analysis showed that there is a longitudinal relationship between the importance dimension of leader identity and self-efficacy, but that this relationship becomes weaker over time. The fit indices of the relationship between these variables are stronger from pre-program to mid-program than from mid-program to post-program. It is interesting that while self-efficacy did not directly predict the importance of one's leader identity during any of the cross-sectional data points it did display a significant relationship longitudinally.

Despite the weak factorial invariance for learning and performance orientation, they were still analyzed within a cross-lagged panel model. This is because there were large mean changes in the sample across time of these variables, indicating that the construct may have evolved over time, resulting in weak factorial invariance, yet still being prudent for examination (Little 2013, p.

159). The fit indices for learning orientation are moderately acceptable across time points. However, like self-efficacy, this relationship appears to weaken over time. Due to the small sample size, it is impossible to conclusively assert whether this is an effect of attrition on the analysis or a naturally occurring phenomenon in the sample. Performance orientation displays a similar pattern of a weakening affect over time with worse fit indices than learning orientation.

The results for perceived prototypicality show the opposite relationship as the previous variables. It appears that the relationship between the importance dimension and perceived prototypicality grows stronger, with larger fit indices from mid-program to post-program than from pre-program to mid-program. The fit indices from Time 1 to Time 2 are extremely poor. However, the missing data for this variable at the pre-program point is likely the cause, as missing data strongly effects the outputs of SEM (Twisk and de Vente 2002; Kang 2013). Fit indices for each variable can be found in *Table 19*.

Table 19: Fit Indices for Cross Lagged Panel Analysis of Importance Dimension of Leader Identity

T1-T2	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	473.57	441.94	341.20	689.14
CFI	.888	.787	.879	.825
TLI	.876	.739	.863	.809
RMSEA	.075	.179	.079	.082
SRMR	.091	4.17	.104	.132
T2-T3	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	502.65	193.99	364.83	786.51
CFI	.829	.946	.831	.712
TLI	.811	.934	.808	.686
RMSEA	.096	.112	.101	.112
SRMR	.181	.166	.148	.157

Overall, the cross-lagged panel analyses for the importance factor in the updated leader identity model lend some credence to the proposition that motivational variables affect leader identity development across time. However, the data follows similar patterns to the previous statistical analyses in that the goal orientation factors are weakly if not entirely insignificantly related to leader identity. Self-efficacy appears to have the strongest relationship with the importance factor of leader identity over time. While perceived prototypicality is likely related to leader identity development, the missing data at Time 1 resulted in poor model fit, disallowing the drawing of a firm conclusion.

4.11.3 Cross-lagged Panel Analysis- Certainty Factor of Leader Identity

Certainty is the second factor in the updated leader identity factor structure. This dimension identifies how sure an individual is of their leader identity. The same procedures as the importance dimension were used for the cross-lagged panel analysis.

Self-efficacy neared acceptable fit indices from Time 1 to Time 2, displaying some support of the longitudinal relationship between self-efficacy and leader identity. However, this relationship again showed a similar pattern of a diminishing relationship in the later time points, resulting in a poor fit from Time 2 to Time 3. Interestingly, across all time points, the relationship between self-efficacy and the certainty dimension was weaker than the relationship between the importance dimension and self-efficacy. This is particularly of note because self-efficacy was most strongly correlated with the certainty dimension throughout the study. However, it appears that despite the cross-sectional strength of this relationship, the longitudinal relationship is weaker. A potential explanation for this effect may be the partial factorial invariance of the certainty factor of leader identity. This partial factorial invariance indicates that some items within this dimension

may have experienced different interpretations throughout the study. While it was prudent to retain the misfit item, the worse model fit indices for the certainty factor may explain the worse fit indices in this cross-lagged panel analysis.

Learning and performance orientation displayed a similar pattern to self-efficacy in this analysis. Both variables decreased in the strength of their relationship from mid-program to post-program when compared to pre-program and mid-program. Also, both learning and performance orientation displayed moderate to poor fit indices for all time points when analyzed with the certainty dimension rather than the importance dimension, not meeting any acceptable fit levels. However, this again is likely due to the partial factorial invariance of the certainty dimension.

Perceived prototypicality again shows an opposite pattern to the other motivational variables, however, this is also likely due to the missing data at Time 1. The results show that the relationship between perceived prototypicality and the certainty dimension of leader identity increase over time, with the fit indices from Time 1 to Time 2 being quite poor and the comparative model fit indices from Time 2 to Time 3 being acceptable. Like the other variables, the cross-panel analyses with the certainty dimension are weaker for perceived prototypicality than the importance dimension. Fit indices for each variable can be found in *Table 20*.

Table 20: Fit Indices for Cross Lagged Panel Analysis of Certainty Dimension of Leader Identity

T1-T2	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	475.07	477.60	365.88	646.39
CFI	.860	.732	.819	.810
TLI	.844	.669	.793	.793
RMSEA	.083	.206	.095	.082
SRMR	.121	.121	.137	.129
T2-T3	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	594.87	277.23	449.12	818.94
CFI	.712	.884	.685	.623
TLI	.680	.857	.641	.588
RMSEA	.124	.170	.136	.124
SRMR	.193	.173	.166	.167

The cross-lagged panel analyses for the certainty factor in the updated leader identity model lend some credence to the role of motivation in leader identity development, but like the importance dimension, the results must be interpreted carefully. Self-efficacy appears to be significantly related to the certainty dimension of leader identity over time. Neither learning nor performance orientation display strong enough fit indices to be able to draw a conclusion that these variables relate to this dimension longitudinally. Finally, although from Time 2 to Time 3 perceived prototypicality has a good fit and is likely longitudinally significantly related to the certainty factor, the missing data at Time 1 makes the interpretation difficult. It is important to note that overall, the certainty dimension displayed worse fit with all variables than the importance dimension. However, this factor also had only partial factorial invariance which may explain these results.

4.11.4 Cross-lagged Panel Analysis- Descriptiveness Factor of Leader Identity

The final factor in the updated leader identity factor structure is descriptiveness. This dimension encapsulates how strongly an individual feels being identified as a leader describes them. The same procedures were used for this dimension as the previous analyses. When interpreting these results, it is important to highlight that the descriptiveness dimension had almost a perfect model fit, indicating strong factorial invariance and therefore little change in the construct over time.

The same pattern emerged in the relationship between self-efficacy and descriptiveness as with both certainty and importance. Self-efficacy was significantly related to the descriptiveness dimension of leader identity across all time points in the study. However, this relationship slightly decreased from Time 2 to Time 3. Although the fit indices are still approaching a good fit from Time 2 to Time 3, it is difficult to conclude if there is an effect of diminishing returns or if this effect is a result of the decreased sample size at Time 3.

Learning orientation was approaching acceptable fit across all time points with the descriptiveness dimension of leader identity but did not meet them. Again, displaying the same pattern as previous results, this relationship appears to weaken over time. Although performance orientation had an acceptable fit with this dimension originally, this relationship weakened considerably over time, becoming a poor fit from Time 2 to Time 3. While these findings must be interpreted carefully due to the weak invariance, they lend partial support to the construct validity of the updated factor model. Based on the item wording of the measure (Hiller 2005), one can conclude that descriptiveness is a largely external factor of leader identity which therefore relates to the external reinforcement regarded as important by those holding performance orientations (VandeWalle 1997; Day and Sin 2011), supporting the greater influence of performance over learning orientation on this factor.

Similarly, perceived prototypicality also appears to be the most strongly related to the descriptiveness dimension. However, due to the missing data, this relationship does not emerge until Time 2 and Time 3, where perceived prototypicality displays the best fit to any leader identity factor out of any motivational variable across all time points. While this variable is approaching acceptable fit with descriptiveness from Time 1 to Time 2, the results must be interpreted cautiously. Fit indices for each variable can be found in *Table 21*.

Table 21: Fit Indices for Cross Lagged Panel Analysis of Descriptiveness Dimension of Leader Identity

T1-T2	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	269.67	308.21	229.77	440.31
CFI	.933	.748	.834	.854
TLI	.924	.654	.803	.838
RMSEA	.055	.223	.085	.068
SRMR	.102	5.31	.116	.118
T2-T3	**Self-Efficacy**	**Perceived Prototypicality**	**Learning Orientation**	**Performance Orientation**
Chi-square	338.49	81.59	245.93	558.87
CFI	.838	.976	.803	.707
TLI	.816	.967	.767	.675
RMSEA	.093	.095	.108	.108
SRMR	.172	.132	.147	.153

The results for the descriptiveness factor of the updated leader identity model lend additional credence to the longitudinal effect of motivation on leader identity development. Across all leader identity factors, this dimension is the most strongly related to the motivational variables of interest. Self-efficacy is longitudinally related to the descriptiveness factor of leader identity across all time points, while both learning and performance orientation are only approaching acceptable fit indices. Finally, although from Time 2 to Time 3 perceived prototypicality has the best fit of all longitudinal analyses, the missing data at Time 1 disallows a definitive longitudinal

conclusion to be drawn about this relationship. Taken together, it appears that motivational variables influence leader identity development in that self-efficacy and perceived prototypicality are related to each dimension of leader identity across time. The figures for each cross-lagged panel model can be found in *Appendix D*.

4.12 Results of Hypothesis Testing

Before turning to the hypotheses, it is important to highlight the methodological finding that the currently accepted factor structure of the Leader Self-Identity measure (Hiller 2005) may need to be revisited. Across all time points, a new three-factor structure emerged from this measure, which was a better fit and had more explanatory power than the global measure and was therefore relied upon for the structural analyses. Although the updated measure still largely fit into the factors of importance, certainty, and descriptiveness, it was outside the ability of this study to entirely reanalyze and update this measure. However, as no known work has examined its reliability and validity outside of its initial creation, it may be time to make this a priority for future research. The following sections detail the conclusions from hypothesis testing.

4.12.1 Hypothesis 1

Individual motivation will result in differential levels of leader identity development.

In answering the main research question, it appears that individual leader identities do increase due to engagement in identity work, specifically in the context of leadership development programs. This effect was found from the pre to mid-program points and then again from mid to post-program throughout all factors of leader identity. This provides support to Hypothesis 1, that

one's level of motivation will determine their degree of leader identity development. However, as the final sample size for the post-program analysis was too small to conduct latent growth modeling, this relationship is only linear in nature. Future research should assess the quadratic change in leader identity over time to determine the likely dynamic change in this self-view. Additionally, the change from mid to post-program is weaker than pre to mid-program, which provides evidence for the non-linear effect of leader identity development found in previous research (Day and Sin 2011; Kwok *et al.* 2020).

4.12.2 Hypothesis 2

2A: Individual self-efficacy will be positively related to leader identity development.

The initial sub-question, about the effect of motivational traits on leader identity uncovered interesting conclusions. It is concluded that self-efficacy positively predicts leader identity and its development. Self-efficacy was positively related to the certainty factor of leader identity at each measurement point, highlighting the match between the internalized nature of self-efficacy and its influence on this internalized factor of leader identity. This trait also predicted descriptiveness at the second and third data collection points. However, independently, self-efficacy did not predict the importance of one's leader identity. Therefore, more research needs to explore the multifaceted relationship to the factors of leader identity.

The cross-lagged panel analyses showed strong support for a longitudinal relationship between self-efficacy and all dimensions of leader identity. However, it appears that this relationship weakens over time. This indicates a plateauing effect in the leader identity

development process. Despite this, Hypothesis 2A is accepted for its influential role in the process of leader identity development.

2B: *Learning orientations will be positively related to leader identity development while performance orientations will be negatively related to leader identity development.*

Although it was hypothesized that learning orientation would influence leader identity and its development, there was little support for this at any measurement point in the study. The only relationship found between learning orientation and leader identity was a positive relationship between learning orientation and the certainty dimension of leader identity at the pre-program data collection point. However, more detailed analyses showed that it did not predict leader identity or its development over time as this effect became non-significant at Time 2 and Time 3, refuting its role in the development process. Learning orientation fit quite poorly with all leader identity factors longitudinally with an especially poor fit from the mid- to post-program points. Due to its non-predictive nature and its exclusion from all structural models after the pre-program analysis, its role in the leader identity development process is rejected.

Performance orientation was hypothesized to be negatively related to leader identity and its development. However, the only predictive effect of performance orientation was on the certainty of one's leader identity at the mid-program point. Like learning orientation, performance orientation did not significantly impact the predictive statistical analyses or cross-sectional structural model outside of Time 1. The fit indices for the longitudinal analyses were not strong enough to be considered significantly influential on leader identity development for any factor.

Therefore, Hypothesis 2B was rejected, with neither learning nor performance orientation playing a significant role in leader identity development after pre-program assessment.

2C: Individual perceived prototypicality will have a positive relationship with leader identity development.

The results of the study at each time point show that perceived prototypicality is the most important predictor of leader identity and its development. This variable displayed the largest variance with leader identity at each time point, individually predicting descriptiveness, certainty, and importance throughout the study. Perceived prototypicality was also significantly related to leader identity in all the longitudinal analyses, displaying the strongest relationships out of any motivational variable.

While the results of the role of perceived prototypicality on leader identity development are promising, they must be interpreted cautiously. The missing data at the pre-program data collection point for this variable could conceivably influence the magnitude of the results, so perceived prototypicality was excluded from the pre-program structural model. However, despite this missing data, perceived prototypicality is believed to be a strong predictor of leader identity and its development. Therefore, as the data at Time 1 made valid analyses impossible, Hypothesis 2C was partially supported, indicating an increasing importance of perceived prototypicality in the formation of one's leader identity over time.

4.12.3 Hypothesis 3

3A: Self-efficacy and learning orientation will act in an additive manner to predict leader identity development while self-efficacy will moderate the negative effects of performance orientation on leader identity development.

While self-efficacy was significantly, positively related to learning orientation during the first wave of data collection, these traits were unrelated for the remainder of the study. Therefore, despite their additive relationship in the first structural model, as this effect was neutralized for the other models, it does not appear that self-efficacy and learning orientation interact to predict leader identity development. While self-efficacy did moderate performance orientation's effect on the importance dimension of leader identity during the pre-program data collection phase and they were both within the accepted structural model at Time 1, this relationship became insignificant during the remainder of the study. This indicates that while self-efficacy acted as a buffer to performance orientation before entry to an identity workspace, this interactive relationship did not significantly predict leader identity and its development over time. Therefore, Hypothesis 3A is rejected.

3B: Perceived prototypicality acts in an additive manner with self-efficacy. High perceived prototypicality will moderate the negative relationship between low self-efficacy and leader identity.

Unfortunately, due to the missing data for perceived prototypicality during the pre-program data collection wave, Hypothesis 3B must be interpreted with caution. While it appears from the

correlations, structural models (aside from Time 1) and cross-lagged panel models that self-efficacy and perceived prototypicality positively interact to predict leader identity and its development, the missing data at Time 1 means this hypothesis is only partially supported. Furthermore, there is no moderating effect of perceived prototypicality on low levels of self-efficacy at any point in the study. This indicates that while high levels of perceived prototypicality and self-efficacy can work in tangent to create a positive identity spiral that results in leader identity development, this relationship does not extend to a buffering effect on low levels of self-efficacy, only partially supporting Hypothesis 3B.

> *3C: Perceived prototypicality will act in an additive manner with learning orientation to predict leader identity development. However, it will moderate the negative relationship between performance orientation and leader identity*.

Perceived prototypicality has no significant relationship with either goal orientation factor throughout the entirety of the study. It appears that one's perception of their fit in their environment does not interact with their approach to a developmental setting. Therefore, Hypothesis 3C is rejected because there is neither a significant, positive interaction between perceived prototypicality and learning orientation nor a moderating effect of perceived prototypicality on performance orientation in relation to leader identity and its development at any point in the study. These variables were also not included together in any structural model. Therefore, their interaction in the leader identity development process is insignificant.

4.13 Conclusion

In conclusion, it appears that engagement in a leadership development program does catalyze leader identity development, yet this development may slow over time. Specifically, self-efficacy and perceived prototypicality further enhance leader identity and its development both individually and in their interaction. However, learning and performance orientation do not provide incremental explanation to leader identity and its development. The results of all Hypotheses can be found in *Table 22*.

Table 22: Hypotheses

Hypothesis 1	Individual motivation will result in differential levels of leader identity development.	Supported
Hypothesis 2A	Individual self-efficacy will be positively related to leader identity development	Supported
Hypothesis 2B	Learning orientations will be positively related to leader identity development while performance orientations will be negatively related to leader identity development	Not supported
Hypothesis 2C	Individual perceived prototypicality will have a positive relationship with leader identity development	Partially supported
Hypothesis 3A	Self-efficacy and learning orientation will act in an additive manner to predict leader identity development while self-efficacy will moderate the negative effects of performance orientation on leader identity development.	Not supported
Hypothesis 3B	Perceived prototypicality acts in an additive manner with self-efficacy. High perceived prototypicality will moderate the negative relationship between low self-efficacy and leader identity.	Partially supported
Hypothesis 3C	Perceived prototypicality will act in an additive manner with learning orientation to predict leader identity development. However, it will moderate the negative relationship between performance orientation and leader identity.	Not supported

5. Discussion & Conclusions

5.1 Introduction

Due to financial and time constraints, organizations often have limited ability to dedicate resources to leadership development (Gurdjian *et al.* 2014), which can result in prevalent talent-leader gaps (Kwok *et al.* 2020). These gaps can have negative effects on organizations from private businesses to local and national governments, as seen in today's rampant competency-based leadership problems (Kaiser and Curphy 2013; Harris Poll 2021). Research has sought to provide solutions to these problems through examination of leader development, leadership development and their antecedents (Hurtz and Williams 2009; Noe, Wilk, *et al.* 2014). However, this research often neglects an intermediate process, leader identity development, which is a foundational process that influences every aspect of an individual's leadership (Day and Harrison 2007; Epitropaki *et al.* 2017). As it is the cornerstone upon which leader capabilities at the relational and collective levels of organizations are built (Day and Dragoni 2015; Lord and Hall 2005), increased research into this process can fill this intermediary gap. Ultimately, in increasing knowledge of the process of leader identity development, it is possible to impact the distal outcomes of leader and leadership development. This, in turn, will facilitate solutions to the problems associated with leadership through harnessing the power of leader identity development to better understand and develop leaders at all levels of organizations and society.

Despite the potential of leader identity to revolutionize the way we approach leadership problems, there is much we do not know about this phenomenon. Currently, leader identity development is the missing proximal link between antecedents and the distal outcome of leader development (Schwartz *et al.* 2021). While motivation is theorized to be an essential antecedent of leader identity development (Guillén *et al.* 2015; Vogel *et al.* 2020), little research has explored this relationship from a processual standpoint, which is particularly problematic as development

is an inherently temporal phenomenon (Fischer *et al.* 2017). Without processual theorization and longitudinal testing, the field of leader identity development cannot advance (Vogel *et al.* 2020) and its potential cannot be realized. Utilizing expectancy theory, this study set out to determine the process of intraindividual leader identity development and the antecedent role of cognitive-motivational traits. This study makes significant contributions to the domains of motivation and leader identity, as well as leadership development practice by answering the core research question of the study:

> *How do individual leader identities develop during a leadership development program?*

In addition to the core research question, the study also examined several sub-questions:

1. *How does individual self-efficacy influence leader identity development during a leadership development program?*
2. *How does individual goal orientation (learning and performance) influence leader identity development during a leadership development program?*
3. *How does perceived prototypicality influence leader identity development during a leadership development program?*
4. *How do these traits interact to influence leader identity development during a leadership development program?*

The purpose of this chapter is to discuss the significance of the findings in relation to the relevant literature on leader identity development and motivation. This discussion demonstrates

the theoretical and methodological contributions stemming from this study. Then, the limitations of the study are considered. This chapter concludes with a discussion of the study's implications and recommendations for future research and practice.

5.2 Theoretical Contributions

The following section provides an overview of the key findings of the study and their contribution to the areas of leader identity and motivation. This is accomplished through a discussion of the study objectives which are to understand how individual motivational traits influence leader identity development and to determine change in leader identity during participation in a leadership development program. First, the findings are briefly summarized. Then, the role of individual cognitive-motivational traits and their effect on the process of leader identity development is discussed in greater detail. Finally, the temporal aspect of leader identity development is delineated as an expectancy process.

To summarize, this study found that cognitive-motivational traits related to self-perception, self-efficacy and perceived prototypicality, were more predictive of leader identity development than goal orientation, which relates more to how one interacts with a learning environment. However, this effect becomes weaker over time. In applying expectancy theory to the process of leader identity development, this study extends the theorization by Lord and Hall (2005) in that differences exist across individuals in the plateauing rate of development as a function of cognitive-motivational traits. This is because those with higher levels of motivation to engage in identity work will experience greater expectancy toward development. This creates a buffer against the cognitive exhaustion resulting from the increased cognitive challenge associated with the development process. In turn, this leads to greater instrumentality perceptions of the identity

workspace and stronger valences toward the outcome of a cohesive self-concept (Leonard *et al.* 1999), when compared to those with weaker cognitive-motivational traits.

The developmental trajectories of those engaged in leader identity development will slow over time, but differences exist across people in this plateauing effect. Those with stronger cognitive-motivational traits experience higher, sustained expectancies toward identity work and consequently experience greater leader identity development than those with weaker cognitive-motivational traits. This effect is particularly true for traits relating to self-perception. For example, Lord and Hall (2005) postulate that in the beginning of the development process, influences on self-perception will be highly predictive of leader development, but over time this effect will become weaker. This study provides additional evidence to support and explain the extension of this framework to the intraindividual process of leader identity development in finding that the traits related to self-perception are strongly influential in developing a leader identity, but that this effect weakens over time.

Another contribution generated by these findings is to the concept of identity spirals, conceived by DeRue and Ashford (2010). They postulate that at a relational level, a combination of stimuli contributes to an individual's perception of themselves as leaders in their context. When these stimuli are perceived positively, individuals will enter upward spirals and seek out leader experiences, increasing their perception of themselves as leaders. However, these stimuli, when perceived negatively, are conceived as denials of one's leader self and create negative spirals which fracture leader identities. The current study extends this conceptualization by applying it at the intraindividual level. The findings of this study support theorization that stimuli related to self-perception act as motivational antecedents of identity spirals. Those with stronger self-perceptions are motivated to engage with the process of identity work, entering positive spirals and developing

a leader identity, while those with weaker self-perceptions experience little to no motivation, entering negative spirals and experiencing little leader identity development.

Overall, the findings of this study lead to the conclusion that expectancy perceptions are a function of an individual's self-perceptions of their ability to develop and acceptance in their context. These self-perceptions catalyze entry to identity spirals which determine one's active engagement in the process of identity work and result in leader identity development. However, the increasing complexity involved in ongoing development results in increased cognitive load, which requires more time and effort to continually develop.

5.2.1 The Role of Motivational Traits in Leader Identity Development

The first research objective of the study is to explore the antecedent effect of specific cognitive-motivational traits on the process of leader identity development. As seen in the conceptual model detailed in Chapter 2, *Figure 1*, the traits included in the study were self-efficacy, perceived prototypicality and goal orientation. While each of these traits have motivational components and have been identified as essential catalysts to the distal outcome of leader development, they have yet to be linked to the more proximal outcome of leader identity development, particularly in their interaction at the intrapersonal level. This is important to understand due to the influence of leader identity on the entire person as a leader, extending beyond the individual to the relational and collective levels of an organization (Miscenko and Day 2016; Schwartz *et al.* 2021).

To contribute to greater understanding of leader identity development, expectancy theory is used to further explicate the essential antecedent role of motivation in this process. Despite expectancy theory's prominence as a seminal motivational theory, limited research has conceptualized or operationalized it in its intended format (van Eerde and Thierry 1996). A

consistent issue in the utilization of expectancy theory is that, although it was intended to be conceptualized at the intraindividual, cognitive and temporal dimensions, it is often explored as a relational, behavioral, and static phenomenon (Noe and Wilk 1993; van Eerde and Thierry 1996). Consequently, examinations of the validity of the theory are often left wanting, with inappropriate uses of the theory raising concerns as to its utility (Lawler III 1973; Lloyd and Mertens 2018; van Eerde and Thierry 1996). As a result, the use of expectancy theory has waned over time (van Eerde and Thierry 1996), with the limited research focused largely on expectancy, excluding valence and instrumentality (Karriker and Hartman 2019; Lee 2019), thereby eliminating the temporal aspect of this process theory.

While expectancy theory is primed to explain individual, cognitive-motivational phenomena in a processual manner, this potential has yet to be realized. For this reason, the central contribution of this study is that it applies expectancy theory to explain the under explored process of leader identity development, a process which is implied to hinge upon motivation (Miscenko *et al.* 2017), yet has not been explored through a motivational lens. In doing so, individual expectancies toward identity work can be predicted which result in differential rates of leader identity development, through entry to positive or negative identity spirals. This study contributes theoretically to the expectancy theory literature by being the first to conceptualize the three components of expectancy theory at the appropriate levels in predicting the antecedent role of motivation in developing a leader identity. This form of development is optimally explained by expectancy theory because at its foundational level, it is an inherently temporal, intraindividual, cognitive process (Lord and Hall 2005; Miscenko and Day, 2016) hinging on motivation (Miscenko *et al.* 2017). Thus, it is aligned with the often-overlooked aspects of expectancy theory. Through the application of expectancy theory to leader identity development, a contribution is

made to increased theoretical knowledge about the processual nature of both phenomena, which is currently lacking despite decades old calls for increased exploration and extension (Day and Harrison, 2007; Noe and Wilk 1993; van Eerde and Thierry 1996). To do this, the specific role of each trait in the process of leader identity development is further discussed in the following subsections.

Self-Efficacy

Self-efficacy significantly predicted leader identity throughout each stage of the study. It displayed strong explanatory power for multiple facets of leader identity, particularly the *certainty* dimension. As self-efficacy relates to one's *certainty* in their ability to harness the cognitive resources to succeed at a task, resulting in motivation (Wood and Bandura 1989; Dadaboyev *et al.* 2019), this finding is unsurprising. However, this link does propose a significant antecedent effect of self-efficacy on the strength facet of one's leader identity as defined in the theorization of cross-domain leader development proposed by Hammond *et al.* (2017). In their theorization, the strength element refers to the degree to which one identifies as a leader (Hammond *et al.* 2017), which can be construed as the certainty element used in this study.

Despite the logical nature of the link between self-efficacy and leader identity, in that one's perception of their ability to succeed at a task is likely to catalyze the motivation to put forth effort toward this task, this study was the first to directly test this relationship. Although Day and Sin (2011) theorized that self-efficacy is likely an important antecedent in leader identity development, they did not test this assertion. Additionally, while Badura *et al.* (2020) found a direct relationship between self-efficacy and the affective-identification facet of the tripartite model of motivation to

lead (Chan and Drasgow 2001), leader identity is a substructure within this larger construct, causing this direct relationship to remain unexplored until this study.

In testing the direct relationship between self-efficacy and leader identity across time, the results confirm that self-efficacy is important to leader identity construction. This finding extends knowledge of the specific antecedent relationship between self-efficacy and leader identity development through identifying that greater levels of self-efficacy catalyze higher rates of leader identity development. This is noteworthy because it implicates the cognitive-motivational role of belief in one's own ability as central to engagement in identity work as those with more self-efficacy experience increased expectancy perceptions of developing a leader identity. This expectancy in turn enhances instrumentality perceptions of the identity workspace and valence toward the outcome of a cohesive sense of self. Those with high levels of self-efficacy will enter positive identity spirals, actively engaging in identity work, resulting in leader identity development, particularly when compared to those with low levels of self-efficacy.

However, due to the increasing complexity involved in the development process, this relationship weakens over time because increased cognitive load requires greater mental effort to sustain the rate of development. Thus, more time and effort must be dedicated to identity work, challenging the initial levels of one's self-efficacy through ego-depletion (Leonard *et al.* 1999). In turn, greater levels of this trait are required to sustain expectancy levels during development. Hence, the effect of self-efficacy on the motivation to engage in identity work diminishes over time because of these increased challenges.

Goal Orientation

Within goal orientation, neither learning nor performance orientation was found to significantly predict leader identity development. These findings did not support the hypotheses that learning orientation would have a positive effect on leader identity development while performance orientation would have a negative effect. This suggests that the trait-like conception of goal orientation does not significantly instigate the motivation to develop a leader identity. This is likely due to the ongoing process of identity work, which requires sustained self-regulation, a cognitive resource which may be depleted over time by the incrementally increasing challenges associated with leader identity development.

Regarding learning orientation, it was postulated that one's mastery approach to learning situations would create the expectancy to engage in identity work, resulting in entry to a positive identity spiral and ultimately lead to leader identity development. An explanation for the opposing findings could be that while learning orientation broadly does influence leader development (Day and Sin 2011) and its outcomes through increasing self-regulation and motivation in the goal attainment process (Dweck 1986), intraindividual leader identity development functions differently than leader skill development, requiring increased self-regulatory powers for sustained development.

Leader identity development is a potentially lifelong process of learning and development (Eva *et al.* 2021; Liu *et al.* 2021). The self-regulation required during the process of leader identity development is much longer than that of the learning processes where learning orientation is traditionally examined (Dweck 1986; Button *et al.* 1996; Johnson *et al.* 2018). Additionally, leader identity is associated with deep cognitive structures more so than the surface level KSAs of leader development (Lord and Hall 2005). As such, it is possible that learning orientation influences the

motivation to engage in self-regulation in the attainment of leader skills and abilities, resulting in leader development. However, due to the much longer, complex, and profound process of identity development, this trait becomes depleted as a motivating resource, having no significant longitudinal effect on leader identity development.

The finding around performance orientation is important because it has received limited attention or, more frequently, been completely excluded in research on leader and leader identity development (Chen *et al.* 2000; Middleton *et al.* 2019). However, as performance and learning orientation are often conceived as bipolar constructs (Payne *et al.* 2007), it is proposed that like learning orientation, performance orientation also does not provide the sustained self-regulatory motivation required for leader identity development. Accordingly, although this trait affects the way in which one approaches a more surface level learning situation (Dweck 1986; Payne *et al.* 2007), the extent of self-regulation required in leader identity development exhausts this trait, rendering it insignificant as a motivator for identity work. While one's performance orientation may instigate an expectancy for displaying competence to referent others during leader development (Day and Sin 2011), this motivating antecedent cannot penetrate the deeper structures required during leader identity development.

These results lead to the conclusion that there is no effect of either goal orientation factor on the motivation to engage in identity work, resulting in an insignificant effect on leader identity development. This supports the overarching conclusion of this study that traits related to self-perception are more important in creating the sustained motivation to engage in the development of a leader identity. Furthermore, this highlights the problem with the continued focus on the antecedent predictors of the distal and surface level outcome of leader development at the expense

of understanding the deeper and proximal outcomes of leader identity development, as they may function differently.

Perceived Prototypicality

The findings indicate that perceived prototypicality is the most significant factor in predicting leader identity development. Throughout the study, perceived prototypicality was particularly explanatory of the *descriptiveness* dimension of leader identity. An explanation for its high degree of explanatory power in the *descriptiveness* dimension is due to perceived prototypicality's cognitive properties of *describing* and defining one's cognitive schema of a prototypical leader (Guillén 2021).

Perceived prototypicality instigates the motivation to engage in identity work through the comparison of an individual's cognitive schema of a prototypical leader to their self-view as a leader. The perceived match between these cognitive structures then determines the level of this prototypicality (van Knippenberg 2011). Those individuals who view themselves as highly prototypical are likely to experience acceptance of their leader selves and perceive grants of their leadership while those who do not feel prototypical will perceive denials of their leader-selves (DeRue and Ashford 2010; van Knippenberg 2011). This study conceives that this leads to differential perceptions of person-environment fit, specifically perceived person-organization fit (Morley 2007), which will determine an individual's expectancy toward identity work.

Individuals high in perceived prototypicality should have strong expectancies toward identity work as they feel they will be accepted as leaders in their context, increasing perceptions of fit between the individual and their environment (Wright and Pandey 2008). This perceived fit increases the perceived likelihood of success in leader identity development, which then instigates

increased perceptions of the instrumentality of the identity workspace, as well as enhanced valence toward the outcome of a more cohesive self-construal as the rewards of leader identity development appear attainable. This will cause these individuals to enter positive identity spirals, actively engaging in identity work and resulting in leader identity development.

However, those with a perceived mismatch between the leader-self and leader prototype will experience little expectancy toward the process of identity work because they do not believe that they will be accepted as a leader in their context nor do they have perceptions of person-organization fit. This will diminish their motivation to actively engage in the identity work process as they experience weakened instrumentality and valence perceptions of this process as successful and rewarding development of the self seems less attainable. This will cause them to enter a negative identity spiral and experience little to no development.

A further explanation for the influence of perceived prototypicality on leader identity development involves the context in which the study occurred. As the participants were involved in leader development in programs conducted by their organizations, they remained within their typical leader contexts throughout the study. As a result, cues determining self-perceptions could be directly applied in situ rather than being transferred from an external context, which can be difficult due to contextual constraints (Jacot *et al.* 2015). Consequently, an individual's ability to interpret and merge perceived acceptance and grants of their leader selves into their leader identity occurred more easily in this study.

The Interaction of Motivational Traits

In addition to the singular effects of the cognitive-motivational traits, this study sought to explore the interactions between these variables as leader identity development is an extremely complex

process (Hammond *et al.* 2017). Thus, in only exploring singular antecedents of leader identity development, the specific understanding of this temporal process would remain unclear.

Self-Efficacy and Goal Orientation

This study found no significant longitudinal effect between self-efficacy and either learning or performance orientation in relation to leader identity development. This indicates that self-efficacy has neither an additive nor a buffering relationship with goal orientation during leader identity development. The implication of this is that while self-efficacy influences individual expectancies toward engagement in identity work, this occurs regardless of one's approach to the learning environment. The insignificant interaction between self-efficacy and goal orientation adds further credence to the assertion that the self-regulatory nature of goal orientation may be effective for forms of development that are surface level and occur over short periods of time. However, the increased time and cognitive dedication required during the identity development process diminishes this variable's effect to an insignificant degree.

The only significant interaction between these traits occurred during the pre-program measurement point of the study. This indicates that self-efficacy, learning orientation and performance orientation predicted the original expectancy to engage in identity work. However, as the process of identity development continued, goal orientation became less significant, diminishing its influence on expectancy perceptions of identity work and its motivational force in this process. In tangent, self-efficacy remained influential throughout the entire leader development process. This again supports the conclusion that self-perceptive traits are the most important in creating and sustaining the motivation to engage in identity work.

Self-Efficacy and Perceived Prototypicality

This study found that self-efficacy and perceived prototypicality significantly interact to influence leader identity development. The findings show that self-efficacy and perceived prototypicality work in tangent to catalyze leader identity development through entry to identity spirals. For example, if an individual feels they are highly prototypical, they will interpret feedback and social cues as acceptance of their leader self. Upon entering an identity workspace, these individuals will hold positive expectancies toward engaging in identity work as they believe their leader-self fits in their context. If this individual also has high self-efficacy, they will hold an inherent belief in their ability to harness and apply the cognitive and motivational resources necessary to succeed (Wood and Bandura 1989) in development and further their acceptance as a leader. Together, this will create entry to a positive identity spiral through increased expectancy toward identity work as the individual believes they can achieve a more cohesive sense of their leader-self and that this leader-self fits and will be accepted in their context.

Accordingly, these traits interact in the early stages of development, when according to Lord and Hall (2005) individuals are most perceptive of feedback and social cues, to increase individual's perception of acceptance of their leader selves (i.e., perceived prototypicality). This then feeds into increased self-efficacy as these prototypical beliefs enhance their perception of their ability to succeed in identity development. In turn, this furthers one's entry into a positive identity spiral, resulting in increased engagement in identity work through strengthening expectancy toward this process. This culminates in leader identity development, which will further increase one's perception of greater alignment between their leader-self and prototypical leader schema. The increased perceptions of one's prototypicality as a leader will result in increased

perceptions of person-organization fit and the affirmation of success in development, bolstering self-efficacy and continuing the expectancy process of identity work in a cyclical manner.

Therefore, self-efficacy and perceived prototypicality act as additive mechanisms throughout this process. Individual's levels of self-efficacy and perceived prototypicality comingle to instigate expectancy toward identity work, in turn creating the perception of the instrumentality of the identity workspace in achieving increased cohesion of the self-concept. Individuals with strong (or weak) levels of these traits will hold greater (or weaker) expectancies toward identity work and will enter positive (or negative) identity spirals. This will result in positive (or negative) rates of development beyond the singular effect of either trait.

Perceived Prototypicality and Goal Orientation

Like the insignificant interactive relationship between self-efficacy and goal orientation, neither goal orientation factor interacted with perceived prototypicality to influence leader identity development. This study found no additive or buffering effects of perceived prototypicality on either performance or learning orientation. This is likely also due to the depleting resource of self-regulation that renders goal orientation an insignificant antecedent of leader identity development over time. Therefore, the significant effect of perceived prototypicality on leader identity development occurs regardless of an individual's approach to development.

When coupled with the insignificant interaction between self-efficacy and goal orientation, it appears that goal orientation does not extend to the deep form of development which characterizes leader identity development. This finding reinforces the conclusion that while goal orientation is an effective self-regulatory characteristic for harnessing the motivation to engage in leader development (Dweck 1986; Johnson *et al.* 2018), this resource is best suited to surface level

learning. For this reason, neither learning nor performance orientations influence motivation in the complex and timely process of leader identity development, even when examined concomitantly with self-efficacy and perceived prototypicality.

5.2.2 The Longitudinal Process of Leader Identity Development

The second research objective concerned uncovering change in leader identity throughout a leadership development program. As this process is longitudinal in nature, the three-wave quantitative research design was essential to extend understanding of the processual nature of leader identity development. The context was chosen because while leadership development programs can act as identity workspaces (Petriglieri and Petriglieri 2010), they are not often viewed through this lens, which diminishes their potential to influence leader identity development.

This study reveals that leader identity develops positively over time. However, the rate of this development plateaus throughout leadership development programs. This finding extends the assertions of Lord and Hall (2005) by applying their process of leader development to the intraindividual level of leader identity development. While the scholars do acknowledge that identity development occurs in tangent with leader development, they do not specify the process of leader identity development in detail, nor do they consider antecedents of leader and leader identity development. As acknowledged by Schwartz *et al.* (2021) this perpetuates a key problem in leadership literature in that the distal outcomes of leader and leadership development are examined, while the proximal outcome of leader identity development is overlooked. Additionally, through excluding antecedents to the process of leader development, Lord and Hall (2005) are unable to predict differences in developmental rates across individuals.

In their initial theorization, Lord and Hall (2005) posit that leader development occurs as, over time, individuals cultivate a larger base of working knowledge relating to leadership. This larger knowledge base allows for the creation of a more sophisticated cognitive schema of leadership. This advanced cognitive schema in turn allows for greater and more in-depth understanding of leadership scenarios while also expanding the potential responses to these situations, resulting in leader development (Lord and Hall 2005). However, in expanding one's working knowledge of leadership, the increasing amount of information available to an individual amplifies the cognitive demands placed on the individual (Sweller 1988). This increasing cognitive load requires more time to interpret, respond, and adapt to novel situations, thus slowing rates of leader development over time (Lord and Hall 2005).

This study blends the theorization from Lord and Hall (2005) with the conclusions of Miscenko and Day (2016), that leader identity is a dynamic process requiring more longitudinal attention, to explain the process of leader identity development. In applying the work of Lord and Hall (2005) to intraindividual leader identity development, this study concludes that through the identity work process, increasing working knowledge of the self as a leader increases cognitive complexity in one's cognitive schema of leadership. This amplifies cognitive load which results in slowing rates of leader identity development. However, as this study demonstrates, these slowing rates of development are a function of individual's cognitive-motivational traits.

Detailed in the revised model presented in *Figure 10*, the process of leader identity development is catalyzed through entering identity workspaces, which activate one's leader identity and stimulate self-reflection and self-exploration (Petriglieri and Petriglieri 2010). As this study illustrates, when one's leader identity is activated, their self-perceptive motivational traits determine their expectancy perceptions and in turn the effort applied in the process of identity

work. The level of engagement in identity work then culminates in changes to an individual's leader identity through entry to identity spirals. As this process continues, the individual establishes a more sophisticated cognitive schema of the self as a leader, resulting in leader identity development. However, this increased knowledge also results in increased cognitive load when encountering novel tasks, requiring extra effort by the individual (Sweller 1988) to weave new knowledge into the self-concept. For this reason, one's cognitive schema dedicated to understanding the leader-self requires more time to access and incorporate relevant information into one's leader identity. This increased need for time to process complex cognitions in novel settings requires more effort throughout the identity work process and thus slows the rate of leader identity development over time.

In using the findings of this study to further explicate intraindividual leader identity development, as leaders enter an identity workspace, their initial leader identities will be activated. Then, based on their cognitive-motivational traits, they will engage in the process of identity work to varying degrees of effort. Based on the engagement with identity work, their working knowledge of themselves as leaders will increase, creating entry to a positive identity spiral and providing a revised understanding of the self as a leader. In the early stages of identity development, this study found that leaders experience large gains in their leader identities as less cognitive effort is required to assimilate information into one's leader identity. This necessitates less reliance on one's cognitive-motivational traits to persevere through the challenges presented to the ego by identity work and increases expectancy perceptions, allowing easier entry to positive identity spirals.

However, as this process unfolds, greater mental effort is required as cognitive load increases (Sweller 1988) due to the increase in sophistication of the self-concept. This amplified

cognitive load presents challenges to the continued mental engagement and motivation required in identity work as these challenges will lead to greater ego-depletion (Leonard *et al.* 1999), decreasing the motivation to continually engage in identity work through diminishing the expectancy toward this process. This increased difficultly could slow the entry to positive identity spirals or even catalyze entry to a negative identity spiral.

These increasing cognitive demands explain the slowing rate of development found in this study. As identity work becomes more complex, individual cognitive-motivational traits are challenged, requiring more time and effort to advance one's conception of the leader-self. Therefore, the rates of leader identity development over time slow as a function of increased challenges presented to the self which diminish expectancy toward development. These findings empirically support the argument made by Miscenko and Day (2016) that greater attention must be paid to exactly how the process of leader identity development unfolds, both within and between-persons, which includes the antecedents of engagement in leader identity development.

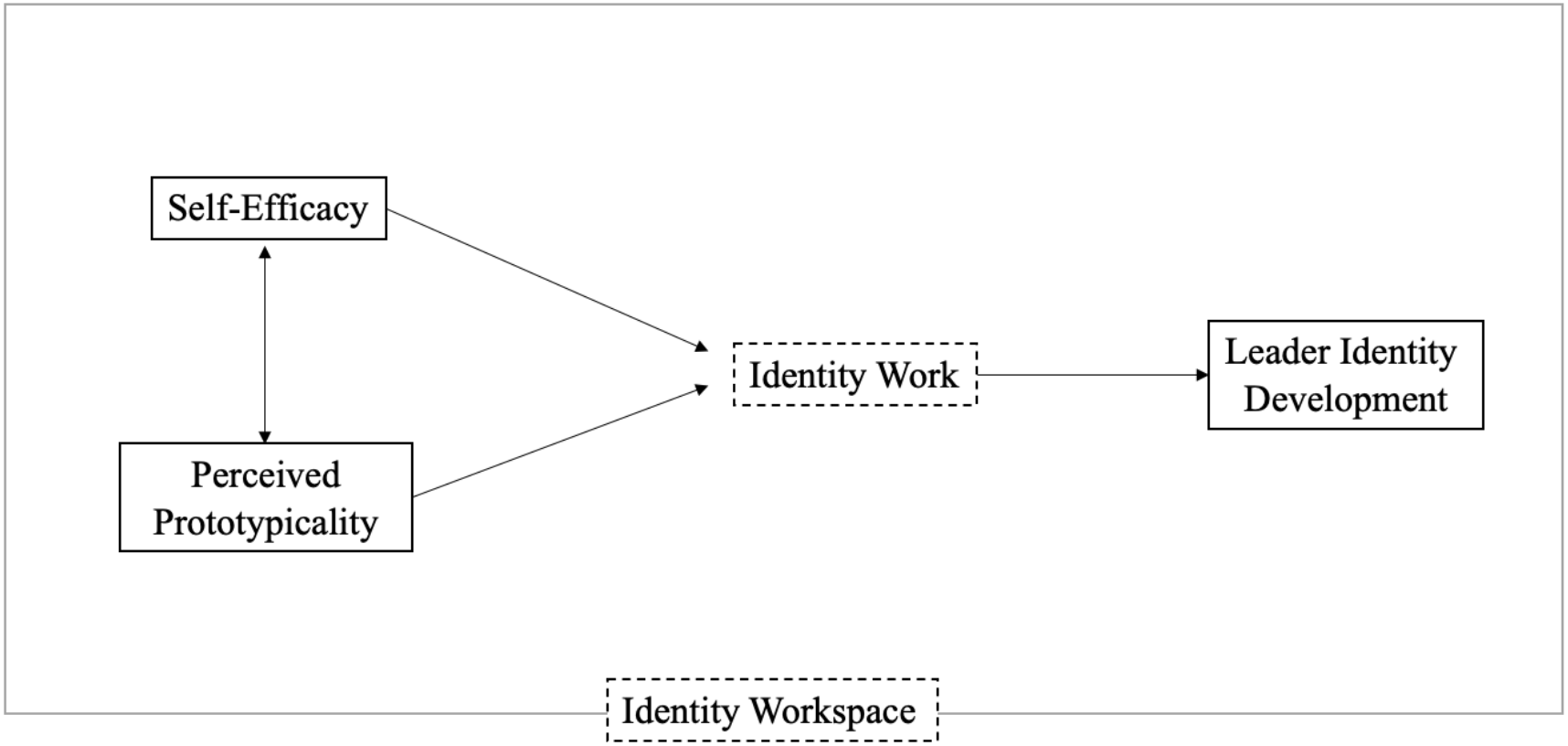


Figure 10: A Revised Model of Leader Identity Development

An expectancy process model of leader identity development

*Dashed lines indicate untested theoretical assumptions

5.3 Methodological Contribution

The methodological contribution of the study stems from the pervasive problem of not conceptualizing or operationalizing either expectancy theory or leader identity development in a temporal manner despite their inherently temporal nature. Specifically, leader identity development research is not often truly longitudinal in nature, relying on time-lagged research designs (Day and Sin 2011), conducted over a matter of weeks (Kwok *et al.* 2020), which are unable to capture this complex and lengthy unfolding process. As research also often uses student samples (Day and Sin 2011; Miscenko *et al.* 2017), it is currently unable to examine leader identity development within organizational settings. Consequently, understanding of this process remains speculative and it is not currently applicable in real-world settings, where it could be beneficial to developing leaders and their organizations.

The research design necessitated the use of a longitudinal methodology to assess the antecedent role of motivation in leader identity development. Through the incorporation of a three-wave design within an organizational population over a period of nine months, limitations of previous research designs were accounted for while also maintaining consistency in variables from the conceptualization through operationalization phases of the study. This methodology contributed to the area of leader identity by allowing increased exploration into and understanding of the temporal process of leader identity development within an organizational setting.

An additional methodological contribution was made by testing the validity and reliability of The Leader Self-Identity measure (Hiller 2005). Despite being the only known measure of intraindividual leader identity, after its initial development, no further studies have explored its validity or reliability. In considering this, it was particularly important for this study to reassess this instrument. The initial conception of this measure highlights its ability to be used as a single

or three-factor measure (Hiller 2005). Additionally, some scholars utilize a short form version of the measure (Day and Sin 2011; Miscenko *et al.* 2017; Middleton *et al.* 2019; Ayoobzadeh and Boies 2020; Kwok *et al.* 2020), despite there being no detailed analysis of this short form's validity.

When conducting a confirmatory factor analysis during the first wave of data analysis, a unique factor structure was uncovered, that while generally fitting into the original three-factors of importance, certainty, and descriptiveness, was organized more so by item wording than directive prompts. After completing an exploratory factor analysis, this new factor structure was used in this study's data analysis to ensure methodological rigor throughout the entire research process. Importantly, this study found that the new, updated, three-factor structure of the Leader Self-Identity measure (Hiller 2005) was identical during each wave of the study. The consistency of this new factor structure across time indicates its factorial invariance and reliability across time (Little 2013). Consequently, this study makes a second significant methodological contribution by calling into question the validity of the current measurement for leader identity and proposing a new three-factor structure. The findings from the confirmatory and exploratory factor analyses emphasize the need for future research to focus on increased validation of this measure for leader identity studies to obtain and report valid and reliable results, without which the field cannot advance.

5.4 Limitations

Despite the various strengths associated with the study there are also limitations to be acknowledged. First, attrition is a limitation in all longitudinal research (Goodman and Blum 1996; Twisk and de Vente 2002), particularly when using an analysis method like structural equation

modeling whose outputs are sensitive to change in sample size (Kyriazos 2018). To minimize the effect of this limitation, mitigation strategies for this problem were incorporated into each phase of the research process. This led to the use of total purposive sampling (Creswell and Clark 2017) and reminder emails which were sent at each data collection point to gain as great a sample size as possible to diminish the validity threats posed by high rates of attrition. Finally, although attrition is an inherent problem in longitudinal research, methodological research into this topic has noted that there are data analysis techniques, particularly pairwise deletion, which was used in this study, that account for missing data with a negligible loss in response rate (Twisk *et al.* 2013).

Despite these precautions, the final sample size for wave three of data collection was ultimately too small to conduct latent growth modeling while maintaining validity in the study's results. Therefore, cross-lagged panel analyses were conducted as these analyses allow for longitudinal outputs without needing the large sample sizes of latent growth modeling (Little 2013), making it possible to produce valid and reliable longitudinal results despite the limitations associated with attrition.

Second, when data collection began in December 2019, perceived prototypicality was not yet included in the study. At the time, this construct was only conceptualized at the relational level and did not fit with the intrapersonal level of focus within this study. However, based on the work of Guillén (2021), which was the first to conceptualize this variable at the intrapersonal level, perceived prototypicality was still included in the later phases of data collection due to its theoretical likelihood of being integral to the motivation to develop a leader identity. Despite the significant empirical relationship established between perceived prototypicality and leader identity throughout most of the study, the missing data points for Organization A, cohort one during the first survey presented a problem for data analysis. As structural equation modeling is highly

sensitive to missing data (Schumaker and Lomax 2016), this amount of missing data for a single variable created the potential for confounding effects and invalid results.

To avoid this problem, perceived prototypicality was removed from the first structural model. In doing so, methodological rigor was maintained throughout the study and the model's validity was ensured. However, despite perceived prototypicality being the most important predictor of leader identity throughout the remainder of the study, this missing data point disallowed full understanding of its role throughout the entire leadership development program. This can be illustrated by the results of the cross-lagged panel analyses, where each variable's relationship with leader identity became weaker over time, while perceived prototypicality became stronger. Due to the missing data, it is impossible to definitively conclude if this is an actual effect in the relationship between perceived prototypicality and leader identity or a methodological artefact obscuring the results. Additional longitudinal research must be conducted to explore how perceived prototypicality functions at the intrapersonal level to better establish its relationship to leader identity development.

A third limitation within this study is its lack of generalizability. The study was conducted mainly with Irish participants, supporting a pervasive focus on Western contexts which may differ from other cultures (Ryba and Schinke 2009). Additionally, as the study occurred within the leadership development programs of three organizations, these results should only be generalized to these settings due to the unique contexts and cultures that exist across industries (Buelens and van den Broeck 2007; Hatmaker 2013). In considering this, access to organizations in different industries was sought to reduce the bias created by assessing organizations in a single industry. However, there should still be caution when extrapolating these findings onto other contexts. To

improve upon the generalizability of this study, future research should replicate this study in other cultures and industries.

A fourth limitation was the inability to manipulate the role of time within this study. Currently, research on leadership processes, including leader identity development, often overlooks time as an essential variable (Day and Harrison 2007; Fischer *et al.* 2017). Field research is constrained by practicalities with studies being conducted in less than 6 months (Day and Sin 2011; Middleton *et al.* 2019; Kwok *et al.* 2020), which may not allow adequate time to examine changes in a population (Wallace *et al.* 2021). In considering this fault, this study sought to explore identity development over nine months to extend the longevity of research into this process. However, due to the limited research specifically considering the role of time, it is acknowledged that this temporal aspect may not have been long enough to capture the inherent changes in the long-term process of leader identity development. While time was not a manipulated variable in this study due to methodological and practical constraints, future research should explore the key role of time in leader identity development to clarify knowledge and extend practical recommendations for the design of effective development initiatives.

A final limitation of this study relates to the impact of the Covid-19 pandemic. In March 2020, individuals were faced with a multitude of unexpected challenges which required a drastic change in the way they both lived and worked. As a result, all the organizations within the study chose to temporarily pause their leadership development programs to prepare for a transition to an online format. This transition presents many challenges to the study. Specifically, research has shown that the delivery method of learning activities, particularly between in-person and online deliveries can have varying learning outcomes (Noe, Wilk, *et al.* 2014). By altering the delivery

format of the programs, an unintended variable was introduced mid-way through the study that may have influenced development outcomes.

Additionally, longitudinal research hinges on the assumption that all data points occur at equal intervals to avoid confounds such as history and maturation (Martens and Haase 2006). Through consistent data collection points, these confounds should be mitigated. Therefore, the inability to ensure complete consistency across data collection points presents a limitation to the study, as some findings could be the result of bias stemming from problems with internal validity. For example, in addition to the organizational changes during the study, participant's lives may have also drastically changed as a result of the pandemic with increased caring responsibilities, difficulty working from home, or psychological and physical health problems (Alon *et al.* 2020; Walker *et al.* 2020; Craig and Churchill 2021; Khan *et al.* 2021). As a result, individual's leader identities may have been affected due to the activation and dominance of other identities (e.g., a parent working from home and educating a child simultaneously).

While these limitations were unavoidable, it was possible to account for the potential confounds created by these changes. First, while it was not feasible to keep the data collection timeline the same across all cohorts, it was possible to alter the scheduled data collection points to ensure consistency within cohorts. This change allowed greater adherence to accepted longitudinal methodology (Little 2013) and increased confidence in the validity of the results. Second, to better understand if the transition to working from home or general life responsibilities changed because of Covid-19, three questions were included on all surveys post-March 2020 to analyze these potential confounds. These questions assessed participant's ease of working from home and change in caring responsibilities. They were designed to capture changes to individual's lives that may have decreased their ability to engage in leader identity development due to other essential

demands. Interestingly, neither the transition to working from home nor changes in caring responsibilities significantly interacted with any motivational variable or facet of leader identity throughout the study. For this reason, the changes necessitated to the study by Covid-19 did not unduly influence the variables of focus and did not present confounds within the study.

5.5 Research Implications & Future Directions

Stemming from the findings and limitations within the study, there are multiple implications for research which guide future directions of study. This study is novel as it examines the influence of specific motivational variables on leader identity development at the intraindividual level. While the study delineated the integral nature of cognitive-motivational traits in the process of leader identity development, the complexity of this process highlights the likely influence of other variables. Future research must explore other antecedent factors of leader identity development to further specify this process.

First, future research can begin by examining and adding to the findings of this study. For example, neither learning orientation nor performance orientation were found to influence leader identity development despite being known to affect leader development (Johnson *et al.* 2018), emphasizing the importance of additional research to clarify this relationship. If goal orientation does become exhausted as a motivator due to the longevity of self-regulation required in leader identity development, when exactly does this occur? Future research can explore potential moderators that can act as buffers to increase resilience in the identity work process that may extend the self-regulatory motivation driven by goal orientation.

Second, as this study found that self-perceptive motivational traits are essential to leader identity development, additional research can extend this work by including other variables related

to self-perception. One example could be the inclusion of self-esteem in a revised conceptual model of leader identity development. While self-esteem has been proposed as important to leadership and has been linked to job performance (van Knippenberg *et al.* 2004), there is no known research linking self-esteem to leader identity. As the focus of this study was on cognitive-motivational traits, self-esteem was not included due to its affective properties (Pelham and Swann 1989). However, as self-esteem affects self-perception through these affective processes (Pelham and Swann 1989), it has the potential to play an influential role in the leader identity development process. Thus, in expanding the model delineated in this study to include additional self-preceptive characteristics, the complicated nature of leader identity development can be further clarified.

Furthermore, due to the nascent nature of research conceptualizing perceived prototypicality at the intraindividual level (Hoffmann *et al.* 2020; Guillén 2021), this study did not seek to explore the effect of perceived non-prototypicality and its interaction with other motivational traits. This is due lack of consideration of non-prototypicality at its originally conceived relational level (Rast III *et al.* 2012), which when paired with the nascent level of intraindividual theorization, disallowed the full exploration of this relationship. However, as the findings of this study indicate that high levels of perceived prototypicality significantly influence motivation and leader identity development, it may be presumed that low levels of perceived prototypicality (i.e., perceptions of non-prototypicality) should act in an opposing manner. In its current state, this nascent and incomplete theorization limits the potential utility of perceived prototypicality to positively influence leader identity, as demonstrated in this study. Future research must examine the differences in leader outcomes between those who perceive themselves to be prototypical and non-prototypical to harness the power of this concept.

Another avenue for this research could be to consider how social identities (i.e., demographic traits), influence the process of leader identity development. While there is a body of work highlighting the role of gender in defining one's leader identity (Ely 1995; Muhr 2011; Ryan *et al.* 2021), this research is mainly qualitative, using only female participants (for an exception see (Haake 2009)). Thus, in its current state, the field is unable to compare rates of development across genders. This line of research is especially important as it could provide greater understanding of and solutions to the known inequality in leadership, which often negatively affects women (Fitzsimmons and Callan 2016; Ryan and Haslam 2005). In addition, it is important to consider other social identities in an intersectional manner (Moorosi 2014), as human beings are not defined by a single demographic but are a culmination of a unique combination of multiple social identities (Crenshaw 1990). Without consideration of intersectionality, the nuanced and complex process of leader identity development across different demographic segments will remain unclear, potentially reinforcing systemic inequality in leadership.

Apart from traits, it is important for future research to consider the role of time in leader identity development. Currently, time remains an ambiguous variable in leadership process research. In their review, Fischer *et al.* (2017) noted that 66% of included studies did not specifically consider the role of time in leadership process research. As these processes are inherently temporal, this causes a key variable to be excluded from these studies. This ambiguity can be seen in the leader identity development literature with research proposing that leader identity can be influenced in a matter of weeks (Kwok *et al.* 2020), or that this process occurs over a lifetime (Sveningsson and Alvesson 2003; Eva *et al.* 2021; Liu *et al.* 2021). While it is necessary to balance the temporal considerations in leader identity research with practical considerations of the resource restrictions of these initiatives (Gurdjian *et al.* 2014), it is essential that future research

directly consider and examine the role of time in the leader identity development process. This will allow for better understanding of the time required for this process as well as contributing practical recommendations as to the ideal length of development initiatives.

An additional area for future research is to increase the generalizability of these findings. Through replication of this study in other cultural and organizational contexts, researchers can increase knowledge of the specific contextual influences on the process of leader identity development and the role of motivation. For example, as this study occurred in Western Europe, which is characterized by individualistic cultures, there may be different findings than if this study was employed in an Eastern culture defined by collectivism (Hofstede 1984). The results of this study showed that individuals relied on self-perceptions in motivating themselves to engage in leader identity development. However, if a leader exists in a culture that is more collectivistic and therefore defined by the group (Hofstede 1984), it is possible that self-perceptions become less of a motivator. To further extend generalizability, future research should also explore leader identity development across identity workspaces. While this study chose to focus on formal leadership development programs, identity work can occur across identity workspaces that exist organically and informally within families or volunteer groups (Hammond *et al.* 2017; Palanski *et al.* 2022). Due to the differing nature of these contexts, future research should isolate additional identity workspaces to further explore the content and trajectory of one's identity development across settings. In expanding beyond Western contexts as well as into other industries and identity workspaces, the process of leader identity development can be truly understood on a global scale.

A final extension of this research is to test the methodological finding of the updated factor structure of the Leader Self-Identity measure (Hiller 2005). While the factorial invariance testing and multi-organizational sample lend credence to the validity of this new factor structure, more

research must be undertaken before conclusions can be firmly drawn about its validity and reliability. Particularly, as this instrument is widely utilized in a variety of formats (Day and Sin 2011; Miscenko *et al.* 2017; Middleton *et al.* 2019; Ayoobzadeh and Boies 2020), from a single to three factor structure (Hiller 2005), with little reporting of fit indices, and no empirical validation since its inception, it is time to revisit this measure. In following the guidelines for instrument development and validation (Benson and Clark 1982; Borsa *et al.* 2012), this measure and its potential factor structures can be piloted in a variety of populations, including across cultures (Borsa *et al.* 2012). In conducting this research, not only will this measure become more valid and reliable, diminishing concerns with deficiency and contamination (Chan 2009), it will also become more widely useable, allowing the examination of unique populations in an accurate manner. This will in turn lead to greater accuracy in leader identity research, thus positioning this foundational construct to be effectively applied in practical settings.

5.6 Practical Implications

So, what does this study mean in a more applied way for leadership development practitioners and organizations? First, this study shows, along with previous studies (Schwartz *et al.* 2021), that leader identity development is a complex and timely process, yet it is fundamental to leader and leadership development. Accordingly, leader development initiatives that target leader identity development must be conscious of the time necessary for effective development. Although research has yet to effectively isolate the ideal timeline for leader identity development (Wallace *et al.* 2021), programs that are shorter (e.g., only a few days or weeks) in nature are unlikely to provide adequate stimulation for an identity shift (Day and Sin 2011).

However, to rectify this problem, it is proposed that organizations and leader development practitioners may want to create development initiatives utilizing a leader identity framework and extend these initiatives over a period of months, with regular follow up activities to catalyze ongoing identity work (Wallace *et al.* 2021). This could take place in the form of mentoring (Ayoobzadeh and Boies 2020) or even journaling, structured around specifically activating and reflecting upon one's leader identity. For example, in their qualitative study of 92 leaders, Zheng *et al.* (2020) found that reflective storytelling exercises instigated ongoing reflection and identity work. As it is possible that the rate of development slows over time due to increased cognitive challenge and complexity, these lengthier initiatives will be better poised to allow developing leaders to reflect on these challenges and successfully incorporate them into their identities without suffering the effects of cognitive overload (Kirsh 2000).

Along with the careful consideration of development timelines, organizations should also consider identity workspaces when designing development programs. As noted by Petriglieri and Petriglieri (2010), organizations are becoming ineffective identity workspaces due to the changing nature of the psychological relationship between employees and organizations (Rousseau 1990), where more than ever, employees are expected to engage in self-development (Boyce *et al.* 2010; Reichard *et al.* 2017). However, as identity workspaces are any environment which activates a leader identity and brings it to the foreground for reflection, the careful design of programs to function as identity workspaces may remedy this issue (Petriglieri and Petriglieri 2010). As identity workspaces are characterized as holding environments that bring one's identity forward for examination and revision (Sveningsson and Alvesson 2003), practitioners could use the exercises designed by Clapp-Smith *et al.* (2019) to achieve this goal as they are designed to bring these identities to the foreground for self-reflection. In doing so, organizations can craft leader

development initiatives to act as identity workspaces, activating individual's leader identities and stimulating this deep form of development. In addition, by designing development programs as identity workspaces, organizations allow developing leaders to undergo identity work in their typical context, which this study posits may influence perceived prototypicality.

Despite the positive implications of consciously crafting an identity workspace, it must be noted that systems of organizational control during the identity work process may create extreme stress and feelings of inadequacy and inauthenticity that could lead to turnover and burnout (Nicholson and Carroll 2013; Gagnon and Collinson 2014). Thus, it is important to note that organizations seeking to exert complete control over how individuals define their leader identities may see negative outcomes in the identity work process. Simply put, a balance must be achieved between organizational guidance and individual authenticity to attain the benefits associated with leader identity development.

In addition to constructing an identity workspace to activate one's leader identity, organizations should also consider the role of motivation, especially the motivating nature of self-perceptions in leader development initiatives. For example, as found in this study, perceived prototypicality is predictive of leader identity development. While this trait relies on an individual's perceived match between a current and ideal leader-self, this ideal leader-self can be partially guided by organizational cues. In the creation of cognitive schemas of leadership, individuals draw on social cues from their surroundings and experiences with leadership (Hogg 2001; Markus 1977). If practitioners can communicate to participants that they are prototypical and valued leaders in their setting, they may activate increased perceptions of prototypicality which will drive the motivation to engage in identity work during development. This could be

achieved in exercises which determine participant's perceptions of what their organization views as an ideal leader and comparing this with the leader's perception of themselves.

Self-perceptions that catalyze motivation could even be targeted in program selection. According to Hannah and Avolio (2010), developmental readiness is predictive of developmental success. Therefore, in program selection, organizations could assess leader self-perceptions, creating motivational profiles to better assist the unique needs of developing leaders. Through the consideration of identity workspaces and the role of motivational traits in the lengthy process of leader identity development, organizations will be in a much better position to develop their leaders, closing the leader-talent gap (Kwok *et al.* 2020) and creating a capable leadership pipeline. In doing so, organizations will be able to meet society's increasing need for leaders who are willing and able to galvanize a brighter future (Harris Poll 2021).

5.7 Conclusion

Leader identity is the foundation upon which leaders develop skill and ability, resulting in leader and leadership development (Schwartz *et al.* 2021). It is the cornerstone on which more complex leader capabilities are built (Lord and Hall 2005), and it may provide a solution to the high failure rates and low return on investment plaguing leader development initiatives (Kwok *et al.* 2020). Through a renewed academic focus on the antecedents that stimulate identity work, leaders and organizations can directly benefit from leader identity development through increased leadership capabilities which will aid in navigating the complex challenges that define business in the 21st century. This in turn will allow organizations to come forth as trusted leaders who can play an integral role in solving society's wicked problems.

This thesis extends knowledge on the process of intraindividual leader identity development and the antecedent role of self-efficacy, goal orientation and perceived prototypicality in this process. Through the creation and longitudinal testing of an expectancy process model of leader identity development, this study offers multiple theoretical and methodological contributions to the area of leadership studies.

First, it provides a much-needed return to the original conceptualization of expectancy theory at the cognitive, individual, and temporal levels. In utilizing every aspect of expectancy theory, this study acknowledges the motivational nature of the process of leader identity development, providing an explanation for different developmental rates both within and between-persons. Second, the findings highlight the role of cognitive-motivational traits, particularly those involving self-perception, in instigating leader identity development. This contribution is important in extending our understanding of the exact antecedent mechanisms that catalyze identity work, in the hopes that this deep form of development will become practically accessible. Finally, the thesis makes two key methodological contributions. First, through the longitudinal testing of leader identity development in an organizational population, and second, through the examination of the validity of The Leader Self-Identity measure (Hiller 2005), which concludes that future research must explore the application of this common survey tool. Overall, these contributions stress the complexity inherent in the process of leader identity development as well as the integral role of self-perception in catalyzing the antecedent motivation to engage in the process of identity work.

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Appendix A: Survey Materials

Leading the Way: Developing the Identity of Future Leaders -

Section 1: Consent Form

Q1 Welcome to the first survey for the study, **Leading the Way: Developing the Identity of Future Leaders**. The information you provide about your experience in a leadership development programme will be invaluable for the research project. This is the first of four surveys that will be given during the programme. It takes less than 15 minutes to complete. All information collected will remain anonymous and confidential. Participation is entirely voluntary and respondents may withdraw from the study at any time.

If you are satisfied with this information and plan to participate in the study, please indicate in the box below and continue to the survey. Thank you for your participation!

Yes, I give my consent to participate in this study, the procedures have been adequately explained to me. (1)
No, I do not wish to participate in the study. (2)

Skip To: End of Survey If Welcome to the first survey for the study, Leading the Way: Developing the Identity of Future Lea... = No, I do not wish to participate in the study.

Section 2: Demographics

Q2 What is your gender?

Male (1)
Female (2)
Other (text response optional) (3)
Prefer not to specify (4)

Q3 How old are you?

18-24 (1)
25-34 (2)
35-44 (3)
45-54 (4)
55+ (5)
Prefer not to specify (6)

Q4 What is your ethnicity?

White (1)
Black (2)
Asian (3)
Mixed (4)
Other (text response optional) (5)
Prefer not to specify (6)

Q5 What is your martial status?

Single (1)
Cohabitating (2)
Married (3)
Separated (4)
Divorced (5)
Other (text response optional) (6)
Prefer not to specify (7)

Q6 How many dependents do you have?

None (1)
One (2)
Two (3)
Three (4)
Four (5)
Five (6)
More than 5 (7)

Q7 What is the highest level of education that you have completed?

Secondary school (Leaving Certification/High School) (1)
Bachelors (2)
Masters (3)
MBA (4)
PhD (5)
Other (text response optional) (6)

Q8 What year was this degree completed? Please use (YYYY) format

Q9 What is your current role?

Q10 How long have you been in this current role?

Less than 1 year (1)
1-5 years (2)
6-10 years (3)
11-15 years (4)
16-20 years (5)
More than 20 years (6)

Section 3: Leader Identity

Q11 Please rate the extent to which the following statements describe you.

	Not at all descriptive						Extremely descriptive
I am a leader	1	2	3	4	5	6	7
I see myself as a leader	1	2	3	4	5	6	7
If I had to describe myself to others, I would include the word “leader”	1	2	3	4	5	6	7
I prefer being seen by others as a leader	1	2	3	4	5	6	7

Q12 How important to you is this view of yourself?

	Not at all important						Extremely important
I am a leader	1	2	3	4	5	6	7
I see myself as a leader	1	2	3	4	5	6	7
If I had to describe myself to others, I would include the word “leader”	1	2	3	4	5	6	7
I prefer being seen by others as a leader	1	2	3	4	5	6	7

Q13 How certain are you about each of these statements?

	Not at all certain						Extremely certain
I am a leader	1	2	3	4	5	6	7
I see myself as a leader	1	2	3	4	5	6	7
If I had to describe myself to others, I would include the word “leader”	1	2	3	4	5	6	7
I prefer being seen by others as a leader	1	2	3	4	5	6	7

Section 4: Motivational Traits

Q14 Please rate how true each of these statements are of you.

	Not at all true					Completely true
Thanks to my resourcefulness, I know how to handle unforeseen situations in my job	1	2	3	4	5	6
If I am in trouble at my work, I can usually think of something to do	1	2	3	4	5	6
I can remain calm when facing difficulties in my job because I can rely on my abilities	1	2	3	4	5	6
When I am confronted with a problem in my job, I can usually find several solutions	1	2	3	4	5	6
No matter what comes my way in my job, I'm usually able to handle it	1	2	3	4	5	6
My past experiences in my job have prepared me well for my occupational future	1	2	3	4	5	6
I meet the goals I have set for myself in my job	1	2	3	4	5	6
I feel prepared to meet most of the demands in my job	1	2	3	4	5	6

Q15 Please rate how true each of these statements are of you.

	Strongly disagree				Strongly agree
As a leader, I am a good example of the kind of people that are members of my organisation	1	2	3	4	5
As a leader, I represent what is characteristic about my organisation	1	2	3	4	5
As a leader, I have a lot in common with members of my organisation	1	2	3	4	5

Q16 Please rate how much you agree or disagree with each of the following statements.

	Strongly disagree						Strongly agree
I often read materials related to my work to improve my ability	1	2	3	4	5	6	7
I prefer to work on projects where I can prove my ability to others	1	2	3	4	5	6	7
I often look for opportunities to develop new skills and knowledge	1	2	3	4	5	6	7
Avoiding a show of low ability is more important to me than learning a new skill	1	2	3	4	5	6	7
For me, the development of my work ability is important enough to take risks	1	2	3	4	5	6	7
I prefer to work in situations that require a high level of ability and talent	1	2	3	4	5	6	7
I would rather prove my ability on a task that I can do well at than to try a new task	1	2	3	4	5	6	7
I'm concerned with showing that I can perform better than my co-workers	1	2	3	4	5	6	7
When I don't understand something at work, I prefer to avoid asking what might appear to others to be "dumb questions" that I should know the answer to already	1	2	3	4	5	6	7
I enjoy it when others at work are aware of how well I am doing	1	2	3	4	5	6	7
I am willing to select a challenging work assignment that I can learn a lot from	1	2	3	4	5	6	7
I would avoid taking on a new task if there was a chance that I would appear rather incompetent to others	1	2	3	4	5	6	7
I enjoy challenging and difficult tasks at work where I'll learn new skills	1	2	3	4	5	6	7
I'm concerned about taking on a new task at work if my performance would reveal that I had low ability	1	2	3	4	5	6	7
I prefer to avoid situations at work where I might perform poorly	1	2	3	4	5	6	7
I try to figure out what it takes to prove my ability to others at work	1	2	3	4	5	6	7

Section 5: Effects of Covid-19

Q17 Due to the unique situation presented by Covid-19, some individual's caring responsibilities have changed. Please indicate which statement best represents your caring responsibilities currently when compared to your responsibilities pre-pandemic.

My caring responsibilities are much greater (1)
My caring responsibilities are somewhat greater (2)
My caring responsibilities are about the same (3)
My caring responsibilities are somewhat less (4)
My caring responsibilities are much less (5)

Q18 Due to the unique situation presented by Covid-19, some individuals have begun working from home. Please indicate if you are currently working from home.

Yes, I now work from home (1)
Yes, but I have always worked from home (2)
No, I do not work from home (3)

Skip To: Q27 If Due to the unique situation presented by Covid-19, some individuals have begun working from home.... = No, I do not work from home

Skip To: Q27 If Due to the unique situation presented by Covid-19, some individuals have begun working from home.... = Yes, but I have always worked from home

Q19 If you are now working from home, please state how much you agree or disagree with the following statement: It has been easy for me to continue my work from home.

Strongly disagree (1)
Somewhat disagree (2)
Neither agree nor disagree (3)
Somewhat agree (4)
Strongly agree (5)

Section 6: Conclusion

Q20 Thank you for completing the first survey for the study, **Leading the Way: Developing the Identity of Future Leaders**. Your responses have been recorded and are invaluable for the study. I will be in contact in the coming months with the next survey. In the meantime, please feel free to contact me with any questions at: sarah.greeley@umail.ucc.ie. Thank you!

Appendix B: Descriptive Statistics

Pre-Program Descriptive Statistics

The descriptive statistics from the pre-program data collection phase can be found in *Table 23*.

Table 23: Pre-Program Descriptive Statistics

	N	Mean	SD	Minimum	Maximum
Gender	109	1.30	.462	1 (Female)	2 (Male)
Age	109	3.06	1.13	1 (18-24)	5 (55+)
Sector	109	1.36	.482	1 (Public)	2 (Private)
Leader Identity	109	4.95	.948	2.25	7.00
Self-Efficacy	109	4.90	.536	3.38	6.00
Perceived Prototypicality	84	3.83	.723	2.00	5.00
Learning Orientation	109	5.67	.666	3.83	7.00
Performance Orientation	109	3.38	.928	1.10	5.50
Leader Identity (Importance)	109	4.93	1.16	1.00	7.00
Leader Identity (Certainty)	109	5.47	.918	2.50	7.00
Leader Identity (Descriptiveness)	109	4.31	1.38	1.00	7.00

The means indicate that largely participants entered the leadership development programs with relatively strong leader identities (4.95/7.00), high self-efficacy (4.90/6.00), and predominantly held learning orientations (5.67/7.00). Participants also reported strong feelings of perceived prototypicality with a mean of 3.38 out of 5.00. The lowest mean in the sample was for performance orientation, which was 3.38 out of 7.00. Interestingly, despite all other variables

receiving the maximum scores for some participants (e.g., the maximum score for leader identity was 7.00, which was the maximum value reported), performance orientation had a maximum score of 5.50 out of 7.00, indicating that overall, participants in the study did not hold dominant performance orientations.

As seen from the descriptive statistics, the updated certainty factor of leader identity has the highest mean while the descriptiveness dimension displays the lowest mean. Based on the item wording in each of these factors, it appears that before entering the programs, participants held a strong internal perception of their leader identities while not necessarily preferring to be exclusively viewed this way by others.

Mid-Program Descriptive Statistics

At the second wave of data collection, means, change in means from the initial wave, and standard deviations were assessed, which can be found in *Table 24*.

Table 24: Mid-Program Descriptive Statistics

	N	Mean	SD	Minimum	Maximum
Gender	77	1.35	.480	1 (Female)	2 (Male)
Age	77	3.29	.795	2 (25-34)	5 (55+)
Sector	77	1.34	.476	1 (Public)	2 (Private)
Leader Identity	77	5.02 (+0.07)	.973	1.92	6.83
Self-Efficacy	76	4.91 (+0.01)	.584	3.00	6.00
Perceived Prototypicality	76	3.76 (-0.07)	.860	1.67	5.00
Learning Orientation	75	5.03 (-0.64)	1.24	2.17	6.83
Performance Orientation	75	3.56 (+0.18)	.912	1.60	5.60
Leader Identity (Importance)	77	4.96 (+0.03)	1.23	1.40	7.00
Leader Identity (Certainty)	77	5.58 (+0.11)	.885	2.50	7.00
Leader Identity (Descriptiveness)	77	4.38 (+0.07)	1.43	1.00	7.00

It is important to note that in *Table 24*, the sample size drops to 76 respondents for self-efficacy and perceived prototypicality and 75 for the goal orientation variables. However, as the full sample responded to the leader identity questions in survey two, all 77 partial responses were included in the analysis to maintain a greater sample size for structural equation modeling, as sample size heavily influences the validity of results in SEM analyses (Little 2013; Schumaker and Lomax 2016). Mean substitution was used to account for the missing data points, as the amount of missing data was only 1% (Schumaker and Lomax 2016).

The means and standard deviations were relatively similar from pre to mid-program. Participants maintained strong leader identities with the mean increasing 0.07 between data collection points. The mean for each separate leader identity factor also increased between data collection points. Self-efficacy remained almost identical with a slight increase (+0.01). Although participants still reported holding stronger learning orientations than performance orientations (mean = 5.03 and 3.56 respectively), the largest change in variables from Time 1 to Time 2 was in learning orientation which decreased 0.64 points. This indicates that either those who left the study from Time 1 to Time 2 were those who hold learning orientations, or that performance orientations became more important to individual's approaches to the development setting over time, as this variable had a 0.18 increase. Interestingly, the mean for perceived prototypicality also slightly decreased (-0.07), indicating that participant's perceptions of fit may have slightly changed over time.

Post-Program Descriptive Statistics

During the final wave of data analysis, means, change in means from the initial data collection wave and standard deviations were analyzed. The results of these analyses can be found in *Table 25*.

Table 25: Post-Program Descriptive Statistics

	N	Mean	SD	Minimum	Maximum
Gender	55	1.32	.474	1	2
Age	55	3.03	1.07	1	5
Sector	55	1.36	.485	1	2
Leader Identity	55	5.22 (+0.27)	.847	2.25	6.92
Self-Efficacy	55	5.05 (+0.15)	.464	3.75	5.88
Perceived Prototypicality	55	3.85 (+0.02)	.793	1.33	5.00
Learning Orientation	55	5.72 (+0.05)	.671	3.33	7.00
Performance Orientation	55	3.35 (-0.03)	.895	1.30	5.40
Leader Identity (Importance)	55	5.22 (+0.29)	1.04	1.60	6.80
Leader Identity (Certainty)	55	5.69 (+0.22)	.776	3.75	7.00
Leader Identity (Descriptiveness)	55	4.58 (+0.27)	1.23	1.00	7.00

The means and standard deviations kept a similar pattern in the final wave of data collection. Leader identity continued to increase and reported the highest mean score of the entire study. Overall, participants leader identities increased throughout the study by a total of 0.27. Each leader identity factor also mirrored the increase of the global factor. The importance dimension had the greatest mean increase at 0.29 while certainty increased 0.22 and descriptiveness increased 0.27. The certainty dimension maintained the highest mean score of the leader identity factors across the study. Self-efficacy also experienced the greatest increase from Time 2 to Time 3

increasing 0.14 to a mean of 5.05. Regarding the goal orientation variables, despite the significant decrease in learning orientation from Time 1 to Time 2 (-0.64), there was a significant increase in this variable from Time 2 to Time 3 for an overall increase of 0.05 in participant's learning orientations. Performance orientation was the only variable to display an overall decrease in mean across the study for a final score of 3.35. Although this overall decrease was only -0.03 and not statistically significant, when taken with the overall increase in learning orientation, it does lend credence to the idea that leader identity becomes increasingly internalized over time (Lord and Hall 2005). Finally, perceived prototypicality recovered from the decrease in mean score at Time 2 for a final mean of 3.85, with an overall increase of 0.02 throughout the study. This slight decrease followed by an increase in perceived prototypicality mirrors findings in similar studies on leader identity that have found evidence for a J-shaped curve in leader identity development and relevant variables involved in this process (Day and Sin 2011).

Appendix C: R Code for Structural Equation Modeling

Pre-Program Data Analysis:

Pre-Program Confirmatory Factor Analyses:

#CFA of Global Model of Leader Identity

```
> modelli<-'
  LIONE=~LI1+LI2+LI3+LI4+LI5+LI6+LI7+LI8+LI9+LI10+LI11+LI12'
>fitli1<-sem(modelli, data=t1_sem, std.lv=TRUE, ordered=TRUE, missing= “pairwise”)
>summary(fitli1, fit.measures=TRUE)
```

#CFA of Original Three Factor Model of Leader Identity

```
>limodel3factorog<-'
  LIONE=~LI1+LI2+LI3+LI4
  LITWO=~LI5+LI6+LI7+LI8
  LITHREE=~LI9+LI10+LI11+LI12 '
>fit3factorog <- sem(limodel3factorog,data=T1_SEM_Multifactor, std.lv=TRUE,
ordered=TRUE, missing = "pairwise")
>summary(fit3factorog,standardized=TRUE,fit.measures=TRUE)
```

#CFA of Updated Three Factor Model of Leader Identity

```
>limodel3factor<-'
  LIONE=~LI4+LI5+LI6+LI8+LI12
  LITWO=~LI1+LI2+LI9+LI10
  LITHREE=~LI3+LI7+LI11 '
>fit3factor <- sem(limodel3factor,data=T1_SEM_Multifactor, std.lv=TRUE, ordered=TRUE,
missing = "pairwise")
>summary(fit3factor,standardized=TRUE,fit.measures=TRUE)
```

Pre-Program Structural Equation Models:

#SEM of Global Factor of Leader Identity and All Predictors (Model 1)

```
>model1.1<-'
  LI=~LI1+LI2+LI3+LI4+LI5+LI6+LI7+LI8+LI9+LI10+LI11+LI12
```

```
  SE=~SE1+SE2+SE3+SE4+SE5+SE6+SE7+SE8
  LO=~GO1+GO3+GO5+GO6+GO11+GO13
  PO=~GO2+GO4+GO7+GO8+GO9+GO10+GO12+GO14+GO15+GO16
  PROTO=~Proto1+Proto2+Proto3
  LI~SE
  LI~LO
  LI~PO
  LI~Proto'
>fit1.1<-sem(model1.1, data=T1_SEM_Multifactor, std.lv=TRUE, ordered=TRUE,
missing="pairwise")
>summary(fit1.1,fit.measures=TRUE,standardized=TRUE,rsquare=TRUE,ci=TRUE)
```

#SEM of Global Factor of Leader Identity Excluding Perceived Prototypicality (Model 2)

```
>model1.2<-'
LI=~LI1+LI2+LI3+LI4+LI5+LI6+LI7+LI8+LI9+LI10+LI11+LI12
  SE=~SE1+SE2+SE3+SE4+SE5+SE6+SE7+SE8
  LO=~GO1+GO3+GO5+GO6+GO11+GO13
  PO=~GO2+GO4+GO7+GO8+GO9+GO10+GO12+GO14+GO15+GO16
  LI~SE
  LI~LO
  LI~PO'
>fit1.2<-sem(model1.2, data=T1_SEM_Multifactor, ordered=TRUE)
>summary(fit1.2,fit.measures=TRUE,standardized=TRUE, rsquare=TRUE,ci=TRUE)
```

#SEM of Updated Leader Identity Factors and All Predictors (Model 3)

```
>limodel3factor<-'
  LIONE=~LI4+LI5+LI6+LI8+LI12
  LITWO=~LI1+LI2+LI9+LI10
  LITHREE=~LI3+LI7+LI11
  SE=~SE1+SE2+SE3+SE4+SE5+SE6+SE7+SE8
  LO=~GO1+GO3+GO5+GO6+GO11+GO13
```

```
  PO=~GO2+GO4+GO7+GO8+GO9+GO10+GO12+GO14+GO15+GO16
  PROTO=~Proto1+Proto2+Proto3
  LIONE~SE
  LIONE~LO
  LIONE~PO
  LIONE~PROTO
  LITWO~SE
  LITWO~LO
  LITWO~PO
  LITWO~PROTO
  LITHREE~SE
  LITHREE~LO
  LITHREE~PO
  LITHREE~PROTO'
>fit3factor <- sem(limodel3factor,data=T1_SEM_Multifactor, std.lv=TRUE, ordered=TRUE,
missing = "pairwise")
>summary(fit3factor,standardized=TRUE,fit.measures=TRUE, rsquare=TRUE)
```

#SEM of Updated Leader Identity Factors Excluding Perceived Prototypicality (Model 4)

```
>limodel3factornoproto<-'
  LIONE=~LI4+LI5+LI6+LI8+LI12
  LITWO=~LI1+LI2+LI9+LI10
  LITHREE=~LI3+LI7+LI11
  SE=~SE1+SE2+SE3+SE4+SE5+SE6+SE7+SE8
  LO=~GO1+GO3+GO5+GO6+GO11+GO13
  PO=~GO2+GO4+GO7+GO8+GO9+GO10+GO12+GO14+GO15+GO16
  LIONE~SE
  LIONE~LO
  LIONE~PO
  LITWO~SE
  LITWO~LO
```

LITWO~PO

LITHREE~SE

LITHREE~LO

LITHREE~PO'

>fit3factornoproto <- sem(limodel3factornoproto,data=T1_SEM_Multifactor, std.lv=TRUE, ordered=TRUE, missing = "pairwise")

>summary(fit3factornoproto,standardized=TRUE,fit.measures=TRUE, rsquare=TRUE)

Mid-Program Data Analysis:

Mid-Program Confirmatory Factor Analyses:

#CFA of Global Model of Leader Identity

>LIcfa1.2<-'

LI=~Q12.1.2+Q12.2.2+Q12.3.2+Q12.4.2+Q13.1.2+Q13.2.2+Q13.3.2+Q13.4.2+Q14.1.2+Q14.2.2+Q14.3.2+Q14.4.2'

>fitLI1.2<-sem(LIcfa1.2, data=FullSet_T2, std.lv=TRUE, ordered=TRUE, missing= "pairwise")

>summary(fitLI1.2, fit.measures=TRUE)

#CFA of Original Three Factor Model of Leader Identity

>LIcfaOG3<-'

LIONE=~Q12.4.2+Q12.3.2+Q12.2.2+Q12.1.2

LITWO=~Q13.1.2+Q13.2.2+Q13.3.2+Q13.4.2

LITHREE=~Q14.3.2+Q14.4.2+Q14.2.2+Q14.1.2'

>fitLIOG3<-sem(LIcfaOG3, data=FullSet_T2, std.lv=TRUE, ordered=TRUE)

>summary(fitLIOG3, fit.measures=TRUE)

#CFA of Updated Three Factor Model of Leader Identity

>LIcfa2.2<-'

LIONE=~Q12.4.2+Q14.4.2+Q13.4.2+Q13.1.2+Q13.2.2

LITWO=~Q12.1.2+Q12.2.2+Q14.1.2+Q14.2.2

LITHREE=~Q12.3.2+Q13.3.2+Q14.3.2'

>fitLI2.2<-sem(LIcfa2.2, data=FullSet_T2, std.lv=TRUE, ordered=TRUE)

>summary(fitLI2.2, fit.measures=TRUE)

Mid-Program Structural Equation Models:

#SEM of Updated Leader Identity Factors and All Predictors (Model 1)

```
>model1.1<-'
LIONE=~Q12.4.2+Q14.4.2+Q13.4.2+Q13.1.2+Q13.2.2
LITWO=~Q12.1.2+Q12.2.2+Q14.1.2+Q14.2.2
LITHREE=~Q12.3.2+Q13.3.2+Q14.3.2
SE=~Q15.1.2+Q15.2.2+Q15.3.2+Q15.4.2+Q15.5.2+Q15.6.2+Q15.7.2+Q15.8.2
LO=~Q16.1.2+Q16.3.2+Q16.5.2+Q16.6.2+Q16.11.2+Q16.13.2
PO=~Q16.2.2+Q16.4.2+Q16.7.2+Q16.8.2+Q16.9.2+Q16.10.2+Q16.12.2+Q16.14.2+Q16.15.2+
Q.16.16.2
PROTO=~Q35.1.2+Q35.2.2+Q35.3.2
LIONE~SE
LIONE~LO
LIONE~PO
LIONE~PROTO
LITWO~SE
LITWO~LO
LITWO~PO
LITWO~PROTO
LITHREE~SE
LITHREE~LO
LITHREE~PO
LITHREE~PROTO'
>fitmodel1.1<-sem(model1.1, data=FullSet_T2, std.lv=TRUE, ordered=TRUE, missing=
"pairwise")
>summary(fitmodel1.1, fit.measures=TRUE, rsquare=TRUE)
```

#SEM of Updated Leader Identity Factors Excluding Learning Orientation (Model 2)

```
>model1.2<-'
```

LIONE=~Q12.4.2+Q14.4.2+Q13.4.2+Q13.1.2+Q13.2.2

LITWO=~Q12.1.2+Q12.2.2+Q14.1.2+Q14.2.2

LITHREE=~Q12.3.2+Q13.3.2+Q14.3.2

SE=~Q15.1.2+Q15.2.2+Q15.3.2+Q15.4.2+Q15.5.2+Q15.6.2+Q15.7.2+Q15.8.2

PO=~Q16.2.2+Q16.4.2+Q16.7.2+Q16.8.2+Q16.9.2+Q16.10.2+Q16.12.2+Q16.14.2+Q16.15.2+ Q.16.16.2

PROTO=~Q35.1.2+Q35.2.2+Q35.3.2

LIONE~SE

LIONE~PO

LIONE~PROTO

LITWO~SE

LITWO~PO

LITWO~PROTO

LITHREE~SE

LITHREE~PO

LITHREE~PROTO'

>fitmodel1.2<-sem(model1.2, data=FullSet_T2, std.lv=TRUE, ordered=TRUE, missing= "pairwise")

>summary(fitmodel1.2, fit.measures=TRUE, rsquare=TRUE)

#SEM of Updated Leader Identity Factors Excluding Learning and Performance Orientation (Model 3)

>model1.3<-'

LIONE=~Q12.4.2+Q14.4.2+Q13.4.2+Q13.1.2+Q13.2.2

LITWO=~Q12.1.2+Q12.2.2+Q14.1.2+Q14.2.2

LITHREE=~Q12.3.2+Q13.3.2+Q14.3.2

SE=~Q15.1.2+Q15.2.2+Q15.3.2+Q15.4.2+Q15.5.2+Q15.6.2+Q15.7.2+Q15.8.2

PROTO=~Q35.1.2+Q35.2.2+Q35.3.2

LIONE~SE

LIONE~PROTO

LITWO~SE

LITWO~PROTO

LITHREE~SE

LITHREE~PROTO'

>fitmodel1.3<-sem(model1.3, data=FullSet_T2,ordered=TRUE, missing= "pairwise")

>summary(fitmodel1.3, fit.measures=TRUE, rsquare=TRUE)

Post-Program Data Analysis:

Post-Program Confirmatory Factor Analyses:

#CFA of Global Model of Leader Identity

>globalLICFAT3<-'

LI=~Q12.1.3+Q12.2.3+Q12.3.3+Q12.4.3+Q13.1.3+Q13.2.3+Q13.3.3+Q13.4.3+Q14.1.3+Q14.2.3+Q14.3.3+Q14.4.3'

>fitLIglobalT3<-sem(globalLICFAT3, data=T3_Data, std.lv=TRUE, ordered=TRUE, missing= "pairwise")

>summary(fitLIglobalT3, fit.measures=TRUE)

#CFA of Original Three Factor Model of Leader Identity

>LIOGT3<-'

LIONE=~Q12.4.3+Q12.3.3+Q12.2.3+Q12.1.3

LITWO=~Q13.1.3+Q13.2.3+Q13.3.3+Q13.4.3

LITHREE=~Q14.2.3+Q14.1.3+Q14.3.3+Q14.4.3'

>fitLIOGT3<-sem(LIOGT3, data=T3_Data, std.lv=TRUE, ordered=TRUE)

>summary(fitLIOGT3, fit.measures=TRUE)

#CFA of Updated Three Factor Model of Leader Identity

>LIT3<-'

LIONE=~Q12.4.3+Q14.4.3+Q13.4.3+Q13.1.3+Q13.2.3

LITWO=~Q12.1.3+Q12.2.3+Q14.1.3+Q14.2.3

LITHREE=~Q12.3.3+Q13.3.3+Q14.3.3'

>fitLIT3<-sem(LIT3, data=T3_Data, std.lv=TRUE, ordered=TRUE)

>summary(fitLIT3, fit.measures=TRUE)

Post-Program Structural Equation Models:

#SEM of Updated Leader Identity Factors and All Predictors (Model 1)

```
>modelT3<-'
LIONE=~Q12.4.3+Q14.4.3+Q13.4.3+Q13.1.3+Q13.2.3
LITWO=~Q12.1.3+Q12.2.3+Q14.1.3+Q14.2.3
LITHREE=~Q12.3.3+Q13.3.3+Q14.3.3
SE=~Q15.1.3+Q15.2.3+Q15.3.3+Q15.4.3+Q15.5.3+Q15.6.3+Q15.7.3+Q15.8.3
LO=~Q16.1.3+Q16.3.3+Q16.5.3+Q16.6.3+Q16.11.3+Q16.13.3
PO=~Q16.2.3+Q16.4.3+Q16.7.3+Q16.8.3+Q16.9.3+Q16.10.3+Q16.12.3+Q16.14.3+Q16.15.3+
Q16.16.3
PROTO=~Q36.1.3+Q36.2.3+Q36.3.3
LIONE~SE
LIONE~LO
LIONE~PO
LIONE~PROTO
LITWO~SE
LITWO~LO
LITWO~PO
LITWO~PROTO
LITHREE~SE
LITHREE~LO
LITHREE~PO
LITHREE~PROTO'
>fitmodelT3<-sem(modelT3, data=T3_Data, std.lv=TRUE, ordered=TRUE, missing=
"pairwise")
>summary(fitmodelT3, fit.measures=TRUE, rsquare=TRUE)
```

#SEM of Updated Leader Identity Factors Excluding Learning Orientation (Model 2)

```
>modelT3.1<-'
LIONE=~Q12.4.3+Q14.4.3+Q13.4.3+Q13.1.3+Q13.2.3
```

```
LITWO=~Q12.1.3+Q12.2.3+Q14.1.3+Q14.2.3
LITHREE=~Q12.3.3+Q13.3.3+Q14.3.3
SE=~Q15.1.3+Q15.2.3+Q15.3.3+Q15.4.3+Q15.5.3+Q15.6.3+Q15.7.3+Q15.8.3
PO=~Q16.2.3+Q16.4.3+Q16.7.3+Q16.8.3+Q16.9.3+Q16.10.3+Q16.12.3+Q16.14.3+Q16.15.3+
Q16.16.3
PROTO=~Q36.1.3+Q36.2.3+Q36.3.3
LIONE~SE
LIONE~PO
LIONE~PROTO
LITWO~SE
LITWO~PO
LITWO~PROTO
LITHREE~SE
LITHREE~PO
LITHREE~PROTO'
>fitmodelT3.1<-sem(modelT3.1, data=T3_Data, std.lv=TRUE, ordered=TRUE, missing=
"pairwise")
>summary(fitmodelT3.1, fit.measures=TRUE, rsquare=TRUE)
```

#SEM of Updated Leader Identity Factors Excluding Learning and Performance Orientation (Model 3)

```
>modelT3.2<-'
LIONE=~Q12.4.3+Q14.4.3+Q13.4.3+Q13.1.3+Q13.2.3
LITWO=~Q12.1.3+Q12.2.3+Q14.1.3+Q14.2.3
LITHREE=~Q12.3.3+Q13.3.3+Q14.3.3
SE=~Q15.1.3+Q15.2.3+Q15.3.3+Q15.4.3+Q15.5.3+Q15.6.3+Q15.7.3+Q15.8.3
PROTO=~Q36.1.3+Q36.2.3+Q36.3.3
LIONE~SE
LIONE~PROTO
LITWO~SE
LITWO~PROTO
```

```
LITHREE~SE
LITHREE~PROTO'
>fitmodelT3.2<-sem(modelT3.2, data=T3_Data, std.lv=TRUE, ordered=TRUE, missing=
"pairwise")
>summary(fitmodelT3.2, fit.measures=TRUE, rsquare=TRUE)
```

Longitudinal Data Analysis:

Factorial Invariance:

#Factorial Invariance Test of Importance Factor of Leader Identity (Model 1)

```
>modellif1 <- '
        lit1 =~ LI4+LI5+LI6+LI8+LI12
        lit2 =~ LI4.2+LI5.2+LI6.2+LI8.2+LI12.2
        lit3 =~ LI4.3+LI5.3+LI6.3+LI8.3+LI12.3
        lit2 ~ lit1
        lit3 ~ lit2
        LI4+LI5+LI6+LI8+LI12 ~ 1
        LI4.2+LI5.2+LI6.2+LI8.2+LI12.2 ~ 1
        LI4.3+LI5.3+LI6.3+LI8.3+LI12.3 ~ 1
        LI4 ~~ LI4.2
        LI5 ~~ LI5.2
        LI6 ~~ LI6.2
        LI8 ~~ LI8.2
        LI12 ~~ LI12.2
        LI4.2 ~~ LI4.3
        LI5.2 ~~ LI5.3
        LI6.2 ~~ LI6.3
        LI8.2 ~~ LI8.3
        LI12.2 ~~ LI12.3'
>fitlif1 <- sem(modellif1,data=Panel_Analysis,std.lv=TRUE, missing="ml")
>summary(fitlif1,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Certainty Factor of Leader Identity (Model 2)

```
>modellif2 <- '
        lit1 =~ LI1+LI2+LI9+LI10
        lit2 =~ LI1.2+LI2.2+LI9.2+LI10.2
        lit3 =~ LI1.3+LI2.3+LI9.3+LI10.3
        lit2 ~ lit1
        lit3 ~ lit2
        LI1+LI2+LI9+LI10 ~ 1
        LI1.2+LI2.2+LI9.2+LI10.2 ~ 1
        LI1.3+LI2.3+LI9.3+LI10.3 ~ 1
        LI1 ~~ LI1.2
        LI2 ~~ LI2.2
        LI9 ~~ LI9.2
        LI10 ~~ LI10.2
        LI1.2 ~~ LI1.3
        LI2.2 ~~ LI2.3
        LI9.2 ~~ LI9.3
        LI10.2 ~~ LI10.3'
>fitlif2 <- sem(modellif2,data=Panel_Analysis,std.lv=TRUE, missing="ml")
>summary(fitlif2,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Descriptiveness Factor of Leader Identity (Model 3)

```
>modellif3 <- '
        lit1 =~ LI3+LI7+LI11
        lit2 =~ LI3.2+LI7.2+LI11.2
        lit3 =~ LI3.3+LI7.3+LI11.3
        lit2 ~ lit1
        lit3 ~ lit2
        LI3+LI7+LI11 ~ 1
        LI3.2+LI7.2+LI11.2 ~ 1
        LI3.3+LI7.3+LI11.3 ~ 1
```

```
        LI3 ~~ LI3.2
        LI7 ~~ LI7.2
        LI11 ~~ LI11.2
        LI3.2 ~~ LI3.3
        LI7.2 ~~ LI7.3
        LI11.2 ~~ LI11.3'
>fitlif3 <- sem(modellif3,data=Panel_Analysis,std.lv=TRUE, missing="ml")
>summary(fitlif3,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Global Measure of Leader Identity (Model 4)

```
>modellicp1 <- '
        lit1 =~ LI1+LI2+LI3+LI4+LI5+LI6+LI7+LI8+LI9+LI10+LI11+LI12
        lit2 =~
LI1.2+LI2.2+LI3.2+LI4.2+LI5.2+LI6.2+LI7.2+LI8.2+LI9.2+LI10.2+LI11.2+LI12.2
        lit3 =~
LI1.3+LI2.3+LI3.3+LI4.3+LI5.3+LI6.3+LI7.3+LI8.3+LI9.3+LI10.3+LI11.3+LI12.3
        lit2 ~ lit1
        lit3 ~ lit2
        LI1+LI2+LI3+LI4+LI5+LI6+LI7+LI8+LI9+LI10+LI11+LI12 ~ 1
        LI1.2+LI2.2+LI3.2+LI4.2+LI5.2+LI6.2+LI7.2+LI8.2+LI9.2+LI10.2+LI11.2+LI12.2 ~ 1
        LI1.3+LI2.3+LI3.3+LI4.3+LI5.3+LI6.3+LI7.3+LI8.3+LI9.3+LI10.3+LI11.3+LI12.3 ~ 1
        LI1 ~~ LI1.2
        LI2 ~~ LI2.2
        LI3 ~~ LI3.2
        LI4 ~~ LI4.2
        LI5 ~~ LI5.2
        LI6 ~~ LI6.2
        LI7 ~~ LI7.2
        LI8 ~~ LI8.2
        LI9 ~~ LI9.2
        LI10 ~~ LI10.2
```

```
        LI11 ~~ LI11.2
        LI12 ~~ LI12.2
        LI1.2 ~~ LI1.3
        LI2.2 ~~ LI2.3
        LI3.2 ~~ LI3.3
        LI4.2 ~~ LI4.3
        LI5.2 ~~ LI5.3
        LI6.2 ~~ LI6.3
        LI7.2 ~~ LI7.3
        LI8.2 ~~ LI8.3
        LI9.2 ~~ LI9.3
        LI10.2 ~~ LI10.3
        LI11.2 ~~ LI11.3
        LI12.2 ~~ LI12.3'
>fitlicp1 <- sem(modellicp1,data=Panel_Analysis,std.lv=TRUE, missing="ml")
>summary(fitlicp1,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Self-Efficacy

```
>modelsefi <- '
        set1 =~ Q15_1+Q15_2+Q15_3+Q15_4+Q15_5+Q15_6+Q15_7+Q15_8
        set2 =~ Q15_1.2+Q15_2.2+Q15_3.2+Q15_4.2+Q15_5.2+Q15_6.2+Q15_7.2+Q15_8.2
        set3 =~ Q15_1.3+Q15_2.3+Q15_3.3+Q15_4.3+Q15_5.3+Q15_6.3+Q15_7.3+Q15_8.3
        set2 ~ set1
        set3 ~ set2
        Q15_1+Q15_2+Q15_3+Q15_4+Q15_5+Q15_6+Q15_7+Q15_8 ~ 1
        Q15_1.2+Q15_2.2+Q15_3.2+Q15_4.2+Q15_5.2+Q15_6.2+Q15_7.2+Q15_8.2 ~ 1
        Q15_1.3+Q15_2.3+Q15_3.3+Q15_4.3+Q15_5.3+Q15_6.3+Q15_7.3+Q15_8.3 ~ 1
        Q15_1 ~~ Q15_1.2
        Q15_2 ~~ Q15_2.2
        Q15_3 ~~ Q15_3.2
        Q15_4 ~~ Q15_4.2
```

```
        Q15_5 ~~ Q15_5.2
        Q15_6 ~~ Q15_6.2
        Q15_7 ~~ Q15_7.2
        Q15_8 ~~ Q15_8.2
        Q15_1.2 ~~ Q15_1.3
        Q15_2.2 ~~ Q15_2.3
        Q15_3.2 ~~ Q15_3.3
        Q15_4.2 ~~ Q15_4.3
        Q15_5.2 ~~ Q15_5.3
        Q15_6.2 ~~ Q15_6.3
        Q15_7.2 ~~ Q15_7.3
        Q15_8.2 ~~ Q15_8.3'
>fitsefi <- sem(modelsefi,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE, missing="ml")
>summary(fitsefi,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Perceived Prototypicality

```
>modelprotofi <- '
        protot1 =~ Q35_1+Q35_2+Q35_3
        protot2 =~ Q35_1.2+Q35_2.2+Q35_3.2
        protot3 =~ Q35_1.3+Q35_2.3+Q35_3.3
        protot2 ~ protot1
        protot3 ~ protot2
        Q35_1+Q35_2+Q35_3~ 1
        Q35_1.2+Q35_2.2+Q35_3.2 ~ 1
        Q35_1.3+Q35_2.3+Q35_3.3 ~ 1
        Q35_1 ~~ Q35_1.2
        Q35_2 ~~ Q35_2.2
        Q35_3 ~~ Q35_3.2
        Q35_1.2 ~~ Q35_1.3
        Q35_2.2 ~~ Q35_2.3
        Q35_3.2 ~~ Q35_3.3'
```

```
>fitprotofi <- sem(modelprotofi,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,
missing="ml")
>summary(fitprotofi,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Learning Orientation

```
>modellofi <- '
        lot1 =~ Q16_1+Q16_3+Q16_5+Q16_6+Q16_11+Q16_13
        lot2 =~ Q16_1.2+Q16_3.2+Q16_5.2+Q16_6.2+Q16_11.2+Q16_13.2
        lot3 =~ Q16_1.3+Q16_3.3+Q16_5.3+Q16_6.3+Q16_11.3+Q16_13.3
        lot2 ~ lot1
        lot3 ~ lot2
        Q16_1+Q16_3+Q16_5+Q16_6+Q16_11+Q16_13~ 1
        Q16_1.2+Q16_3.2+Q16_5.2+Q16_6.2+Q16_11.2+Q16_13.2~ 1
        Q16_1.3+Q16_3.3+Q16_5.3+Q16_6.3+Q16_11.3+Q16_13.3~ 1
        Q16_1 ~~ Q16_1.2
        Q16_3 ~~ Q16_3.2
        Q16_5 ~~ Q16_5.2
        Q16_6 ~~ Q16_6.2
        Q16_11 ~~ Q16_11.2
        Q16_13 ~~ Q16_13.2
        Q16_1.2 ~~ Q16_1.3
        Q16_3.2 ~~ Q16_3.3
        Q16_5.2 ~~ Q16_5.3
        Q16_6.2 ~~ Q16_6.3
        Q16_11.2 ~~ Q16_11.3
        Q16_13.2 ~~ Q16_13.3'
>fitlofi <- sem(modellofi,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE, missing="ml")
>summary(fitlofi,standardized=TRUE,fit.measures=TRUE)
```

#Factorial Invariance Test of Performance Orientation

```
>modelpofi <- '
```

pot1 =~ Q16_2+Q16_4+Q16_7+Q16_8+Q16_9+Q16_10+Q16_12+Q16_14+Q16_15+Q16_16

pot2 =~ Q16_2.2+Q16_4.2+Q16_7.2+Q16_8.2+Q16_.2+Q16_10.2+Q16_12.2+Q16_14.2+Q16_15.2+Q16_16.2

pot3 =~ Q16_2.3+Q16_4.3+Q16_7.3+Q16_8.3+Q16_9.3+Q16_10.3+Q16_12.3+Q16_14.3+Q16_15.3+Q16_16.3

pot2 ~ pot1

pot3 ~ pot2

Q16_2+Q16_4+Q16_7+Q16_8+Q16_9+Q16_10+Q16_12+Q16_14+Q16_15+Q16_16 ~ 1

Q16_2.2+Q16_4.2+Q16_7.2+Q16_8.2+Q16_.2+Q16_10.2+Q16_12.2+Q16_14.2+Q16_15.2+Q16_16.2 ~ 1

Q16_2.3+Q16_4.3+Q16_7.3+Q16_8.3+Q16_9.3+Q16_10.3+Q16_12.3+Q16_14.3+Q16_15.3+Q16_16.3

Q16_2 ~~ Q16_2.2

Q16_4 ~~ Q16_4.2

Q16_7 ~~ Q16_7.2

Q16_8 ~~ Q16_8.2

Q16_9 ~~ Q16_9.2

Q16_10 ~~ Q16_10.2

Q16_12 ~~ Q16_12.2

Q16_14 ~~ Q16_14.2

Q16_15 ~~ Q16_15.2

Q_16 ~~ Q16_16.2

Q16_2.2 ~~ Q16_2.3

Q16_4.2 ~~ Q16_4.3

Q16_7.2 ~~ Q16_7.3

Q16_8.2 ~~ Q16_8.3

Q16_9.2 ~~ Q16_9.3

Q16_10.2 ~~ Q16_10.3

```
        Q16_12.2 ~~ Q16_12.3
        Q16_14.2 ~~ Q16_14.3
        Q16_15.2 ~~ Q16_15.3
        Q16_16.2 ~~ Q16_16.3'
>fitspofi <- sem(modelpofi,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,
missing="ml")
>summary(fitpofi,standardized=TRUE,fit.measures=TRUE)
```

Cross-Lagged Panel Analysis:

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Self-Efficacy, Pre-Program to Mid-Program

```
>modellif1SE <- '
        LIt1 =~ a1*Q12_4+a2*Q13_1+a3*Q13_2+a4*Q13_4+a5*Q14_4
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt2 ~ LIt1
        Q12_4 ~~ Q12_4.2
        Q13_1 ~~ Q13_1.2
        Q13_2 ~~ Q13_2.2
        Q13_4 ~~ Q13_4.2
        Q14_4 ~~ Q14_4.2
        SEt1 =~
b1*Q15_1+b2*Q15_2+b3*Q15_3+b4*Q15_4+b5*Q15_5+b6*Q15_6+b7*Q15_7+b8*Q15_8
        SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2
        SEt2 ~ SEt1
        Q15_1 ~~ Q15_1.2
        Q15_2 ~~ Q15_2.2
        Q15_3 ~~ Q15_3.2
        Q15_4 ~~ Q15_4.2
        Q15_5 ~~ Q15_5.2
```

```
        Q15_6 ~~ Q15_6.2
        Q15_7 ~~ Q15_7.2
        Q15_8 ~~ Q15_8.2
        SEt2 ~ LIt1
        LIt2 ~ SEt1'
>fitlif1SE <-
sem(modellif1SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1SE,standardized=TRUE,fit.measures=TRUE, rsquare=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Self-Efficacy, Mid-Program to Post-Program

```
>modellif1.2SE <- '
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt3 =~ a1*Q12_4.3+a2*Q13_1.3+a3*Q13_2.3+a4*Q13_4.3+a5*Q14_4.3
        LIt3 ~ LIt2
        Q12_4.2 ~~ Q12_4.3
        Q13_1.2 ~~ Q13_1.3
        Q13_2.2 ~~ Q13_2.3
        Q13_4.2 ~~ Q13_4.3
        Q14_4.2 ~~ Q14_4.3
        SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2
        SEt3 =~
b1*Q15_1.3+b2*Q15_2.3+b3*Q15_3.3+b4*Q15_4.3+b5*Q15_5.3+b6*Q15_6.3+b7*Q15_7.3+
b8*Q15_8.3
        SEt3 ~ SEt2
        Q15_1.2 ~~ Q15_1.3
        Q15_2.2 ~~ Q15_2.3
        Q15_3.2 ~~ Q15_3.3
        Q15_4.2 ~~ Q15_4.3
```

```
        Q15_5.2 ~~ Q15_5.3
        Q15_6.2 ~~ Q15_6.3
        Q15_7.2 ~~ Q15_7.3
        Q15_8.2 ~~ Q15_8.3
        SEt3 ~ LIt2
        LIt3 ~ SEt2'
>fitlif1.2SE <-
sem(modellif1.2SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1.2SE,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Perceived Prototypicality, Pre-Program to Mid-Program

```
>modellif1Proto <- '
        LIt1 =~ a1*Q12_4+a2*Q13_1+a3*Q13_2+a4*Q13_4+a5*Q14_4
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt2 ~ LIt1
        Q12_4 ~~ Q12_4.2
        Q13_1 ~~ Q13_1.2
        Q13_2 ~~ Q13_2.2
        Q13_4 ~~ Q13_4.2
        Q14_4 ~~ Q14_4.2
        Protot1 =~ b1*Q35_1+b2*Q35_2+b3*Q35_3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
        Protot2 ~ Protot1
        Q35_1 ~~ Q35_1.2
        Q35_2 ~~ Q35_2.2
        Q35_3 ~~ Q35_3.2
        Protot2 ~ LIt1
        LIt2 ~ Protot1'
>fitlif1Proto <-
sem(modellif1Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
```

>summary(fitlif1Proto,standardized=TRUE,fit.measures=TRUE)

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Perceived Prototypicality, Mid-Program to Post-Program

```
>modellif1.2Proto <- '
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt3 =~ a1*Q12_4.3+a2*Q13_1.3+a3*Q13_2.3+a4*Q13_4.3+a5*Q14_4.3
        LIt3 ~ LIt2
        Q12_4.2 ~~ Q12_4.3
        Q13_1.2 ~~ Q13_1.3
        Q13_2.2 ~~ Q13_2.3
        Q13_4.2 ~~ Q13_4.3
        Q14_4.2 ~~ Q14_4.3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
        Protot3 =~ b1*Q35_1.3+b2*Q35_2.3+b3*Q35_3.3
        Protot3 ~ Protot2
        Q35_1.2 ~~ Q35_1.3
        Q35_2.2 ~~ Q35_2.3
        Q35_3.2 ~~ Q35_3.3
        Protot3 ~ LIt2
        LIt3 ~ Protot2'
>fitlif1.2Proto <-
sem(modellif1.2Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1.2Proto,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Learning Orientation, Pre-Program to Mid-Program

```
>modellif1LO <- '
        LIt1 =~ a1*Q12_4+a2*Q13_1+a3*Q13_2+a4*Q13_4+a5*Q14_4
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt2 ~ LIt1
```

```
        Q12_4 ~~ Q12_4.2
        Q13_1 ~~ Q13_1.2
        Q13_2 ~~ Q13_2.2
        Q13_4 ~~ Q13_4.2
        Q14_4 ~~ Q14_4.2
        LOt1 =~ b1*Q16_1+b2*Q16_3+b3*Q16_5+b4*Q16_6+b5*Q16_11+b6*Q16_13
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt2 ~ LOt1
        Q16_1 ~~ Q16_1.2
        Q16_3 ~~ Q16_3.2
        Q16_5 ~~ Q16_5.2
        Q16_6 ~~ Q16_6.2
        Q16_11 ~~ Q16_11.2
        Q16_13 ~~ Q16_13.2
        LOt2 ~ LIt1
        LIt2 ~ LOt1'
>fitlif1LO <-
sem(modellif1LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Learning Orientation, Mid-Program to Post-Program

```
>modellif1.2LO <- '
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt3 =~ a1*Q12_4.3+a2*Q13_1.3+a3*Q13_2.3+a4*Q13_4.3+a5*Q14_4.3
        LIt3 ~ LIt2
        Q12_4.2 ~~ Q12_4.3
        Q13_1.2 ~~ Q13_1.3
        Q13_2.2 ~~ Q13_2.3
        Q13_4.2 ~~ Q13_4.3
```

```
        Q14_4.2 ~~ Q14_4.3
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt3 =~
b1*Q16_1.3+b2*Q16_3.3+b3*Q16_5.3+b4*Q16_6.3+b5*Q16_11.3+b6*Q16_13.3
        LOt3 ~ LOt2
        Q16_1.2 ~~ Q16_1.3
        Q16_3.2 ~~ Q16_3.3
        Q16_5.2 ~~ Q16_5.3
        Q16_6.2 ~~ Q16_6.3
        Q16_11.2 ~~ Q16_11.3
        Q16_13.2 ~~ Q16_13.3
        LOt3 ~ LIt2
        LIt3 ~ LOt2'
>fitlif1.2LO <-
sem(modellif1.2LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1.2LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Performance Orientation, Pre-Program to Mid-Program

```
>modellif1PO <- '
        LIt1 =~ a1*Q12_4+a2*Q13_1+a3*Q13_2+a4*Q13_4+a5*Q14_4
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt2 ~ LIt1
        Q12_4 ~~ Q12_4.2
        Q13_1 ~~ Q13_1.2
        Q13_2 ~~ Q13_2.2
        Q13_4 ~~ Q13_4.2
        Q14_4 ~~ Q14_4.2
```

```
        POt1 =~
b1*Q16_2+b2*Q16_4+b3*Q16_7+b4*Q16_8+b5*Q16_9+b6*Q16_10+b7*Q16_12+b8*Q16_1
4+b9*Q16_15+b10*Q16_16
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt2 ~ POt1
        Q16_2 ~~ Q16_2.2
        Q16_4 ~~ Q16_4.2
        Q16_7 ~~ Q16_7.2
        Q16_8 ~~ Q16_8.2
        Q16_9 ~~ Q16_9.2
        Q16_10 ~~ Q16_10.2
        Q16_12 ~~ Q16_12.2
        Q16_14 ~~ Q16_14.2
        Q16_15 ~~ Q16_15.2
        Q16_16 ~~ Q16_16.2
        POt2 ~ LIt1
        LIt2 ~ POt1'
>fitlif1PO <-
sem(modellif1PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1PO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Importance Factor of Leader Identity and Performance Orientation, Mid-Program to Post-Program

```
>modellif1.2PO <- '
        LIt2 =~ a1*Q12_4.2+a2*Q13_1.2+a3*Q13_2.2+a4*Q13_4.2+a5*Q14_4.2
        LIt3 =~ a1*Q12_4.3+a2*Q13_1.3+a3*Q13_2.3+a4*Q13_4.3+a5*Q14_4.3
        LIt3 ~ LIt2
        Q12_4.2 ~~ Q12_4.3
        Q13_1.2 ~~ Q13_1.3
```

```
        Q13_2.2 ~~ Q13_2.3
        Q13_4.2 ~~ Q13_4.3
        Q14_4.2 ~~ Q14_4.3
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt3 =~
b1*Q16_2.3+b2*Q16_4.3+b3*Q16_7.3+b4*Q16_8.3+b5*Q16_9.3+b6*Q16_10.3+b7*Q16_12.
3+b8*Q16_14.3+b9*Q16_15.3+b10*Q16_16.3
        POt3 ~ POt2
        Q16_2.2 ~~ Q16_2.3
        Q16_4.2 ~~ Q16_4.3
        Q16_7.2 ~~ Q16_7.3
        Q16_8.2 ~~ Q16_8.3
        Q16_9.2 ~~ Q16_9.3
        Q16_10.2 ~~ Q16_10.3
        Q16_12.2 ~~ Q16_12.3
        Q16_14.2 ~~ Q16_14.3
        Q16_15.2 ~~ Q16_15.3
        Q16_16.2 ~~ Q16_16.3
        POt3 ~ LIt2
        LIt3 ~ POt2'
>fitlif1.2PO <-
sem(modellif1.2PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif1.2PO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Self-Efficacy, Pre-Program to Mid-Program

```
>modellif2SE <- '
        LIt1 =~ a1*Q12_1+a2*Q12_2+a3*Q14_1+a4*Q14_2
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
```

LIt2 ~ LIt1

Q12_1 ~~ Q12_1.2

Q12_2 ~~ Q12_2.2

Q14_1 ~~ Q14_1.2

Q14_2 ~~ Q14_4.2

SEt1 =~
b1*Q15_1+b2*Q15_2+b3*Q15_3+b4*Q15_4+b5*Q15_5+b6*Q15_6+b7*Q15_7+b8*Q15_8

SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2

SEt2 ~ SEt1

Q15_1 ~~ Q15_1.2

Q15_2 ~~ Q15_2.2

Q15_3 ~~ Q15_3.2

Q15_4 ~~ Q15_4.2

Q15_5 ~~ Q15_5.2

Q15_6 ~~ Q15_6.2

Q15_7 ~~ Q15_7.2

Q15_8 ~~ Q15_8.2

SEt2 ~ LIt1

LIt2 ~ SEt1'

>fitlif2SE <-
sem(modellif2SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")

>summary(fitlif2SE,standardized=TRUE,fit.measures=TRUE)

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Self-Efficacy, Mid-Program to Post-Program

>modellif2.2SE <- '

LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2

LIt3 =~ a1*Q12_1.3+a2*Q12_2.3+a3*Q14_1.3+a4*Q14_2.3

LIt3 ~ LIt2

```
        Q12_1.2 ~~ Q12_1.3
        Q12_2.2 ~~ Q12_2.3
        Q14_1.2 ~~ Q14_1.3
        Q14_2.2 ~~ Q14_4.3
        SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2
        SEt3 =~
b1*Q15_1.3+b2*Q15_2.3+b3*Q15_3.3+b4*Q15_4.3+b5*Q15_5.3+b6*Q15_6.3+b7*Q15_7.3+
b8*Q15_8.3
        SEt3 ~ SEt2
        Q15_1.2 ~~ Q15_1.3
        Q15_2.2 ~~ Q15_2.3
        Q15_3.2 ~~ Q15_3.3
        Q15_4.2 ~~ Q15_4.3
        Q15_5.2 ~~ Q15_5.3
        Q15_6.2 ~~ Q15_6.3
        Q15_7.2 ~~ Q15_7.3
        Q15_8.2 ~~ Q15_8.3
        SEt3 ~ LIt2
        LIt3 ~ SEt2'
>fitlif2.2SE <-
sem(modellif2.2SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif2.2SE,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Perceived Prototypicality, Pre-Program to Mid-Program

```
>modellif2Proto <- '
        LIt1 =~ a1*Q12_1+a2*Q12_2+a3*Q14_1+a4*Q14_2
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt2 ~ LIt1
```

```
        Q12_1 ~~ Q12_1.2
        Q12_2 ~~ Q12_2.2
        Q14_1 ~~ Q14_1.2
        Q14_2 ~~ Q14_4.2
        Protot1 =~ b1*Q35_1+b2*Q35_2+b3*Q35_3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
        Protot2 ~ Protot1
        Q35_1 ~~ Q35_1.2
        Q35_2 ~~ Q35_2.2
        Q35_3 ~~ Q35_3.2
        Protot2 ~ LIt1
        LIt2 ~ Protot1'
>fitlif2Proto <-
sem(modellif2Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif2Proto,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Perceived Prototypicality, Mid-Program to Post-Program

```
>modellif2.2Proto <- '
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt3 =~ a1*Q12_1.3+a2*Q12_2.3+a3*Q14_1.3+a4*Q14_2.3
        LIt3 ~ LIt2
        Q12_1.2 ~~ Q12_1.3
        Q12_2.2 ~~ Q12_2.3
        Q14_1.2 ~~ Q14_1.3
        Q14_2.2 ~~ Q14_4.3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
        Protot3 =~ b1*Q35_1.3+b2*Q35_2.3+b3*Q35_3.3
        Protot3 ~ Protot2
        Q35_1.2 ~~ Q35_1.3
        Q35_2.2 ~~ Q35_2.3
```

```
        Q35_3.2 ~~ Q35_3.3
        Protot3 ~ LIt2
        LIt3 ~ Protot2'
>fitlif2.2Proto <-
sem(modellif2.2Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif2.2Proto,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Learning Orientation, Pre-Program to Mid-Program

```
>modellif2LO <- '
        LIt1 =~ a1*Q12_1+a2*Q12_2+a3*Q14_1+a4*Q14_2
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt2 ~ LIt1
        Q12_1 ~~ Q12_1.2
        Q12_2 ~~ Q12_2.2
        Q14_1 ~~ Q14_1.2
        Q14_2 ~~ Q14_4.2
        LOt1 =~ b1*Q16_1+b2*Q16_3+b3*Q16_5+b4*Q16_6+b5*Q16_11+b6*Q16_13
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt2 ~ LOt1
        Q16_1 ~~ Q16_1.2
        Q16_3 ~~ Q16_3.2
        Q16_5 ~~ Q16_5.2
        Q16_6 ~~ Q16_6.2
        Q16_11 ~~ Q16_11.2
        Q16_13 ~~ Q16_13.2
        LOt2 ~ LIt1
        LIt2 ~ LOt1'
>fitlif2LO <-
sem(modellif2LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
```

```
>summary(fitlif2LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Learning Orientation, Mid-Program to Post-Program

```
>modellif2.2LO <- '
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt3 =~ a1*Q12_1.3+a2*Q12_2.3+a3*Q14_1.3+a4*Q14_2.3
        LIt3 ~ LIt2
        Q12_1.2 ~~ Q12_1.3
        Q12_2.2 ~~ Q12_2.3
        Q14_1.2 ~~ Q14_1.3
        Q14_2.2 ~~ Q14_4.3
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt3 =~
b1*Q16_1.3+b2*Q16_3.3+b3*Q16_5.3+b4*Q16_6.3+b5*Q16_11.3+b6*Q16_13.3
        LOt3 ~ LOt2
        Q16_1.2 ~~ Q16_1.3
        Q16_3.2 ~~ Q16_3.3
        Q16_5.2 ~~ Q16_5.3
        Q16_6.2 ~~ Q16_6.3
        Q16_11.2 ~~ Q16_11.3
        Q16_13.2 ~~ Q16_13.3
        LOt3 ~ LIt2
        LIt3 ~ LOt2'
>fitlif2.2LO <-
sem(modellif2.2LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif2.2LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Performance Orientation, Pre-Program to Mid-Program

```
>modellif2PO <- '
        LIt1 =~ a1*Q12_1+a2*Q12_2+a3*Q14_1+a4*Q14_2
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt2 ~ LIt1
        Q12_1 ~~ Q12_1.2
        Q12_2 ~~ Q12_2.2
        Q14_1 ~~ Q14_1.2
        Q14_2 ~~ Q14_4.2
        POt1 =~
b1*Q16_2+b2*Q16_4+b3*Q16_7+b4*Q16_8+b5*Q16_9+b6*Q16_10+b7*Q16_12+b8*Q16_1
4+b9*Q16_15+b10*Q16_16
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt2 ~ POt1
        Q16_2 ~~ Q16_2.2
        Q16_4 ~~ Q16_4.2
        Q16_7 ~~ Q16_7.2
        Q16_8 ~~ Q16_8.2
        Q16_9 ~~ Q16_9.2
        Q16_10 ~~ Q16_10.2
        Q16_12 ~~ Q16_12.2
        Q16_14 ~~ Q16_14.2
        Q16_15 ~~ Q16_15.2
        Q16_16 ~~ Q16_16.2
        POt2 ~ LIt1
        LIt2 ~ POt1'
>fitlif2PO <-
sem(modellif2PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif2PO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Certainty Factor of Leader Identity and Learning Orientation, Mid-Program to Post-Program

```
>modellif2.2PO <- '
        LIt2 =~ a1*Q12_1.2+a2*Q12_2.2+a3*Q14_1.2+a4*Q14_2.2
        LIt3 =~ a1*Q12_1.3+a2*Q12_2.3+a3*Q14_1.3+a4*Q14_2.3
        LIt3 ~ LIt2
        Q12_1.2 ~~ Q12_1.3
        Q12_2.2 ~~ Q12_2.3
        Q14_1.2 ~~ Q14_1.3
        Q14_2.2 ~~ Q14_4.3
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt3 =~
b1*Q16_2.3+b2*Q16_4.3+b3*Q16_7.3+b4*Q16_8.3+b5*Q16_9.3+b6*Q16_10.3+b7*Q16_12.
3+b8*Q16_14.3+b9*Q16_15.3+b10*Q16_16.3
        POt3 ~ POt2
        Q16_2.2 ~~ Q16_2.3
        Q16_4.2 ~~ Q16_4.3
        Q16_7.2 ~~ Q16_7.3
        Q16_8.2 ~~ Q16_8.3
        Q16_9.2 ~~ Q16_9.3
        Q16_10.2 ~~ Q16_10.3
        Q16_12.2 ~~ Q16_12.3
        Q16_14.2 ~~ Q16_14.3
        Q16_15.2 ~~ Q16_15.3
        Q16_16.2 ~~ Q16_16.3
        POt3 ~ LIt2
        LIt3 ~ POt2'
>fitlif2.2PO <-
sem(modellif2.2PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
```

```
>summary(fitlif2.2PO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Self-Efficacy, Pre-Program to Mid-Program

```
>modellif3SE <- '
        LIt1 =~ a1*Q12_3+a2*Q13_3+a3*Q14_3
        LIt2 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt2 ~ LIt1
        Q12_3 ~~ Q12_3.3
        Q13_3 ~~ Q13_3.3
        Q14_3 ~~ Q14_3.3
        SEt1 =~
b1*Q15_1+b2*Q15_2+b3*Q15_3+b4*Q15_4+b5*Q15_5+b6*Q15_6+b7*Q15_7+b8*Q15_8
        SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2
        SEt2 ~ SEt1
        Q15_1 ~~ Q15_1.2
        Q15_2 ~~ Q15_2.2
        Q15_3 ~~ Q15_3.2
        Q15_4 ~~ Q15_4.2
        Q15_5 ~~ Q15_5.2
        Q15_6 ~~ Q15_6.2
        Q15_7 ~~ Q15_7.2
        Q15_8 ~~ Q15_8.2
        SEt2 ~ LIt1
        LIt2 ~ SEt1'
>fitlif3SE <-
sem(modellif3SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3SE,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Self-Efficacy, Mid-Program to Post-Program

```
>modellif3.2SE <- '
        LIt2 =~ a1*Q12_3.2+a2*Q13_3.2+a3*Q14_3.2
        LIt3 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt3 ~ LIt2
        Q12_3.2 ~~ Q12_3.3
        Q13_3.2 ~~ Q13_3.3
        Q14_3.2 ~~ Q14_3.3
        SEt2 =~
b1*Q15_1.2+b2*Q15_2.2+b3*Q15_3.2+b4*Q15_4.2+b5*Q15_5.2+b6*Q15_6.2+b7*Q15_7.2+
b8*Q15_8.2
        SEt3 =~
b1*Q15_1.3+b2*Q15_2.3+b3*Q15_3.3+b4*Q15_4.3+b5*Q15_5.3+b6*Q15_6.3+b7*Q15_7.3+
b8*Q15_8.3
        SEt3 ~ SEt2
        Q15_1.2 ~~ Q15_1.3
        Q15_2.2 ~~ Q15_2.3
        Q15_3.2 ~~ Q15_3.3
        Q15_4.2 ~~ Q15_4.3
        Q15_5.2 ~~ Q15_5.3
        Q15_6.2 ~~ Q15_6.3
        Q15_7.2 ~~ Q15_7.3
        Q15_8.2 ~~ Q15_8.3
        SEt3 ~ LIt2
        LIt3 ~ SEt2'
>fitlif3.2SE <-
sem(modellif3.2SE,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3.2SE,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Perceived Prototypicality, Pre-Program to Mid-Program

```
>modellif3Proto <- '
        LIt1 =~ a1*Q12_3+a2*Q13_3+a3*Q14_3
        LIt2 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt2 ~ LIt1
        Q12_3 ~~ Q12_3.3
        Q13_3 ~~ Q13_3.3
        Q14_3 ~~ Q14_3.3
        Protot1 =~ b1*Q35_1+b2*Q35_2+b3*Q35_3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
        Protot2 ~ Protot1
        Q35_1 ~~ Q35_1.2
        Q35_2 ~~ Q35_2.2
        Q35_3 ~~ Q35_3.2
        Protot2 ~ LIt1
        LIt2 ~ Protot1'
>fitlif3Proto <-
sem(modellif3Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3Proto,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Perceived Prototypicality, Mid-Program to Post-Program

```
>modellif3.2Proto <- '
        LIt2 =~ a1*Q12_3.2+a2*Q13_3.2+a3*Q14_3.2
        LIt3 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt3 ~ LIt2
        Q12_3.2 ~~ Q12_3.3
        Q13_3.2 ~~ Q13_3.3
        Q14_3.2 ~~ Q14_3.3
        Protot2 =~ b1*Q35_1.2+b2*Q35_2.2+b3*Q35_3.2
```

```
        Protot3 =~ b1*Q35_1.3+b2*Q35_2.3+b3*Q35_3.3
        Protot3 ~ Protot2
        Q35_1.2 ~~ Q35_1.3
        Q35_2.2 ~~ Q35_2.3
        Q35_3.2 ~~ Q35_3.3
        Protot3 ~ LIt2
        LIt3 ~ Protot2'
>fitlif3.2Proto <-
sem(modellif3.2Proto,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3.2Proto,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Learning Orientation, Pre-Program to Mid-Program

```
>modellif3LO <- '
        LIt1 =~ a1*Q12_3+a2*Q13_3+a3*Q14_3
        LIt2 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt2 ~ LIt1
        Q12_3 ~~ Q12_3.3
        Q13_3 ~~ Q13_3.3
        Q14_3 ~~ Q14_3.3
        LOt1 =~ b1*Q16_1+b2*Q16_3+b3*Q16_5+b4*Q16_6+b5*Q16_11+b6*Q16_13
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt2 ~ LOt1
        Q16_1 ~~ Q16_1.2
        Q16_3 ~~ Q16_3.2
        Q16_5 ~~ Q16_5.2
        Q16_6 ~~ Q16_6.2
        Q16_11 ~~ Q16_11.2
        Q16_13 ~~ Q16_13.2
        LOt2 ~ LIt1
```

```
        LIt2 ~ LOt1'
>fitlif3LO <-
sem(modellif3LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Learning Orientation, Mid-Program to Post-Program

```
>modellif3.2LO <- '
        LIt2 =~ a1*Q12_3.2+a2*Q13_3.2+a3*Q14_3.2
        LIt3 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt3 ~ LIt2
        Q12_3.2 ~~ Q12_3.3
        Q13_3.2 ~~ Q13_3.3
        Q14_3.2 ~~ Q14_3.3
        LOt2 =~
b1*Q16_1.2+b2*Q16_3.2+b3*Q16_5.2+b4*Q16_6.2+b5*Q16_11.2+b6*Q16_13.2
        LOt3 =~
b1*Q16_1.3+b2*Q16_3.3+b3*Q16_5.3+b4*Q16_6.3+b5*Q16_11.3+b6*Q16_13.3
        LOt3 ~ LOt2
        Q16_1.2 ~~ Q16_1.3
        Q16_3.2 ~~ Q16_3.3
        Q16_5.2 ~~ Q16_5.3
        Q16_6.2 ~~ Q16_6.3
        Q16_11.2 ~~ Q16_11.3
        Q16_13.2 ~~ Q16_13.3
        LOt3 ~ LIt2
        LIt3 ~ LOt2'
>fitlif3.2LO <-
sem(modellif3.2LO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3.2LO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Performance Orientation, Pre-Program to Mid-Program

```
>modellif3PO <- '
        LIt1 =~ a1*Q12_3+a2*Q13_3+a3*Q14_3
        LIt2 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt2 ~ LIt1
        Q12_3 ~~ Q12_3.3
        Q13_3 ~~ Q13_3.3
        Q14_3 ~~ Q14_3.3
        POt1 =~
b1*Q16_2+b2*Q16_4+b3*Q16_7+b4*Q16_8+b5*Q16_9+b6*Q16_10+b7*Q16_12+b8*Q16_1
4+b9*Q16_15+b10*Q16_16
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt2 ~ POt1
        Q16_2 ~~ Q16_2.2
        Q16_4 ~~ Q16_4.2
        Q16_7 ~~ Q16_7.2
        Q16_8 ~~ Q16_8.2
        Q16_9 ~~ Q16_9.2
        Q16_10 ~~ Q16_10.2
        Q16_12 ~~ Q16_12.2
        Q16_14 ~~ Q16_14.2
        Q16_15 ~~ Q16_15.2
        Q16_16 ~~ Q16_16.2
        POt2 ~ LIt1
        LIt2 ~ POt1'
>fitlif3PO <-
sem(modellif3PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
>summary(fitlif3PO,standardized=TRUE,fit.measures=TRUE)
```

#Cross-Lagged Panel Analysis of the Descriptiveness Factor of Leader Identity and Performance Orientation, Mid-Program to Post-Program

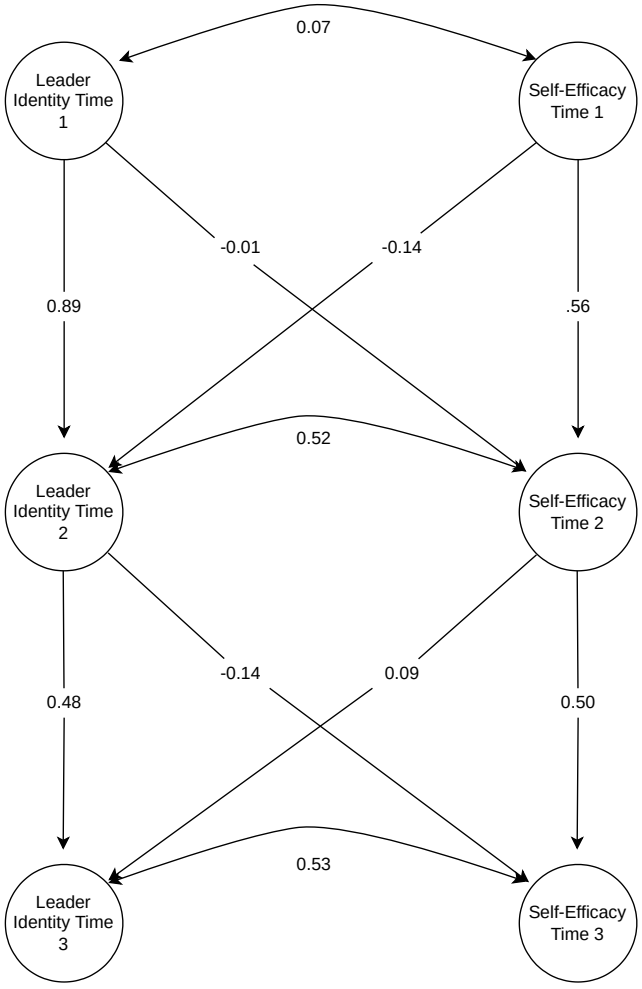
```
>modellif3.2PO <- '
        LIt2 =~ a1*Q12_3.2+a2*Q13_3.2+a3*Q14_3.2
        LIt3 =~ a1*Q12_3.3+a2*Q13_3.3+a3*Q14_3.3
        LIt3 ~ LIt2
        Q12_3.2 ~~ Q12_3.3
        Q13_3.2 ~~ Q13_3.3
        Q14_3.2 ~~ Q14_3.3
        POt2 =~
b1*Q16_2.2+b2*Q16_4.2+b3*Q16_7.2+b4*Q16_8.2+b5*Q16_9.2+b6*Q16_10.2+b7*Q16_12.
2+b8*Q16_14.2+b9*Q16_15.2+b10*Q16_16.2
        POt3 =~
b1*Q16_2.3+b2*Q16_4.3+b3*Q16_7.3+b4*Q16_8.3+b5*Q16_9.3+b6*Q16_10.3+b7*Q16_12.
3+b8*Q16_14.3+b9*Q16_15.3+b10*Q16_16.3
        POt3 ~ POt2
        Q16_2.2 ~~ Q16_2.3
        Q16_4.2 ~~ Q16_4.3
        Q16_7.2 ~~ Q16_7.3
        Q16_8.2 ~~ Q16_8.3
        Q16_9.2 ~~ Q16_9.3
        Q16_10.2 ~~ Q16_10.3
        Q16_12.2 ~~ Q16_12.3
        Q16_14.2 ~~ Q16_14.3
        Q16_15.2 ~~ Q16_15.3
        Q16_16.2 ~~ Q16_16.3
        POt3 ~ LIt2
        LIt3 ~ POt2'
>fitlif3.2PO <-
sem(modellif3.2PO,data=PhD_UCC_Compiled_Data_Final,std.lv=TRUE,missing="ml")
```

```
>summary(fitlif3.2PO,standardized=TRUE,fit.measures=TRUE)
```

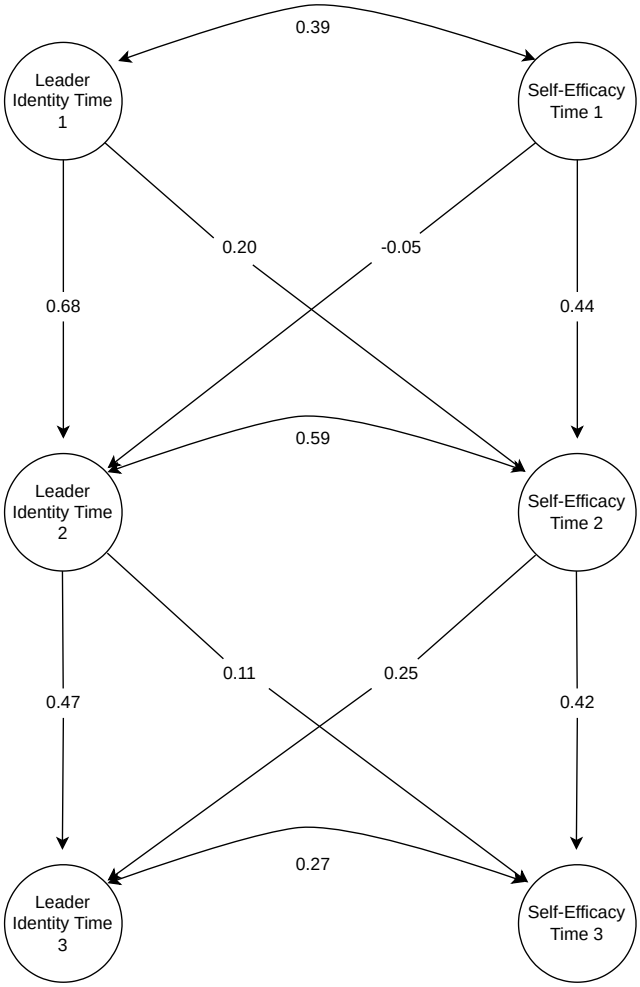
Appendix D: Cross-Lagged Panel Models

Self-Efficacy and Leader Identity

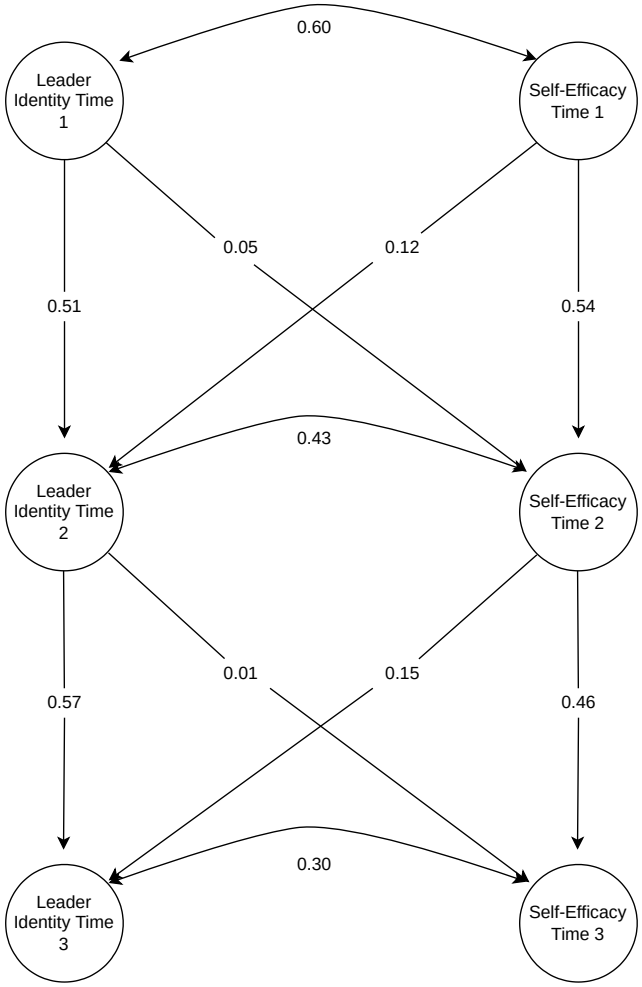
Importance



Certainty

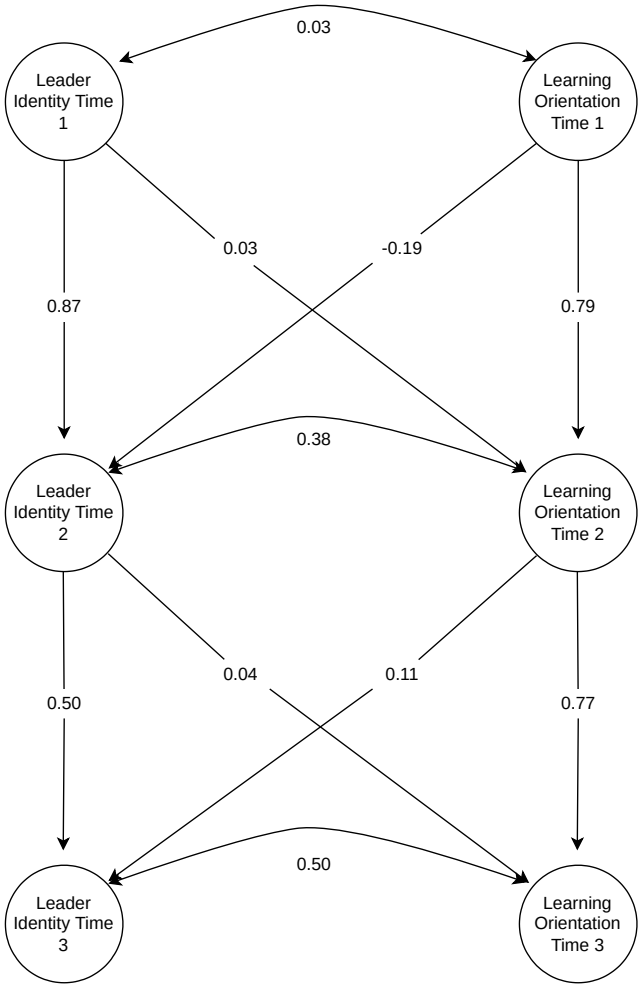

0.39
Leader Identity Time 1
Self-Efficacy Time 1
0.20
-0.05
0.68
0.44
0.59
Leader Identity Time 2
Self-Efficacy Time 2
0.11
0.25
0.47
0.42
0.27
Leader Identity Time 3
Self-Efficacy Time 3

Descriptiveness

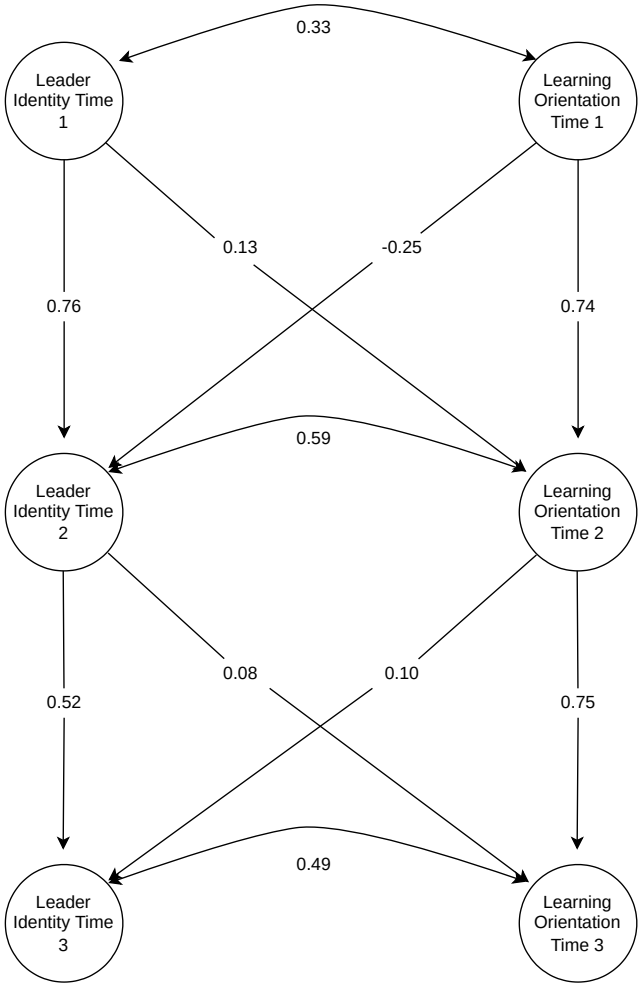


Learning Orientation and Leader Identity

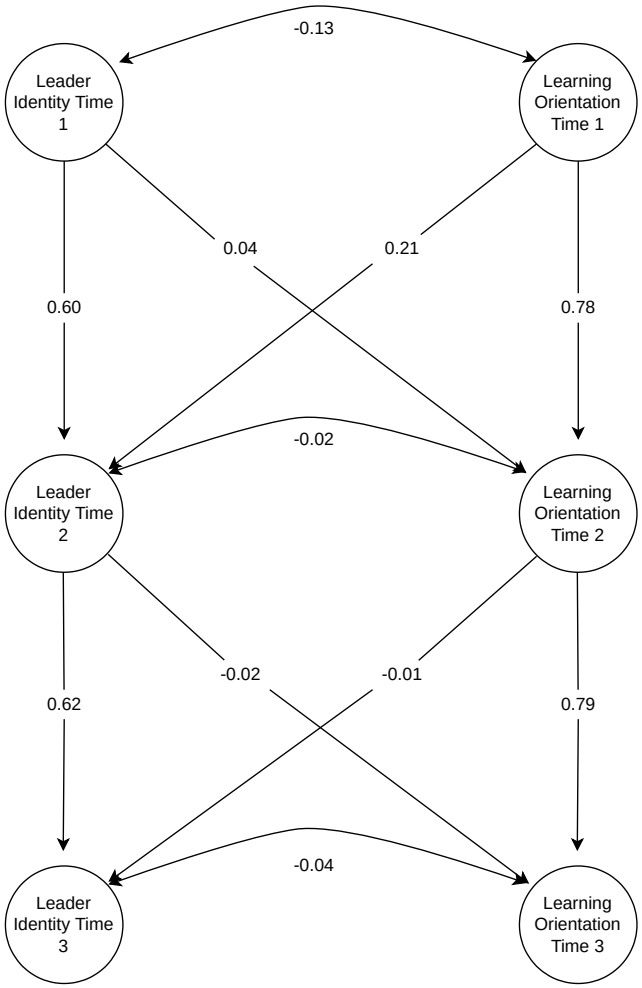
Importance



Certainty

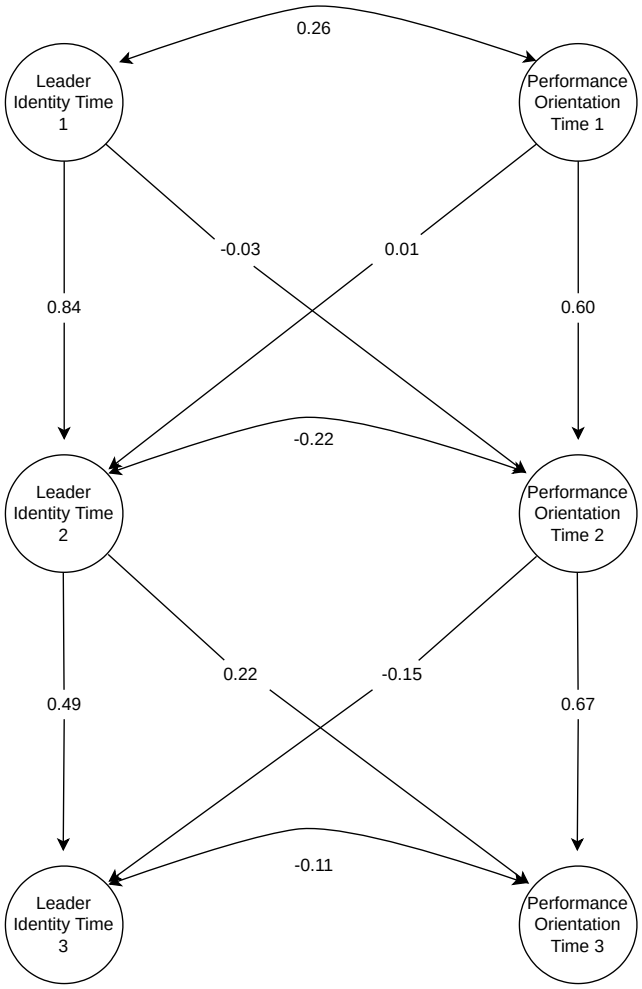

0.33
Leader Identity Time 1
Learning Orientation Time 1
0.13
-0.25
0.76
0.74
0.59
Leader Identity Time 2
Learning Orientation Time 2
0.08
0.10
0.52
0.75
0.49
Leader Identity Time 3
Learning Orientation Time 3

Descriptiveness

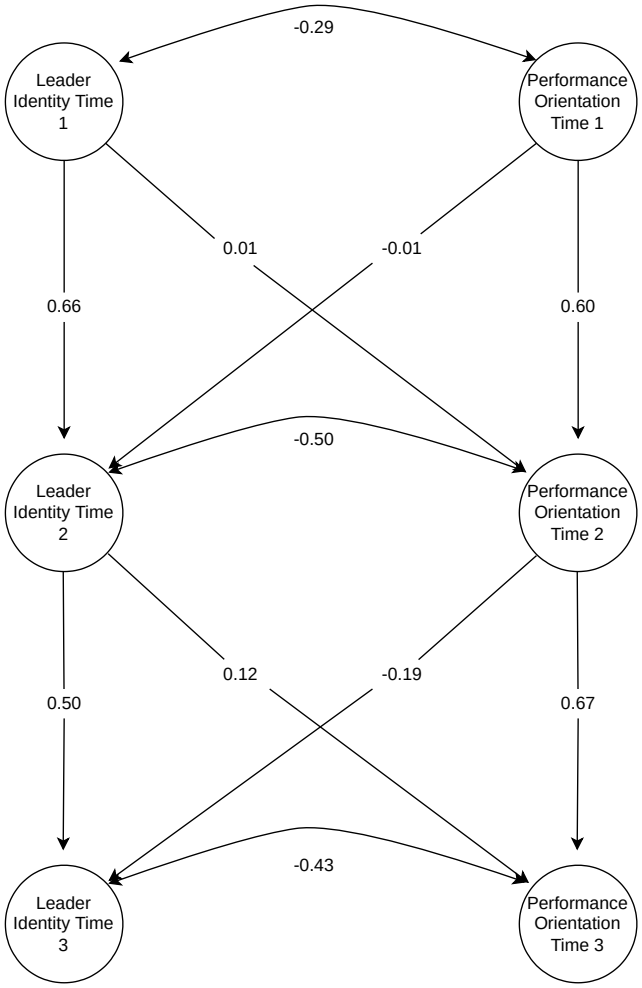


Performance Orientation and Leader Identity

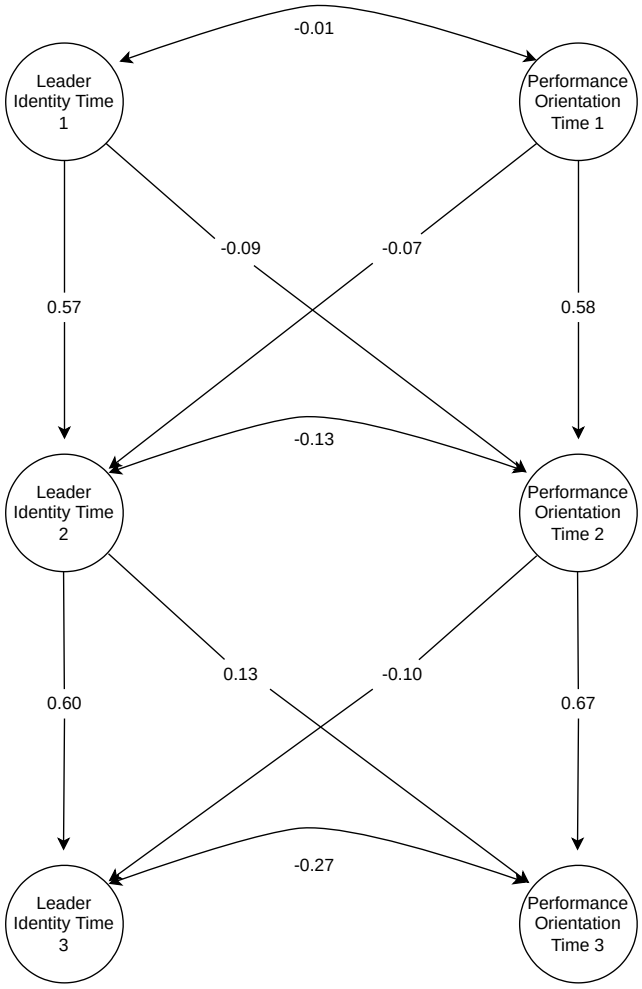
Importance



Certainty

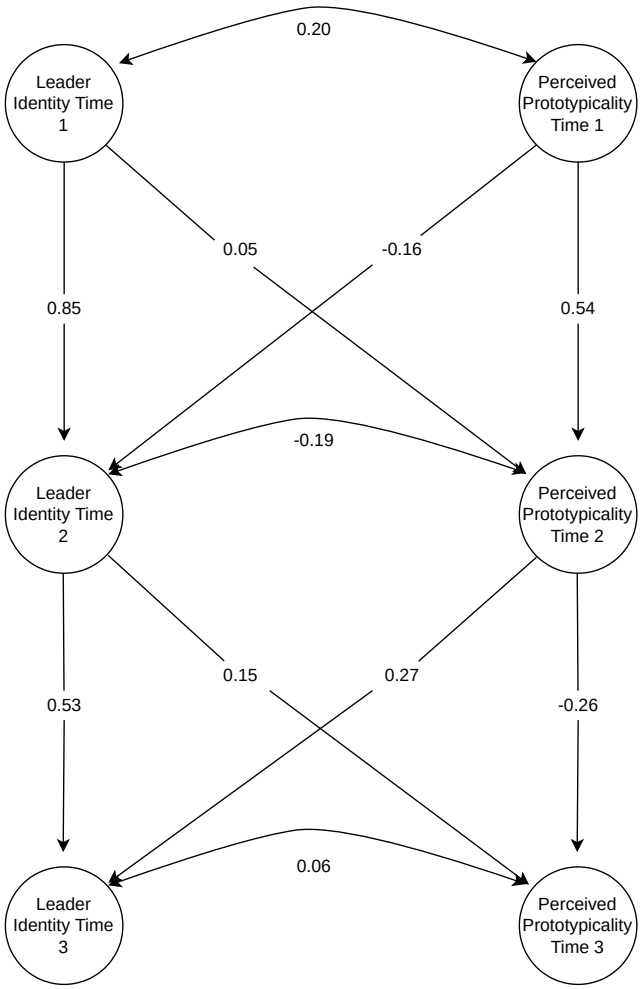

-0.29
Leader Identity Time 1
Performance Orientation Time 1
0.01
-0.01
0.66
0.60
-0.50
Leader Identity Time 2
Performance Orientation Time 2
0.12
-0.19
0.50
0.67
-0.43
Leader Identity Time 3
Performance Orientation Time 3

Descriptiveness

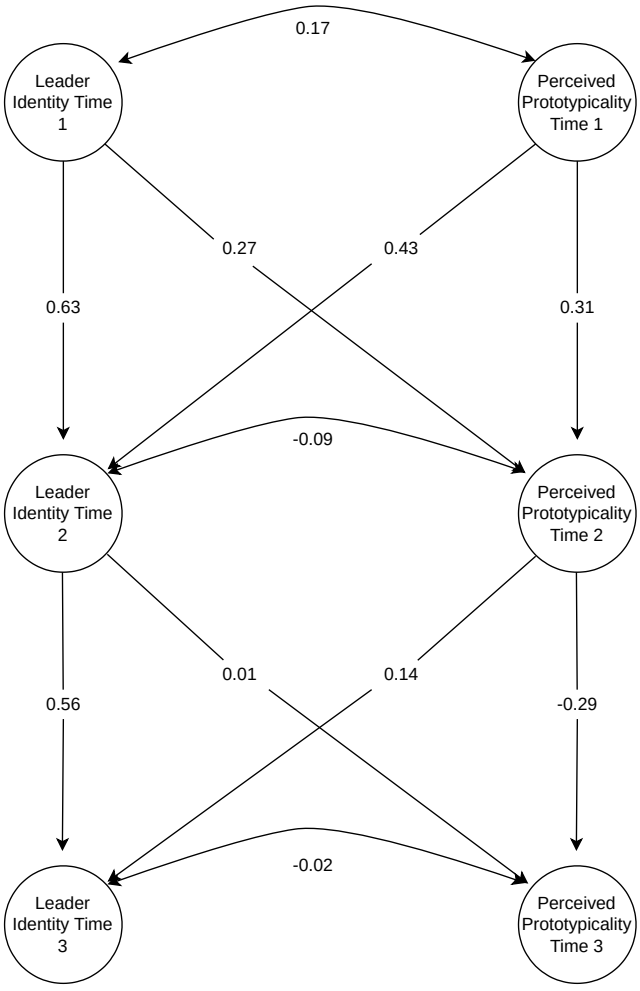


Perceived Prototypicality and Leader Identity

Importance



Certainty


0.17
Leader Identity Time 1
Perceived Prototypicality Time 1
0.27
0.43
0.63
0.31
-0.09
Leader Identity Time 2
Perceived Prototypicality Time 2
0.01
0.14
0.56
-0.29
-0.02
Leader Identity Time 3
Perceived Prototypicality Time 3

Descriptiveness

