

UNTANGLING LEARNING AGILITY: EXPLORING CONNECTIONS WITH INFORMAL LEARNING, PERSONALITY, REFLECTIVE THINKING, AND MOTIVATION TO LEARN

by

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(Under the Direction of Karen E. Watkins)

ABSTRACT

Learning agility has gained significant traction within organizational talent management. This trend is not surprising, given that meta-analytic reviews have indicated that learning agility is a strong predictor of leadership performance and potential. Yet, despite significant empirical findings, critics have argued that learning agility is conceptually unclear and lacks a solid theoretical basis. This study aimed to add conceptual clarity to the learning agility construct by examining learning agility's relationship to the theoretically connected concept of informal learning. It also investigated motivation to learn, reflective thinking, and personality as antecedents of learning agility and modeled the relationship between these constructs, learning agility, and informal learning. By modeling these variables' relationships, this study provided a better understanding of learning agility's nomological network.

The following research questions guided this study: (1) To what extent, if any, does learning agility predict informal learning behaviors? (2) To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors? (3) What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors? This study analyzed secondary self-report survey data

from 310 participants. Data analysis procedures entailed simple and multiple linear regression and path analysis.

The study findings indicated that learning agility predicts informal learning behaviors and that learning agility predicts informal learning above and beyond personality factors. The hypothesized path model among study variables had poor model fit; however, a revised, more parsimonious path model consisting of openness to experience, extraversion, emotional stability, learning agility, motivation to learn, reflective thinking, and informal learning behaviors exhibited a favorable model fit and explained approximately 35.9% of the variation in informal learning behaviors.

The study concluded that learning agility, as currently understood, lacks conceptual clarity and robust measurement. While learning agility predicted informal learning behaviors, the relationships were weak, and subdimensional relationships among study variables deviated from conceptual understanding. Therefore, the study results underscore the importance of developing more precise conceptual frameworks and measurement tools for learning agility. Overall, this research contributes to a more nuanced understanding of learning agility by providing a model elucidating the learning-from-experience process.

INDEX WORDS: Learning agility, Informal learning behaviors, Motivation to learn,
 Reflective thinking, Personality, Learning from experience

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DEDICATION

Dedicated to my wife, who has been an unfaltering source of love and support, and to our children, who've shown tremendous patience and understanding during my long hours locked away in the office. May this achievement demonstrate that with hard work, determination, and the love and support of those around you, no goal is unattainable.

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CHAPTER 1

INTRODUCTION

Newly appointed leaders have an abysmal failure rate—between 40% and 50%—in their new roles (Hogan et al., 2011; Martin & Schmidt, 2010). While multiple factors contribute to managerial failure, some scholars (e.g., Lombardo & Eichinger, 2000) have pointed to an inability to learn from previous mistakes and adapt to new situations as leading causes. To better identify individuals who more readily learn and adapt, many organizations are turning to the concept of *learning agility*, broadly defined as an individual’s ability to learn from experience to successfully perform in new situations (De Meuse & Harvey, 2021). In fact, survey data have suggested that 50% of organizations use learning agility (or some form of learning ability) as part of their high-potential identification strategy (Church et al., 2015).

Proponents maintain that learning agility represents an essential skill for leaders navigating today’s ever-changing organizational environments, helping them operate successfully in the face of unique, complex challenges. This notion is consistent with Lombardo and Eichinger's (2000) original definition of learning agility as “the willingness and ability to learn new competencies in order to perform under first-time, tough, or different conditions” (p. 323). Since its conceptualization, scholars have positioned learning agility as a construct most relevant to leadership potential, or the likelihood of successful performance in positions of higher responsibility at some point in the future (Finkelstein et al., 2018). However, the willingness and ability to learn, grow, and adapt in response to workplace change are essential for not only future

leaders but any professional operating in today's volatile, uncertain, complex, and ambiguous (VUCA) environments (Fugate et al., 2004).

The rapid workplace changes brought about by the global COVID-19 pandemic are a timely example of the need for learning agility. The pandemic necessitated strategic organizational shifts while simultaneously requiring learning and adaptability at the individual level. Many leaders had to quickly learn how to lead virtual teams, with little or no training, while many individual contributors were forced to navigate novel virtual landscapes. Other employees did not have the flexibility to work virtually and, consequently, faced distinctive challenges. Many professionals, such as first responders and healthcare professionals, had to learn to navigate workplaces under the constant threat of COVID-19 exposure. This new workplace reality forced organizations to develop—and employees to learn—new policies and procedures to complete their work safely. Indeed, the rapid changes brought about by COVID-19 required employees to adapt and perform in new, first-time conditions; in other words, they needed to demonstrate learning agility.

Even before the onset of COVID-19, the workplace was rapidly changing and will undoubtedly continue to do so. Globalization and accelerated technological advancement will alter the way individuals live and work in the future. Some future-of-work pundits have suggested that up to 85% of the jobs that will be available in 2030 have yet to be conceived (Dehaze, 2021). As Blume et al. (2010) noted, formal education and employee training programs cannot keep pace with the rapid evolution of the workplace. It is not surprising, therefore, that over 70% of workplace learning occurs outside formal training and education (Cseh et al., 2000; Koopmans et al., 2006; Marsick & Watkins, 1990). Given the fast-changing workplace landscape, learning agility is one of the most sought-after employee competencies (Wilson &

Breault, 2018) as it allows employees to learn from experience to evolve in tandem with dynamic workplaces.

Although the conceptualization of learning agility as a discrete construct is relatively new (circa 2000), several researchers (e.g., Dai et al., 2013; Dries et al., 2012; Juhdi et al., 2012) have found promising evidence of learning agility's link to critical leadership outcomes such as performance, promotions, and potential. For instance, in a recent meta-analysis, De Meuse (2019) reviewed the empirical evidence for learning agility and found a strong relationship between learning agility and leader performance ($\rho = .74$) as well as learning agility and leader potential ($\rho = .75$). Previous empirical work on leader selection has typically regarded IQ as the best single predictor of leadership outcomes (Schmidt & Hunter, 2004). The meta-analytic findings around learning agility are significant since they suggest that learning agility's relationship with leadership outcomes is stronger than IQ's relationship with leadership outcomes. However, these results warrant further investigation given that the research on learning agility is relatively new, while the research on IQ is grounded in over 50 years of empirical studies.

Despite such promising empirical research, learning agility does not have a robust theoretical history. The construct grew out of practitioner work based on corporate studies of learning from experience. Lombardo and Eichinger (2000) cited several studies centering on learning from experience in their original work, which guided their ideas about learning agility. Learning agility scholars empirically derived the construct from corporate studies and interviews to identify those who learn from experience and apply their learning to performance in future unknown situations (Lombardo & Eichinger, 2000). Lombardo and Eichinger suggested that learning agility comprises four dimensions: people agility, change agility, mental agility, and

results agility. People agility is the ability to work with diverse groups of people to accomplish tasks. Change agility indicates one's comfort with change and a propensity to experiment actively to determine new solutions. Mental agility refers to an individual's ability to operate efficiently in complexity. Lastly, results agility is the ability to perform effectively and produce desired outcomes in first-time conditions.

Some scholars have attempted to establish a theoretical grounding for learning agility. For example, DeRue et al. (2012) proposed a model that defines learning agility as the speed and flexibility with which learners move through the experiential learning process. To tap into these learning agility components, the researchers suggested that a measure of learning agility should assess cognitive attributes and behavioral processes. In addition to redefining learning agility, DeRue et al. indicated that a full learning agility model must consider individual differences and contextual factors. Lee and Song (2020) developed a theoretical framework for learning agility that grounds the construct in adult learning theory and organization behavioral theory to explain how learning agility impacts workplace behavior. The researchers maintained that experiential learning theory (Kolb, 1984), transformative learning theory (Mezirow, 1978), behavioral theory of the firm (Cyert & March, 1963/2001), and organizational learning theory (Argyris & Schön, 1974) all underlie learning agility.

Though the concept of learning agility is relatively new, scholarly focus on learning from experience and adaptability is not. The conceptually similar idea of informal learning, which entails learning that takes place outside formal classroom settings, has been an important topic in human resource development literature since Watkins and Marsick introduced the topic in the 1980s. Marsick and Watkins (2015) described informal learning as learning that “may occur in institutions, but it is not typically classroom-based or highly structured, and control of learning

rests primarily in the hands of the learner” (p. 12). Informal learning focuses on unstructured and experiential learning activities (Marsick & Watkins, 1990). A key component of informal learning is the trial-and-error processes of learning from experiences and mistakes (Marsick & Watkins, 2015).

Some scholars have drawn a distinction between informal learning and informal learning behaviors, or “non-curricular behaviors and activities pursued in service of knowledge and skill acquisition that take place outside formally-designated learning contexts” (Cerasoli et al., 2018, p. 204). On the other hand, some scholars have described learning agility as not necessarily a behavior but, rather, a meta-competency (DeRue et al., 2012). A competency refers to the characteristics and attributes needed for successful performance (Hoge et al., 2005), while a meta-competency is a competency required to develop other competencies (Briscoe & Hall, 1999). Individuals vary in their likelihood of engaging in informal learning behaviors (Noe et al., 2013), and individual differences may contribute to someone’s propensity to learn from their experiences and environment (Cerasoli et al., 2018). The meta-competency of learning agility may relate to an individual’s willingness to engage in informal learning behaviors, although no studies have empirically linked these constructs.

Despite the lack of research connecting informal learning and learning agility, both concepts relate, in some ways, to an individual’s willingness and ability to learn from their experience. Other individual differences, such as personality, may serve as a precursor to someone’s willingness and ability to learn from their experiences. Some scholars have sought to better understand what role an individual’s personality plays in informal learning and learning agility. Previous research findings have suggested that individual personality influences one’s likelihood of engaging in informal learning behaviors (e.g., Noe et al., 2013), and many scholars

have linked learning agility to personality (e.g., Connolly, 2001), although with somewhat inconsistent results. What remains unclear is how learning agility and informal learning relate, as well as how personality, informal learning behaviors, and learning agility relate collectively to one another.

Problem Statement

Despite promising research findings and prevalent industry use of learning agility, some researchers have criticized the construct. DeRue et al. (2012) noted that academic scholars have been largely excluded from the conversation about learning agility. These researchers have also argued that learning agility lacks conceptual clarity and is “ill defined and poorly measured” (p. 258). DeRue et al. are not alone in their critique of the construct. Arun et al. (2012) indicated that “if learning agility is to be raised to the status of a scientific construct, then much work is still needed” (p. 292). Indeed, further research on learning agility, especially the relationship between learning agility and similar concepts, is needed to better define and understand the construct.

Wang and Beirer (2012) claimed that the concept of learning agility ignores similar ideas related to learning from experience, such as informal learning. They suggested that a crucial component of learning agility is “learning in situ” (p. 294) instead of learning through formal developmental activities. Similarly, informal learning focuses on unstructured learning activities and the trial-and-error process of learning from mistakes and experience (Marsick & Watkins, 1990). Lombardo and Eichenger’s (2000) research on learning agility echoes the importance of learning from experience, suggesting that extracting lessons from experience is critical to leadership potential and success. Despite the apparent overlap of learning agility and informal learning theories, no empirical studies have examined the relationship between these two conceptually similar theories.

Further, it is unclear how, or if, learning agility differs from individual personality traits. Some scholars have found limited relationships between personality and learning agility (e.g., Connolly, 2001; Laxson, 2018), while other researchers have discovered multiple significant relationships between learning agility dimensions and personality dimensions (e.g., Ogisi, 2006; Smith et al., 2017). While there is no clear consistency in the learning agility research, the strongest association between learning agility and personality seems to relate to the openness-to-experience dimension of the five-factor model of personality (McCrae & Costa, 2003). This relationship is plausible given that openness to experience relates to intellectual curiosity, imagination, and creativity (McCrae & Costa, 2003), possibly resulting in an individual's willingness and openness to engaging in learning-agile behaviors.

Arguably, learning agility is a critical concept supported by promising empirical findings. However, learning agility's utility is currently limited by a lack of theoretical understanding of the construct and a lack of knowledge regarding its place relative to conceptually similar constructs. Thus, further research is needed to better understand learning agility and its relation to similar concepts, such as informal learning and personality dimensions. Scholars have linked both learning agility and informal learning behaviors to individual personality differences, but it is unclear how these constructs interrelate.

Study Purpose and Research Questions

The purpose of this study was to add conceptual clarity to the learning agility construct by examining learning agility's relationship to several theoretically connected concepts. The study examined how learning agility relates to informal learning behaviors. It also investigated motivation to learn, reflective thinking, and personality as antecedents of learning agility and

modeled the relationship between these constructs, learning agility, and informal learning. The following research questions (RQs) guided the study:

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?

The study addressed these research questions through a quantitative analysis of archival, self-report survey data from federal leaders in a healthcare context.

Theoretical Framework

The theoretical framework for this study integrates multiple theories and frameworks: DeRue et al.'s (2012) learning agility framework; Marsick and Watkins' (1990) informal and incidental learning model; Lee and Song's (2020) theoretical framework of learning agility; and Lombardo and Eichinger's (2000) conceptualization of learning agility. As depicted in Figure 1, this study's theoretical framework presents learning agility as a multidimensional psychological construct comprising mental agility, people agility, results agility, and change agility, consistent with Lombardo and Eichinger's conceptualization. Informal learning, though depicted as a cycle, is an iterative process consistent with Marsick and Watkins' theory of informal learning.

Although the theoretical framework outlines the relationship between personality, learning agility, informal learning, and performance, this study focused on the relationship between individual differences (specifically personality, motivation to learn, and reflective thinking), learning agility, and informal learning to better understand the relationship between the

constructs. The study did not investigate how these constructs relate to performance, since multiple empirical studies have already focused on the relationship between personality and performance, informal learning and performance, and learning agility and performance.

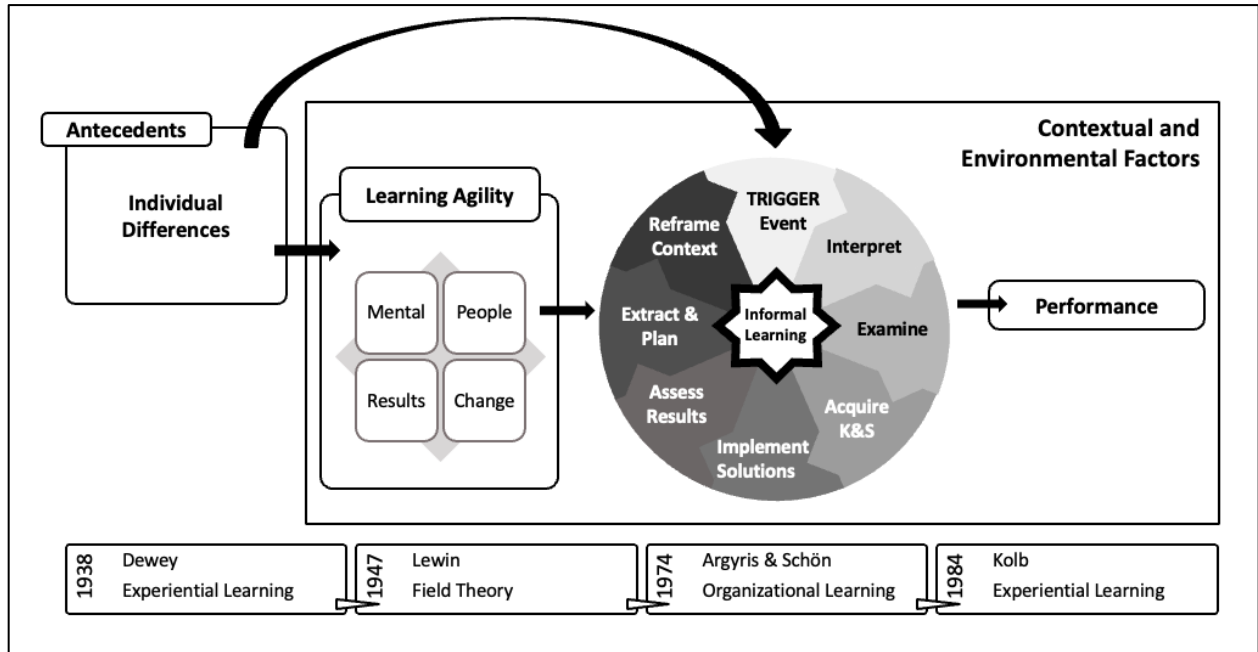


Figure 1 *Theoretical Framework*

Study Significance

This study's findings have important implications for scholars and practitioners since it addresses an important gap in the current learning agility literature. The main criticisms of learning agility have centered on a perceived lack of conceptual clarity, a lack of theoretical grounding, and uncertainty around learning agility as a unique construct. The concept of learning agility was empirically derived (Lombardo & Eichinger, 2000), which is not inherently problematic, but the lack of theoretical grounding has led to confusion about the bounds of the construct. DeRue et al. (2012) proposed a more theoretical model of learning agility, but this

model has not been fully tested and deviates from the traditional conceptualization of learning agility. While learning agility is conceptualized as learning from experience, little is understood about the connection to similar constructs. Lee and Song (2020) sought to connect learning agility to experiential learning by drawing on the works of Kolb (1984), Mezirow (1978), Cyert and March (1963/2001), and Argyris and Schön (1974). Many of the theories Lee and Song drew upon overlap with the theoretical work that informed Marsick and Watkins' (1990) informal learning theories—indicating a potential connection between informal learning and learning agility.

The lack of conceptual clarity is likely a contributing factor to some confusion around the bounds of the construct. For example, learning agility is conceptually related to learning from experience; however, it is unclear how some dimensions of learning agility relate to this concept. For example, people agility involves working well with diverse groups of people and treating others constructively (Lombardo & Eichinger, 2000), but this does not seem inherently related to learning from experience. Further, the lack of a theoretical basis also contributes to a lack of understanding about learning agility's relationship to other constructs. For instance, Wang and Beier (2012) maintained that learning agility research has not incorporated similar concepts such as informal learning. In addition, learning agility's association with personality requires further examination as current research findings are inconsistent, making it unclear how learning agility is related to, or even different from, personality.

Despite the criticisms and confusion in the literature, learning agility is seemingly gaining popularity in organizational applications, with many organizations using the construct in their talent management and development strategies. The prevalence of learning agility is supported by empirical evidence linking learning agility and leadership performance, but this

evidence varies greatly. Assessment vendors are currently conducting much of the empirical research on learning agility, and this work should be complemented with academic inquiry into the construct. Learning agility is an area where academic scholarship can help better inform organizational practice. This study sought to provide convergent validity evidence, which is a type of construct validity, by demonstrating that learning agility is linked to a conceptually similar concept: informal learning. The study results will help elucidate learning agility's nomological network, or the network of constructs to which a construct relates (Cronbach & Meehl, 1955). Understanding learning agility's connection to other constructs will lend greater conceptual clarity to the construct and help scholars better understand the theoretical roots of learning agility.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this study was to add conceptual clarity to the learning agility construct by examining learning agility's relationship with several theoretically related concepts, foremost among them informal learning behaviors. The study also investigated motivation to learn, reflective thinking, and personality as antecedents of learning agility and informal learning behaviors and modeled the relationship between and among these variables. This literature review focuses first on the conceptual and theoretical underpinnings of learning agility and informal learning behaviors, and then discusses the theoretical framework for the study. After exploring the empirical literature on learning agility and informal learning, the review centers on personality, motivation to learn, and reflective thinking and how these variables might relate to learning agility and informal learning behaviors. The chapter concludes with a summary of the research questions and hypotheses and with a discussion on the need for further research around the construct of learning agility.

This literature review utilizes an integrative approach, which, according to Torraco (2016), "is a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspectives on the topic are generated" (p. 356). In keeping with this definition, the review attempts to generate a new perspective on learning agility's connection to similar, theoretically related constructs. I consulted ProQuest, EBSCO, Google Scholar, and Wiley databases, using the following key search terms: *informal learning, informal learning behaviors, learning agility, personality AND learning agility, personality AND informal learning, personality AND learning, motivation to*

learn, and *reflective thinking*. Additionally, this review employed a snowball technique (Callahan, 2014) whereby I identified additional sources of interest through the in-text citations of articles I located during my initial database search. I reviewed article abstracts to uncover sources pertinent to my literature review, and I excluded studies that were not relevant to my topic. Notably, this review did not uncover any empirical articles specifically examining the relationship between learning agility and informal learning behaviors, further substantiating the need for the current research.

Learning Agility

Although Lombardo and Eichinger (2000) coined the term *learning agility* only 20 years ago, the concept has received considerable attention in the academic literature. Most of these learning agility studies have been empirical, relating to learning agility's utility as a predictor of high-potential leaders. However, more recently, several scholars have attempted to establish a theoretical framework to better define learning agility. This section traces the origins of learning agility and the evolution of this recent theoretical work.

Learning Agility Conceptualization and Evolution

Learning agility does not have a robust theoretical history; rather, the construct was borne from practitioner work based on corporate studies of learning from experience. In their original work, Lombardo and Eichinger (2000) cited several studies on learning from experience that guided their ideas on learning agility. This section describes the studies undergirding Lombardo and Eichinger's initial work on learning agility as a unique construct and how the theoretical conceptualization of learning agility has evolved.

The earliest research that Lombardo and Eichinger (2000) cited included several studies conducted by AT&T that found that low-potential executives performed above expectations

when they were given developmental work opportunities and had varied work experience (Bray et al., 1974; Howard & Bray, 1988). The findings from these studies demonstrated that experience is a crucial differentiator in the developmental trajectory of leaders. This and related conclusions led Lombardo and Eichinger (2000) to suggest that “while certain skills and attributes can be selected for, it seems that what happens after hiring a person has as much or more impact on long-term worth as anything that has gone before” (p. 322).

In the late 1980s, the Center for Creative Leadership (CCL) conducted a pair of studies that further supported the idea that developmental experience is vital to managerial success. These studies, which McCall and Morrison (1988) summarized, entailed interviews with successful executives to determine the factors that had contributed to career success. The researchers found that challenging experiences were critical developmental milestones, but individuals differed in how they learned from experience. Some individuals grew and adapted through difficult experiences, though this was not the case for everyone. These CCL studies served as the basis for the notion that certain qualities or attributes impact what individuals ascertain from experiences.

Lombardo and Eichinger (2000) also drew on Sternberg et al. (1995), whose work suggested that factors aside from cognitive ability predict long-term success. Sternberg et al. argued that learning from experience, which the researchers described as “street smarts,” is more important than cognitive ability in an individual’s career success and successful adaptation to novel situations. According to Sternberg et al., street smarts refer to the ability to work through and solve day-to-day challenges by drawing on past experiences.

In addition to the finding that learning from experience is critical to leadership success over time, the CCL studies also identified a lack of receptiveness to new learning as the

predominant cause of managerial derailment (McCall & Lombardo, 1983). These studies found that individuals sometimes had difficulty shedding habits and skills that had led to early success. Individuals would often overuse competencies and skills that had worked in previous scenarios based on the erroneous assumption that what worked in the past would continue to lead to success in new and different situations. The tendency to neglect the need to adapt and learn new ways of responding to novel scenarios led those who had been successful in the past to derail in their performance and careers.

The research discussed in this section led Lombardo and Eichinger (2000) to hypothesize that some individual differences influence the tendency for some to grow from challenges and experiences, while others derail due to their inability to adapt. Lombardo and Eichinger postulated that those able to adapt differ in a few critical ways: (1) they seek feedback and use the feedback to improve; (2) they have more challenging on-the-job experiences; and (3) they learn new skills and patterns of thought to respond to challenges. Based on these assumptions, Lombardo and Eichinger conducted two studies to create an instrument for identifying high potentials—those individuals who would grow and learn from experience over time. Utilizing a series of interviews and survey questions, the researchers developed the original measure of learning agility.

Evolving Perspectives on Learning Agility

Much of the work on learning agility is grounded in Lombardo and Eichinger's (2000) original conceptualization of learning agility as “the willingness and ability to learn new competencies in order to perform under first-time, tough, or different conditions” (p. 323). However, researchers and practitioners have modified Lombardo and Eichinger's conceptualization over time, adding several new dimensions. In a critique of Lombardo and

Eichinger's work, DeRue et al. (2012) proposed a new model that defines learning agility more narrowly. Recently, several researchers (e.g., Dai & De Meuse, 2021; Lee & Song, 2020) have attempted to ground learning agility in theory. In the following subsections, I discuss the evolution of learning agility's conceptualization as well as recent theoretical work on learning agility.

Lombardo and Eichinger's (2000) Model. In their original work, Lombardo and Eichinger (2000) suggested that learning agility comprises four separate factors: people agility, change agility, mental agility, and results agility. Mental agility refers to an individual's ability to operate efficiently in complexity. People agility relates to one's ability to work with diverse groups of people to accomplish work. Change agility centers on one's comfort with change and the propensity to actively experiment to determine new solutions. Lastly, results agility refers to one's ability to achieve results in new situations. Table 1 summarizes these four facets as described by Lombardo and Eichinger.

Table 1

Original Facets of Learning Agility—Lombardo & Eichinger's (2000) Model

Learning Agility Facet	Description
Mental agility	Easily operates in complexity. Capable of taking a unique view in novel situations and performing in VUCA environments.
People agility	Adept at working with diverse groups of people. Strong awareness of themselves and treats others constructively.
Change agility	Comfortable with change and likes to experiment. Curious and engages in active experimentation.
Results agility	Gets results in VUCA situations even when faced with first-time, novel challenges.

Note. VUCA = volatile, uncertain, complex, and ambiguous. Adapted from “High Potentials as High Learners,” by M. M. Lombardo and R. W. Eichinger, 2000, *Human Resource Management*, 39(4), p. 325 ([https://doi.org/10.1002/1099-050X\(200024\)39:4<321::AID-HRM4>3.0.CO;2-1](https://doi.org/10.1002/1099-050X(200024)39:4<321::AID-HRM4>3.0.CO;2-1)). Copyright 2000 by John Wiley & Sons.

Subsequent conceptualizations of learning agility have modified the original factors in Lombardo and Eichinger's (2000) model. Many of these modifications have involved renaming the factors, with little change to what the factors measure. However, some researchers have also added factors. For example, De Meuse et al. (2011, as cited in De Meuse, 2017) added a fifth factor—self-awareness—which they defined as “the depth to which individuals know themselves, recognizing their skills, strengths, weaknesses, blind spots, and hidden strengths” (p. 272). While De Meuse et al. made self-awareness an additional factor of learning agility, Lombardo and Eichinger's (2000) model initially captured self-awareness within the people agility factor. De Meuse et al.'s model removes the self-awareness component from the people agility dimension since the model encapsulates self-awareness as a separate factor. Table 2 displays the dimensions of the learning agility frameworks that have been based on Lombardo and Eichinger's original model.

Table 2

Evolution of Learning Agility Models Grounded in Lombardo & Eichinger's (2000)

Conceptualization

Lombardo & Eichinger (2000)	De Meuse et al. (2011)	De Meuse & Feng (2015, 2017)	Bedford (2011); Juhdi et al. (2012)
People agility	People agility	Interpersonal acumen	Single-dimension conceptualization
Change agility	Change agility	Change alacrity	
Results agility	Results agility	Drive to excel	
Mental agility	Mental agility Self-awareness	Cognitive perspective Feedback receptiveness Environmental mindfulness	

Note. Adapted from “Learning Agility: Its Evolution as a Psychological Construct and Its Empirical Relationship to Leader Success,” by K. P. De Meuse, 2017, *Consulting Psychology Journal: Practice and Research*, 69(4), p. 276 (<http://dx.doi.org/10.1037/cpb0000100>). Copyright 2017 by the American Psychological Association.

The conceptualization of learning agility continued to evolve as De Meuse and Feng (2015) added feedback responsiveness and environmental mindfulness to their model. According to the authors, feedback responsiveness is the extent to which an individual seeks and implements feedback to improve their performance (De Meuse & Feng, 2015). The original learning agility model included feedback receptiveness within various dimensions; De Meuse and Feng simply made it a distinct factor (De Meuse, 2017). The environmental mindfulness facet captures the extent to which individuals observe their surroundings, attend to new situations, and remain nonjudgmental and open (De Meuse & Feng, 2015). Though the researchers renamed the remaining factors (as detailed in Table 2), they still aligned very closely with the factors in Lombardo and Eichinger's (2000) conceptualization.

Not all researchers who have drawn on Lombardo and Eichinger's (2000) model have conceptualized learning agility as a multidimensional construct. For example, Bedford (2011) developed a single-dimension measure of learning agility in his unpublished doctoral dissertation. Likewise, Juhdi et al. (2012) created a single-dimension measure of learning agility for their peer-reviewed journal article. Both Bedford and Juhdi et al. cited Lombardo and Eichinger's learning agility model as the basis for their conceptualizations. Other researchers (e.g., Connolly, 2001; Ogisi, 2006) have noted that each dimension of learning agility may have unique associations with other constructs; consequently, single-dimension measures would obscure more nuanced relationships. The shortening of learning agility scales is an area that requires further research.

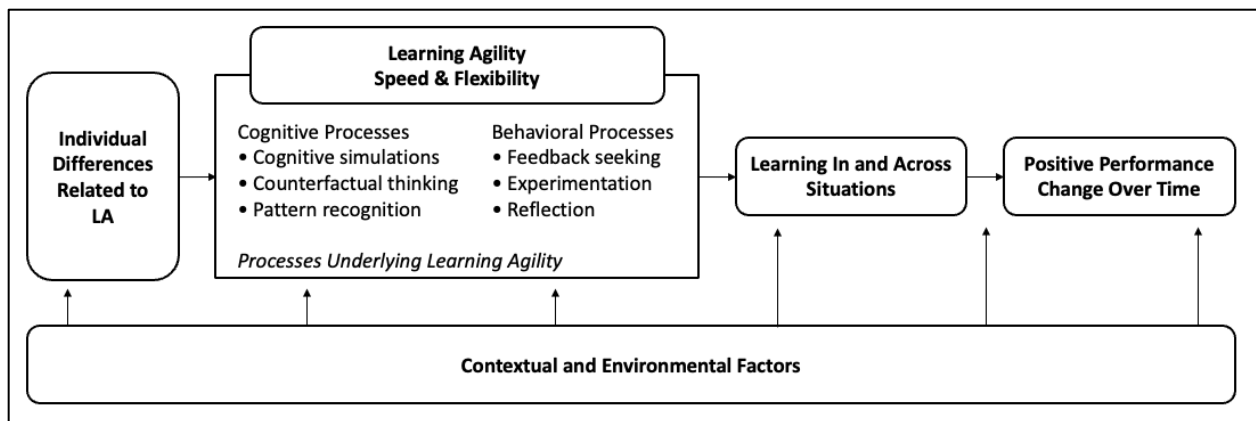
DeRue et al.'s (2012) Model and Related Models. While the conceptualizations discussed thus far are grounded in Lombardo and Eichinger's (2000) original learning agility model, DeRue et al. (2012) offered a divergent model. The researchers critiqued Lombardo and Eichinger's conceptualization of learning agility as being conflated with learning *ability*, stating that

it is unclear whether learning agility is a unique concept or simply a repackaging of old wine in a new bottle. Existing research on learning agility does not carefully differentiate, either theoretically or empirically, the agility concept from general ability to learn.

(DeRue, 2012, p. 259)

DeRue et al. (2012) suggested that, due to its broad definition, the term *learning agility* has been used too loosely to mean anything related to experiential learning. To remedy the liberal use of the term, the researchers sought to define learning agility more narrowly as the speed and flexibility with which learners move through the experiential learning process. To tap

into these learning agility components, they suggested that any measure of learning agility should focus on cognitive attributes and behavioral processes. In addition to redefining learning agility, DeRue et al. indicated that a comprehensive learning agility model must consider individual differences and contextual factors. Figure 2 illustrates DeRue et al.'s model.



Note. Adapted from "Learning Agility: In Search of Conceptual Clarity and Theoretical Grounding," by D. S. DeRue, S. J. Ashford, and C. G. Myers, 2012, *Industrial and Organizational Psychology*, 5(3), p. 265 (<https://doi.org/10.1111/j.1754-9434.2012.01444.x>). Copyright 2012 by Society for Industrial and Organizational Psychology.

Figure 2 DeRue et al.'s (2012) Conceptualization of Learning Agility

Although no learning agility measures fully capture DeRue et al.'s (2012) conceptualization, Burke et al. (2016) refined the learning agility model by creating a measure that adds the facets of speed and information gathering. According to Burke et al.'s model, speed is the extent to which individuals move through ideas quickly to determine what works, while information gathering concerns seeking out additional information, such as through conferences or training, to remain proficient within an area of expertise. The researchers modified all other facet names, but the measured facets appear to be similar to those in Lombardo and Eichinger's (2000) original model (De Meuse, 2017). Therefore, Burke et al.'s operationalization of learning

agility blends components of Lombardo and Eichinger’s conceptualization with portions of DeRue et al.’s (2012). Table 3 lists the dimensions of Burke et al.’s learning agility model. Seven of the nine facets align with Lombardo and Eichinger’s conceptualization, with speed and information gathering being new additions aligned with DeRue et al.’s work.

Table 3

Burke et al. ’s (2016) Learning Agility Facets Compared With Lombardo & Eichinger’s (2000) Model

Lombardo & Eichinger (2000)	Burke et al. (2016)
People agility	Collaborating
	Interpersonal risk-taking
Change agility	Experimenting
Results agility	Performance risk-taking
Mental agility	Flexibility
	Reflecting
	Feedback seeking
	Speed
	Information gathering

Note. Adapted from “Learning Agility: Its Evolution as a Psychological Construct and Its Empirical Relationship to Leader Success,” by K. P. De Meuse, 2017, *Consulting Psychology Journal: Practice and Research*, 69(4), p. 276 (<http://dx.doi.org/10.1037/cpb0000100>). Copyright 2017 by the American Psychological Association.

Theoretical Work on Learning Agility

Learning agility is an empirically driven construct with no agreed-upon theoretical basis. Most of the models described previously derive from Lombardo and Eichinger’s (2000) empirical work. Even the work of DeRue et al. (2012) does little to advance the underlying theory of learning agility, since no measures exist to empirically test their model. This lack of a

clear theoretical basis has led to definitional ambiguity and “measurement messiness” (Dai & De Meuse, 2021, p. 33). However, in the following subsections, I discuss several recent attempts to establish a theoretical basis for learning agility.

Lee and Song’s (2020) Theoretical Framework and Conceptual Model. Lee and Song (2020) conducted an integrative review of the learning agility literature to develop “conceptual models by identifying what sub-factors can capture the characteristics of learning agility” (p. 2). They grounded learning agility in adult learning theory and organization behavioral theory to explain how learning agility impacts workplace behavior. The researchers suggested that experiential learning theory (Kolb, 1984), transformative learning theory (Mezirow, 1978), behavioral theory of the firm (Cyert & March, 1963/2001), and organizational learning theory (Argyris & Schön, 1974) underlie learning agility. They attempted to expand learning agility beyond a measure of leadership performance and potential to describe its broader applicability to organizations, citing the need for organizations as a whole to be more flexible and adaptive (i.e., learning agile).

Based on their literature review, Lee and Song (2020) recommended that the learning agility model comprise the following components: self-directed learning, challenging experience, critical reflection, seeking constructive feedback, adaptation to the job environment, and rational problem solving (p. 17). Lee and Song’s model has little empirical support; however, the researchers recently developed a measure of learning agility grounded in their conceptualization (Lee & Song, 2021), potentially allowing for further empirical investigation of their model. Yet, one drawback of their model is ambiguity concerning its components. Specifically, it is unclear which components are traits (i.e., individual characteristics and behaviors) of the learning-agile versus antecedents and outcomes. For example, it is vague if challenging experience is an input

in a process linking learning agility to an outcome or if the learning-agile tend to engage in more challenging experiences because of their disposition.

Dai and De Meuse's (2021) Theoretical Framework of Learning Agility. Dai and De Meuse (2021) recently proposed a learning agility theoretical framework, citing the need for a more theoretical grounding to help clarify the construct. Whereas Lee and Song (2020) did not build their conceptualization on Lombardo and Eichinger's (2000) work, Dai and De Meuse (2021) used the latter's learning agility model as a starting point to help elucidate the learning agility construct. Dai and De Meuse defined learning agility and related the model to theory, highlighting three main components of learning agility: motivation, ability, and application. For each of these components, the researchers suggested that learning occurs in three primary contexts: at the individual level (self), the group level (social), and cognitively. Predicated on the components and contexts of learning, learning agility has nine facets according to the authors: intellectual curiosity, unconventional thinking, cognitive flexibility, open-mindedness, social astuteness, social flexibility, personal learner, self-reflection, and self-regulation. Table 4 displays Dai and De Meuse's theoretical model.

Table 4*Dai & De Meuse's (2021) Theoretical Model of Learning Agility*

Component	Cognitive Learning Context	Social Learning Context	Self Learning Context
Motivation	Intellectual curiosity	Open-mindedness	Personal learner
Ability	Unconventional thinking	Social astuteness	Self-reflection
Application	Cognitive flexibility	Social flexibility	Self-regulation

Note. Adapted from “Learning Agility and the Changing Nature of Leadership,” by G. Dai and K. P. De Meuse, in *The Age of Agility: Building Learning Agile Leaders and Organizations*, V. S. Harvey and K. P. De Meuse (Eds), 2021, p. 44 (<https://doi.org/10.1093/oso/9780190085353.001.0001>). Copyright 2021 by Oxford University Press.

Dai and De Meuse (2021) suggested that current learning agility measures align neatly with their theoretical model. However, in some cases, their proposed alignment is questionable. For example, the researchers maintained that their model’s self-regulation component aligns with the results agility component of the Korn Ferry viaEDGE—a popular commercial measure of learning agility. However, the viaEDGE technical manual (Korn Ferry, 2016) defined results agility as “the degree to which an individual is motivated by challenge and can deliver results in first time and/or tough situations through resourcefulness and by inspiring others” (p. 2), whereas Dai and De Meuse (2021) described self-regulation in this way: “mindful; inhibits automaticity; deliberate when thinking and behaving” (p. 45). Based on the preceding definitions, it is unclear how these dimensions relate to one another, and Dai and De Meuse offered little explanation. Thus, one area for future research is investigating how the components of Dai and De Meuse’s model relate to the current dimensions of learning agility. For example, further research could correlate an established self-regulation measure with results agility to determine the relationship.

Learning Agility Theoretical Summary

The current literature includes multiple models of learning agility. However, many of the models represent only variations of preceding models, with slight modifications to, or renaming of, the learning agility dimensions. The roots of most of the models can be traced to three fundamental conceptualizations of learning agility: Lombardo and Eichinger (2000), DeRue et al. (2012), and Lee and Song (2020). Despite the various models and their unclear theoretical basis, there are some commonalities in the learning agility literature. In a recent review, De Meuse and Harvey (2021) noted that learning agility scholars and practitioners have generally agreed on the following points: (1) learning agility is a multidimensional psychological construct; (2) learning agility involves learning from work and life experience; (3) learning agility predicts leadership potential; and (4) learning agility has utility in leadership development and identification. Based on these commonalities, the authors offered the following definition of learning agility: “the ability and willingness to learn from experience and then apply those lessons to perform well in new and challenging leadership situations” (De Meuse & Harvey, 2021, p. 19). This study aligned with this definition of learning agility, with one exception: learning agility is relevant to all new and challenging situations and should not be limited to leadership scenarios.

Informal Learning

Lee and Song’s (2020) recent work on learning agility identified some theoretical overlap between learning agility and experiential learning; however, the scholars did not directly address a connection between learning agility and informal learning. This section of the literature review discusses informal learning, including definitions, foundations, and theoretical influences. The subsequent section discusses the connection between learning agility and informal learning.

Defining Informal Learning

Several scholars have put forth definitions of informal learning. Marsick and Watkins (2015) indicated that informal learning is “a category that includes incidental learning [and] may occur in institutions, but it is not typically classroom-based or highly structured, and control of learning rests primarily in the hands of the learner” (p. 12). Cerasoli et al. (2018) defined informal learning behaviors as “non-curricular behaviors and activities pursued in service of knowledge and skill acquisition that take place outside formally-designated learning contexts. Such activities are predominantly self-directed, intentional, and field based. Informal learning behaviors are not syllabus based, discrete, or linear” (p. 204). In addition, Eraut (2004) suggested that informal learning is “implicit, unintended, opportunistic and unstructured learning in the absence of a teacher” (p. 250). Although the preceding definitions differ, a common theme emerges from them—that informal learning occurs outside formal settings and educational institutions.

According to Cerasoli et al. (2018), there is a distinction between informal learning and informal learning *behaviors*. The authors distinguished these two terms by defining informal learning as the knowledge and skills individuals gain through engagement in informal learning behaviors. Not all scholars have drawn a distinction between informal learning and informal learning behaviors. Therefore, this literature review focuses broadly on informal learning, which includes both informal learning and the behaviors leading to informal learning. However, this study’s research design incorporated a measure of informal learning behaviors, which is discussed in more detail in Chapter 3 (Methodology).

Although the preceding definitions also share similarities, no unanimously agreed-upon definition of informal learning exists. Some researchers (e.g., Misko, 2008) have indicated that

the lines between formal and informal learning are blurred and overlap. Colley et al. (2002) noted that informal learning is difficult to define and that the definition varies depending on the context and perspective of the researcher. Thus, the concept of informal learning might be best understood by juxtaposing informal learning with formal learning. For example, some scholars (e.g., Stern & Sommerlad, 1999; Van Noy et al., 2016) have recommended thinking of informal and formal learning as existing on a continuum versus dichotomizing the two concepts. Van Noy et al. (2016) suggested that the location, who leads the learning (i.e., student or instructor), whether the learning is curriculum-based, and the purpose of the learning help determine where along the continuum the learning falls. These differentiators of informal learning are similar to those established by Marsick and Watkins (2015), who suggested that context, consciousness, reflection, and facilitation help distinguish informal learning from formal learning.

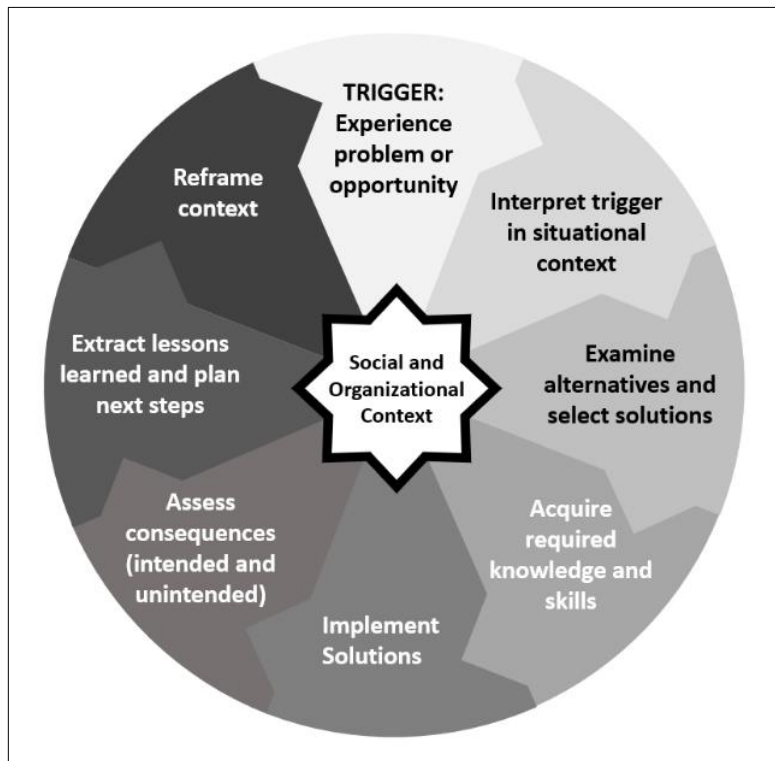
The informal learning literature makes frequent mention of incidental learning. Incidental learning is a type of informal learning that occurs as “a byproduct of some other activity, such as task accomplishment, interpersonal interactions, sensing the organizational culture, or trial-and-error experimentation” (Marsick & Watkins, 1990, p.7). While multiple definitions exist, this study was rooted in Marsick and Watkins’s (2015) work:

Informal and incidental learning both speak to learning outside formally structured, institutionally sponsored, classroom-based activities. As a result, both informal and incidental learning often take place under nonroutine conditions, that is, when the procedures and responses that people normally use fail.... [I]ncidental learning is never planned or intentional, whereas informal learning can be planned or intentional, as for example, in self-directed learning or help consciously sought from coaches or mentors. (pp. 6–7)

Although some scholars have examined informal and incidental learning constructs separately (e.g., Rowden, 2002; Rowden & Ahmad, 2000), most of the relevant research has not (Jeong et al., 2018). This study examined the overarching construct of informal learning.

Informal Learning Foundations

Marsick and Watkins are leading informal learning scholars (Cofer, 2000). Although other informal learning models exist (e.g., Collis & Margaryan, 2005; Illeris, 2003; Tannenbaum et al., 2010), Marsick and Watkins's (1990) model is likely the most frequently cited. Their original model contained “a cycle of formulating a problem, designing a solution, implementing the solution in a way consistent with the design, and assessing results—leading to further cycles of personal action research” (Marsick & Watkins, 2018, p. 1). Since introducing their initial model, Marsick and Watkins have continued to revise and adapt the framework to incorporate more recent research findings. Further revisions to their model have included emphasizing context as a significant factor influencing the informal learning process (Cseh et al., 2000). The researchers have also incorporated changes recognizing the social and interactive components of informal learning (Marsick & Watkins, 2015; Marsick et al., 2017). Figure 3 illustrates an adaption of the most recent version of Marsick and Watkins's (1990) informal learning theory.



Note. Adapted from "Evaluating Informal Learning in the Workplace," by K. E. Watkins, V. J. Marsick, and M. Fernández de Álava, 2014, in T. Halttunen, M. Koivisto, and S. Billett (Eds.), *Promoting, Assessing, Recognizing, & Certifying Lifelong Learning: International Perspectives and Practices*, p. 64. Copyright 2014 by Springer Verlag.

Figure 3 Marsick and Watkins's (1990) Theory of Informal Learning

While the model of informal learning appears linear, Marsick and Watkins (2001) explicitly pointed out that the process is iterative:

The model depicts a progression of meaning making that, in practice, is often more of an ebb and flow as people begin to make sense of a situation. With each new insight, they may have to go back and question earlier understandings. The model is arranged in a circle, but the steps are neither linear nor necessarily sequential. (p. 29)

Theoretical Influences

Marsick and Watkins's (1990) original model of informal learning drew upon the works of Dewey (1938), Argyris and Schön (1974), Lewin (1947), Kolb (1984), and Simon (1965).

Dewey's (1938) work emphasized reflective thought in response to a dilemma. According to Dewey, when an individual encounters a dilemma, they consider solutions leading to observation, experimentation, and a decision about whether to act (Dewey, 1938, as cited in Marsick & Watkins, 1990).

Argyris and Schön (1974) suggested that people have theories about how things work in practice, or theories-in-use, and theories about how things should work, or espoused theories. According to Argyris and Schön, when people's expectations are met, they do not reflect on their actions. However, if actions do not lead to the expected results, people may notice an error and adjust their actions accordingly. Argyris and Schön suggested that individuals engage in single- or double-loop learning. Single-loop learning attempts to solve a problem directly, while double-loop learning tries to adjust the governing variables.

Kolb's (1984) experiential learning cycle shows how people learn through experience. According to Kolb, individuals take in information through abstract conceptualization or concrete experience and learn through reflective observation or active experimentation. Marsick and Watkins (2018) pointed out that even though Kolb's learning cycle has been critiqued as linear, the model provides a helpful paradigm for understanding how learning occurs through experience. Marsick and Watkins (1990) also incorporated Lewin's (1947) notion that a person's interaction with their environment influences their behavior. Additionally, Simon's (1965) decision-making model provided Marsick and Watkins with insights into how individuals might react in routine versus nonroutine situations.

Noe et al.'s (2013) Conceptualization of Informal Learning

This study used Noe et al.'s (2013) measure of informal learning behaviors. Further details on Noe et al.'s informal learning measure are detailed in the methodology section of this

dissertation (Chapter 3); however, this section briefly addresses the theoretical foundation of Noe et al.'s informal learning work, which drew upon Marsick and Watkins (1990) as a theoretical basis. The researchers suggested that informal learning begins with a learner's intent to learn, which leads to a learning experience. Since Noe et al.'s description of informal learning requires an intent to learn, their conceptualization of informal learning does not include incidental learning, that is, learning as a byproduct of some other activity.

Noe et al. (2013) suggested that informal learning requires feedback and reflection, which is consistent with Marsick and Watkin's (1990) work. According to Noe et al., informal learning falls into three distinct categories: learning from oneself, learning from others, and learning from non-interpersonal sources. Learning from oneself might include reflection or experimenting with task performance. Learning from others might include activities such as asking a colleague or supervisor how to perform a task. Learning from non-interpersonal sources might include time spent reading a book or searching the internet for information. Although Noe et al. refer to their measure as a measure of informal learning, to remain consistent with Cerasoli et al.'s (2018) distinction between informal learning and informal learning behaviors, it is critical to note that Noe et al.'s conceptualization is consistent with the latter. Each of the categories described entail behaviors that might lead to informal learning.

Central to Noe et al.'s (2013) informal learning work is the concept that individual dispositions might influence an individual's propensity to engage in informal learning behaviors. Drawing on the notion that informal learning begins with an individual's intent to learn, Noe et al. suggested that motivation to learn and personality dispositions might influence an individual's likelihood to pursue learning behaviors. Further, personality traits might impact an individual's tendency to engage with others, consistent with Noe et al.'s category of learning from others.

Noe et al.'s empirical work connecting informal learning behaviors and personality dimensions is discussed in the empirical section of this literature review.

Connecting Learning Agility and Informal Learning

Lee and Song (2020) claimed that Kolb's (1984; Kolb & Kolb, 2009) experiential learning theory is the basis of learning agility. Specifically, the researchers discussed the importance of reflective thought in learning agility, which is similar to reflective thought in informal learning theory. Although Lee and Song (2020) did not specifically address Dewey's work, Kolb's work was rooted in Dewey's concepts of reflective thought and action (Miettinen, 2000). Additionally, Lee and Song pointed to the importance of double-loop learning in the experiential learning process. Again, the conversation on double-loop learning is represented in informal learning theory. The current study helps demonstrate the overlap in these theories by exploring the association between learning agility and informal learning through empirical analysis. A positive association between learning agility and informal learning would indicate they belong in the same nomological network and may suggest common theoretical undergirding:

Hypothesis 1: Learning agility will predict informal learning behaviors.

Theoretical Framework

The purpose of this study was to add conceptual clarity to the learning agility construct by examining the association between learning agility and several conceptually related constructs. While learning agility has been conceptualized as learning from experience, little research has centered on understanding the connection to similar constructs. This study provides convergent validity evidence, which is a type of construct validity, by demonstrating that learning agility is linked to the conceptually similar concept of informal learning. Additionally,

the current study investigated personality, motivation to learn, and reflective thinking as antecedents of learning agility and informal learning. The study findings elucidate learning agility's nomological network, the network of constructs to which a construct relates. Understanding learning agility's connection to other constructs helps provide conceptual clarity and assists scholars in better understanding the theoretical roots of learning agility. Figure 4 illustrates this study's theoretical framework.

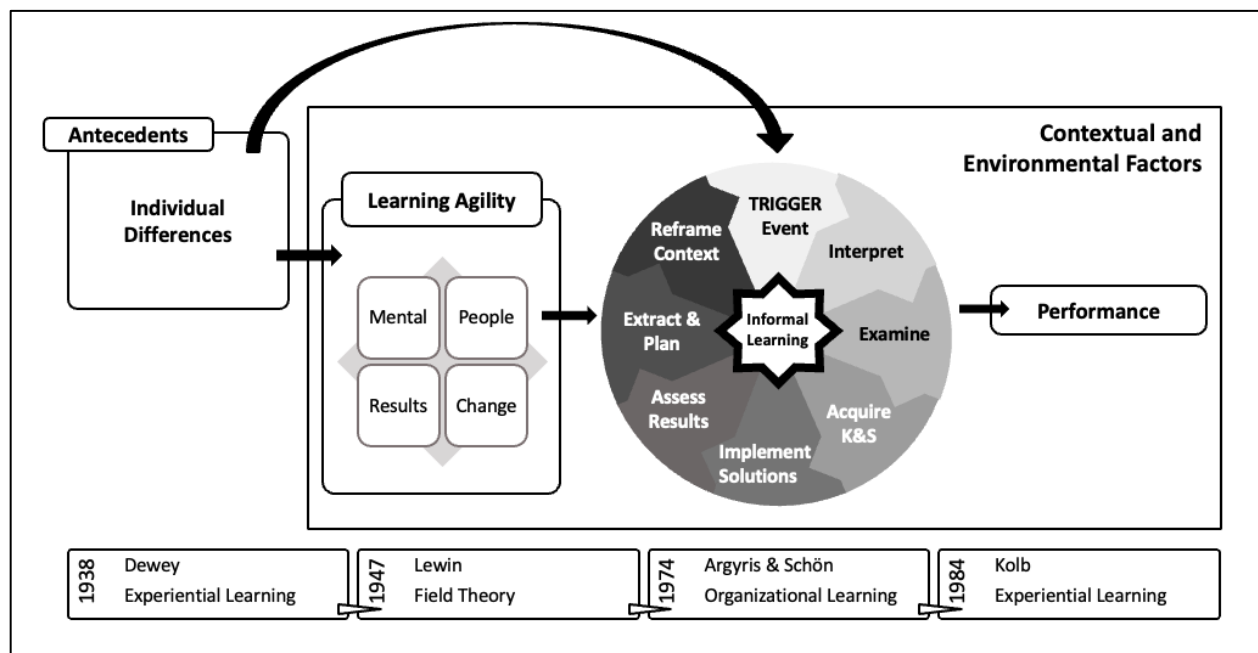


Figure 4 *Theoretical Framework*

Based on the review of the literature, no scholar has addressed the specific linkage between informal learning and learning agility. Though learning agility has many definitions, the construct is generally defined as the willingness and ability to learn from experience and apply the learning to future situations (Dai & De Meuse, 2021). Learning from experience is at the core of learning agility. Similarly, Marsick and Watkins (2015) indicated that “a central feature of

informal and incidental learning is learning from and through experience” (p. 15). Based on the definitions of informal learning described previously, informal learning and learning agility are indeed conceptually similar. This study hypothesized that learning agility is an individual difference that impacts someone’s willingness and ability to engage in informal learning activities and apply those lessons to future situations.

This study’s theoretical framework is primarily rooted in DeRue et al.’s (2012) learning agility model, which is one of the few models that elucidates how learning agility leads to performance. According to the model, individual attributes impact learning agility, which in turn leads to “learning in and across situations,” which subsequently leads to “positive performance change over time” (DeRue et al., 2012, p. 265). DeRue et al.’s model explicitly highlights three individual differences related to learning agility: goal orientation, (meta)cognitive ability, and openness to experience. Building upon DeRue et al. as well as the existing empirical research on learning agility, this study investigated motivation to learn, reflective thinking, and personality as individual difference antecedents.

This study adapted DeRue et al.’s (2012) model by replacing “learning in and across situations” with “informal learning.” Learning in and across situations is consistent with the conceptualization of informal learning, as discussed in the previous section. Since its inception, the learning agility construct has focused on learning from experience versus learning through formal means (Dai & De Meuse, 2021; Lombardo & Eichinger, 2000). DeRue et al.’s original model simply lists learning in situations, with little explanation of how the learning occurs. The informal learning model of my theoretical framework is based upon Marsick and Watkins’s (1990) theory of informal and incidental learning, which expounds upon how the learning occurs.

As an additional change, Lombardo and Eichinger's (2000) conceptualization of learning agility was used instead of DeRue et al.'s (2012). DeRue et al.'s conceptualization focuses on speed and flexibility, but it diverges from the more common conceptualization of learning agility as comprising mental agility, people agility, results agility, and change agility.

Contextual and environmental factors are central to both DeRue et al.'s (2012) model of learning agility and Marsick and Watkins's (1990) theory of informal and incidental learning. DeRue et al. focused on an environment that offers challenges and complexity but is also psychologically safe. Learning agility has traditionally been associated with high-potential leaders (Dai & De Meuse, 2021). For leaders to reach their full potential, they must encounter challenging situations represented by the context within the theoretical framework. Watkins et al. (2014) highlighted the social aspects of learning, also captured by the contextual and environmental factors component. Empirical work on informal learning and learning agility has demonstrated that individual differences impact both constructs, so individual differences serve as antecedents in this study's theoretical framework. Further, this study's research hypothesis posited that, as an individual difference, learning agility would predict informal learning behaviors.

A significant contribution of this study's theoretical framework is that multiple theories undergird the relationships between learning agility, informal learning, and performance. A common criticism of learning agility is that it lacks a theoretical basis, which had led to ambiguous and divergent conceptualizations of the construct (Dai & De Meuse, 2021). A recent study by Lee and Song (2020) sought to add such a theoretical basis to learning agility by drawing on the works of Kolb (1984), Mezirow (1978), Cyert and March (1963/2001), and Argyris and Schön (1974). Additionally, many of the theories that Lee and Song relied on

overlap with the theoretical work that Marsick and Watkins (1990) built on for their informal and incidental learning theories.

The preceding discussion illustrates the conceptual overlap of learning agility and informal learning. The description of the theoretical framework also shows how the constructs being studied are theoretically linked. In the following section, I discuss the empirical findings around learning agility and informal learning. I then review how personality, metacognition, and motivation to learn relate to informal learning and learning agility.

Empirical Findings Related to Learning Agility

Much of the research on learning agility has sought to link learning agility with leadership performance and potential. De Meuse's (2017) meta-analysis reviewed the empirical evidence around learning agility and found a strong relationship with leader performance ($\rho = .74$) and leader potential ($\rho = .75$). Table 5 summarizes the empirical studies on learning agility since Lombardo and Eichinger (2000) first introduced the construct over 20 years ago. As evidenced by these studies, researchers have focused primarily on learning agility's relevance to leader outcomes.

Table 5*Summary of Empirical Studies Related to Learning Agility and Leader Outcomes*

Author(s) (Year)	Purpose	Methodology/Sample	Findings	Implications
Lombardo & Eichinger (2000)	Investigate identification of individuals with potential to lead through LA characteristics.	- Quantitative, cross-sectional correlation design using survey data - LA dimensions linked with manager ratings of perf/potential $n = 217$; sample details unspecified	$r = .52$ ($p < .001$) PA & perf/potential $r = .50$ ($p < .001$) RA & perf/potential $r = .47$ ($p < .001$) MA & perf/potential $r = .53$ ($p < .001$) CA & perf/potential	Introduced LA as a unique construct; provided construct and facet definitions. Found LA linkage to perf and potential. Reported results at facet level versus overall LA. Study lacks methodological details (e.g., sample details and correlations table).
Eichinger & Lombardo (2004)	Examine LA impact on promotion and subsequent perf.	- Quantitative, cross-sectional correlation design using survey data - LA linked with perf after promotion $n = 313$; recently promoted managers & individual contributors from three firms	$r = .33$ ($p < .01$) Perf after promotion	Demonstrated LA's relevance to potential by examining linkage to perf ratings in new role. Examined personality and IQ in the analysis and determined LA provides a unique contribution beyond these constructs.
Dries et al. (2012)	Determine if LA predicts HiPo identification above and beyond job perf.	- Quantitative, case-control design using survey data - LA linked with supervisor-rated perf $n = 63$ (32 HiPo, 31 Non-HiPo) individual contributors and managers from 7 firms	<u>HiPos</u> $r = .35$ ($p < .001$) behavioral learning <u>Non HiPos</u> $r = .68$ ($p < .001$) job content learning $r = .51$ ($p < .001$) behavioral learning $r = .59$ ($p < .001$) Non-HiPos; LA & perf	Provided further evidence of the linkage between LA and perf. Showed incremental validity of LA over perf in predicting HiPo identification. Found on-the-job learning mediated LA/ perf relationship.

Author(s) (Year)	Purpose	Methodology/Sample	Findings	Implications
Juhdi et al. (2012)	Determine qualities of HiPo employees.	- Quantitative, cross-sectional correlation design using survey data - LA linked to self-report job attitudes $n = 329$; mix of individual contributors and managers	$r = .38$ ($p < .01$) LA & job engagement $r = .49$ ($p < .01$) LA & org engagement $r = .55$ ($p < .01$) LA & perf drive	Linked LA to outcomes of interest beyond perf & potential: job engagement, org engagement, and drive for high perf. Developed a scale of LA which did not measure underlying constructs.
Dai et al. (2013), Study 1	Examine how LA contributes to executive success.	- Quantitative, cross-sectional correlation design using survey data - LA linked with objective perf outcomes and supervisor rated competence $n = 114$; managers from consumer products company in leadership development program	$r = .29$ ($p < .01$) LA & leadership competence $r = 0.25$ ($p < 0.05$) LA & CEO proximity $r = 0.38$ ($p < 0.01$) LA & total compensation	Added to the growing evidence of LA's utility by linking construct with outcomes not previously investigated in the literature: CEO proximity and total compensation. Did not control for other factors that influence career success.
Dai et al. (2013), Study 2	Examine how LA contributes to executive success.	- Quantitative, retrospective correlation design using survey data - LA linked with objective performance outcomes $n = 83$ (district sales managers in North American pharmaceutical company)	$r = .44$ ($p < .01$) LA & promotion rate $r = 0.35$ ($p < 0.01$) LA & salary increase	Retrospective design linked LA to rate of promotion over a 10-year period. Added to the evidence that LA relates to individual growth over time and demonstrated utility as a predictor of potential. Single company sample limited generalizability of results.
Saputra et al. (2018)	Explore the effect of learning culture on work engagement and LA.	- Quantitative study using self-assessment survey data and purposive sampling method $n = 67$; senior Indonesian managers of multiple sectors	$.034$ ($p < .001$) Path coefficient for learning culture & LA $.46$ ($p < .0001$) Path coefficient for LA and work engagement	Findings indicated that LA impacts work engagement. Additionally, learning culture has an impact on LA. Sample size small and limited to Indonesian workers.

Author(s) (Year)	Purpose	Methodology/Sample	Findings	Implications
De Meuse (2019)	Scientifically investigate LA relationship to leader success.	Meta-analysis of 20 field studies examining link between LA and potential/perf	$p = .74$ LA & leader perf $p = .75$ LA & leader potential	Findings synthesized almost two decades of empirical evidence linking LA to leader success. Questionably high correlations and use of non-peer-reviewed sources limited findings.

Note. LA = learning agility; PA = people agility; RA = results agility; MA = mental agility; CA = change agility; perf = performance; HiPo = high potential; org = organizational.

The findings summarized in the preceding table illustrate the utility of learning agility in measuring leadership potential and leadership performance. Several of the researchers linked learning agility with leader performance (De Meuse, 2019; Lombardo & Eichinger, 2000). Additionally, Eichinger and Lombardo (2004) investigated learning agility's relationship with performance after promotion and found a significant positive relationship ($r = .33, p < .01$). The research suggested that performance after promotion is a reliable indicator of how leaders adapt to new challenges. Other researchers demonstrated learning agility's relation to potential by investigating promotion rates and CEO proximity (Dai et al., 2013). Taken together, these findings suggest that learning agility has very promising relationships to leadership potential—the original intent of the measure.

Since the link between learning agility and leader outcomes has been well established, this research investigated the mechanism through which learning agility impacts performance by studying learning agility's relationship to informal learning while also investigating individual differences that might impact learning agility. The following sections review learning agility's relationship to learning as well as research on individual differences related to learning agility.

Learning Agility and Learning

As noted, multiple researchers have investigated the connection between learning agility and leadership outcomes around performance and potential. These studies have measured outcomes via promotions, compensation, and even CEO proximity. Collectively, the findings have suggested that learning agility has a robust linkage to leadership outcomes. What is far less understood is how learning agility relates to learning (Hezlett & Kuncel, 2012). The term *learning agility*, defined as the ability to learn from experience and apply that learning to novel situations (Lombardo & Eichinger, 2000), suggest that learning is a key component of learning

agility. However, researchers have focused on the application component of learning agility, through its linkage to leadership outcomes, without investigating the learning component of the construct. Indeed, very few studies have examined the link between learning outcomes and learning agility, and those that have focused on the learning aspect of learning agility have tended to appear in non-peer-reviewed publications (e.g., dissertations).

In his doctoral dissertation, Trathen (2007) investigated the relationship between learning agility and change in leadership competency as determined by gain scores in leadership competency measured 17 months apart. Trathen found that learning agility had a strong correlation with gain scores measured across 11 leadership competencies. Out of 100 correlations, nearly half (49%) were practically significant, with correlation values above .30; however, the researcher did not report statistical significance. In her doctoral dissertation, Laxson (2018) found that learning agility did not correlate with learning over time, as measured by growth in managerial competency scores.

Dries et al. (2012) investigated the linkage between learning agility and manager-rated on-the-job learning. They found that overall learning agility was not related to job-content on-the-job learning but was related to behavioral-skill on-the-job learning ($r = .35, p < .005$). The researchers defined *job-content on-the-job learning* as learning new technical and functional information, while *behavioral-skill on-the-job learning* relates to interacting with others effectively. At the dimension level, only two dimensions of learning agility—people agility and change agility—had statistically significant relationships with behavioral-skill on-the-job learning. These results might suggest that learning agility, especially at the dimension level, does not have a strong relationship with learning. However, Dries et al. used manager-rated one-item

measures for each type of on-the-job learning, and the learning definitions were highly specific to certain behavior, which may have impacted the findings.

Given these mixed results, further research is needed to better understand the connection between learning agility and learning. The present study helps clarify this relationship by quantitatively examining the link between learning agility and informal learning.

Antecedents of Learning Agility

This study sought to better understand learning agility by investigating if and how personality, reflective thinking, and motivation to learn relate to learning agility's nomological network. A common question concerning learning agility is how the construct relates to other individual differences (e.g., age, gender, personality, and IQ). Additionally, in their learning agility model, DeRue et al. (2012) proposed goal orientation, meta-cognition, and openness to experience (personality) as antecedents of learning agility. Yet, few, if any, researchers have empirically validated DeRue et al.'s model. Although several researchers have investigated how these constructs relate to learning agility, there is no clear consensus; thus, the research is limited.

Age

Several researchers have examined age demographics in relation to learning agility, and their findings have suggested that learning agility is not related to age. In a study of individual contributors and managers (n = 329), Juhdi et al. (2012) found that age had no correlation with overall learning agility. Likewise, Dai et al. (2013) found that age had no relation with overall learning agility scores, nor did it have any relation to individual learning agility facets.

Gender

Few researchers have studied learning agility's relation to gender. Bedford (2011) found no significant differences in learning agility when comparing scores between genders. Dai et al. (2013) replicated these results in a sample of high-potential employees and found that gender had nonsignificant relationships with all learning agility factors, as well as overall learning agility.

Personality

In this subsection, relationship between personality and learning agility is briefly addressed. However, in a later section, this information is summarized and how each dimension of personality relates to both learning agility and informal learning is more thoroughly discussed.

Connolly (2001) did not find an association between learning agility and personality at the construct level but did identify a relationship between openness to experience and mental agility ($r = .21, p < .05$) as well as openness to experience and change agility ($r = .30, p < .01$). Further, Connolly found that learning agility added incremental validity beyond personality in predicting manager ratings of performance and potential. Laxson (2018) found a relationship between overall learning agility and openness to experience ($r = .28, p < .05$) but found limited associations between personality and learning agility (only certain learning agility dimensions and/or personality dimensions); however, other researchers have found more robust relationships between the two constructs.

Ogisi (2006) highlighted multiple significant relationships between overall learning agility and personality. Korn Ferry (2016) found multiple significant relationships between their viaEDGE measure and the Hogan Personality Inventory (HPI; a measure of general personality closely aligned with the Big Five model of personality). At the dimension level, 11 of 25 possible correlations were significant, ranging in strength from .19 to .46. Smith et al. (2017)

measured the association between the HPI and the Burke Learning Agility Inventory (LAI) and found 51 significant correlations out of 63 possible correlations. Correlations ranged from .12 to .51 ($p < .05$ to $p < .01$), suggesting that personality may play a large role in learning agility.

While there is no clear consistency in the learning agility research, the most common association between learning agility and personality appears to be with openness to experience. However, given the inconsistent findings, this is an area for further research.

IQ

In his study of the relationship between learning agility and personality, Connolly (2001) also examined the connection between IQ and learning agility. Connolly found no relation between IQ and learning agility and discovered that learning agility provided incremental validity over personality and IQ when predicting supervisor ratings of performance and promotability. It is essential to note that Connolly's study did not find a relationship between personality and job performance, nor did it find an association between IQ and job performance. These findings contradict prevailing research findings. By contrast, Ogisi (2006) found correlations between each dimension of learning agility and cognitive ability (r ranging from .19 to .35). Few studies have investigated the relationship between IQ and learning agility—another area for further research given the known interrelation between IQ and learning ability (Jensen, 1989).

Learning Goal Orientation

In DeRue et al.'s (2012) model of learning agility, goal orientation is an antecedent of learning agility. According to Dweck (1986), individuals with a performance orientation believe their performance is fixed and adopt an avoidance approach whereby they avoid potentially difficult situations. Individuals with a learning goal orientation perceive demanding situations as

an opportunity to learn. The literature is mixed on the link between learning agility and learning goal orientation. For example, Connolly (2001) found no association, whereas Burke et al. (2016) found a strong correlation between overall learning agility and learning goal orientation ($r = .75, p < .01$).

Empirical Findings Related to Informal Learning

This section of the literature review explores findings from multiple empirical studies of informal learning. Furthermore, several researchers (e.g., Cerasoli et al., 2018; Jeong et al., 2018) have recently conducted reviews of the existing literature on informal learning. In a recent meta-analysis, Cerasoli et al. (2018) summarized the empirical, informal learning literature by examining personal antecedents, situational antecedents, and informal learning outcomes. The researchers identified 43 studies in their meta-analysis, which included 376 separate effect sizes (i.e., each study might contain multiple relationships between informal learning and other variables, resulting in multiple effect sizes per study). The researchers further divided personal antecedents into individual predispositions and demographics, and divided situational antecedents into job/task characteristics, support, and opportunities for learning. Cerasoli et al. investigated outcomes, including attitudes, knowledge and skill acquisition, and performance. This organizing framework, summarized in Table 6, provides a helpful categorization of the informal learning research. The current review of the empirical literature uses Cerasoli et al.'s categories as the organizing framework, and focuses primarily on personal antecedents of informal learning since this category is more relevant to the current study.

Table 6*Organizing Framework for Informal Learning Empirical Studies*

Personal Antecedents	Situational Antecedents	Outcomes
Individual predispositions	Job/task characteristics	Attitudes
Demographics	Support	Knowledge/skill acquisition
	Opportunities for learning	Performance

Situational Antecedents of Informal Learning

Several situational characteristics impact informal learning, including support from peers and supervisors, job characteristics, and learning opportunities. Previous research has demonstrated that an employee's supervisor impacts the extent an individual engages in informal learning activities. Sambrook and Stewart (2000) found that perceived managerial support as well as leadership style impact informal learning. Additionally, working with peers (Holley et al., 2016) and networking were positively related to informal learning opportunities (Van der Heijden et al., 2009). Cerasoli et al. (2018) found that, overall, support had a corrected population correlation of $\rho = .32$

The opportunity for learning is another important situational antecedent of informal learning. Specifically, the opportunity and time available for informal learning as well as lower workload have positive associations with engagement in informal learning. Livingstone (2001) found that hours worked were related to informal learning behaviors, with the association being more robust among men ($r = .21, p < .001$) than among women ($r = .10, p < .05$). Van der Heijden et al. (2009) found mixed results when examining time available and engagement in informal learning. The researchers found that time available had a positive association with the

informal learning component of *interaction with one's supervisor*. De Groot et al. (2012) found that the opportunity to receive feedback also related to self-reported informal learning.

Personal Antecedents

For the purposes of this study, personal antecedents of informal learning, namely individual predispositions, were most pertinent. As the term implies, personal antecedents are those characteristics specific to individuals that relate to informal learning. In their meta-analysis, Cerasoli et al. (2018) divided personal antecedents into demographics and individual predispositions. Both categories had implications for this study, especially individual predispositions. Previous research has suggested that individual characteristics, such as personality, predict an individual's propensity to engage in informal learning (Noe et al., 2013). Learning agility is an individual disposition that the current study hypothesized would impact an individual's tendency to engage in informal learning. Therefore, this literature review focused on other individual dispositions researchers have investigated and the results associated with those studies.

Demographics

Several researchers have investigated the relationship between demographic characteristics and informal learning. The study results around age and informal learning have been mixed, but generally they have suggested that age and engagement in informal learning are inversely related. Nilsson and Rubenson (2014) found a negative relationship between age and informal learning. Sibaran et al.'s (2015) findings further supported this inverse relationship between age and informal learning, indicating that younger generations are more eager about and open to informal learning activities. Yet, other researchers have found that the relationship between age and informal learning differs depending on the type of informal learning activity,

with some informal learning activities being inversely related to age and other informal learning activities being positively related to age (Berg & Chyung, 2008). In summarizing the research on age and informal learning, Cerasoli et al. (2018) reported the corrected population correlation as $\rho = -.07$, indicating a negative relationship between age and informal learning. However, more research is needed in this area given that a unique association between age and type of informal learning activity may exist.

Kyndt et al. (2009) found that education level was positively associated with informal learning behaviors, meaning that as years of education increased, the likelihood of engaging in informal learning behaviors also increased. Gender seems to have a nuanced impact on informal learning as well. Males and females differ in the type of informal learning activities they prefer and their motivation for engaging in informal learning activities (de Grip & Smits, 2012; Nilsson & Robinson, 2014). Years of experience and tenure have also demonstrated mixed results in the literature. Welch (2013) and van der Klink et al. (2014) both found that tenure has a negative relationship with informal learning; however, years of professional experience seem to have a negative association with most types of informal learning activities (Parise & Spillane, 2010).

As shown in this subsection, the relationship between demographics and informal learning behaviors is mixed in some cases. However, as previous results imply, demographic factors do have implications for informal learning behaviors.

Individual Predispositions

Multiple scholars have investigated the relationship between individual predispositions and informal learning. Scholars have examined personality and motivation, as well as IQ and efficacy. This previous research informed the current study's examination of how learning agility—an individual difference comprising ability and motivation components—influences

informal learning. Research has demonstrated that individual predispositions play a role in informal learning. Cerasoli et al. (2018) reported that individual predisposition correlates positively with informal learning behaviors, with a corrected population correlation of $\rho = .27$. This relationship was higher than demographics, job characteristics, and learning opportunities, signifying that individual predisposition is arguably the most influential antecedent of informal learning behaviors.

Prior research has also suggested that personality traits are associated with an individual's engagement in informal learning. For instance, in a sample of 180 restaurant managers, Noe et al. (2013) found that each of the Big Five personality traits was positively associated with informal learning. Notably, Noe et al. also examined how zest impacted informal learning; when all differences were examined together, zest was the only significant predictor of informal learning. Noe et al. also found that cognitive ability, as measured using the Wonderlic QuickTest, did not have a significant association with informal learning. Noe et al.'s findings were important to this study: The significant positive association with personality and nonsignificant relationship with cognitive ability mirror the relationship between learning agility and personality and IQ. As with informal learning in Noe et al.'s study, learning agility has a demonstrated association with personality factors and lacks a relationship with cognitive ability (Connolly, 2001).

Learning orientation, motives, and self-efficacy all have positive relations with informal learning behaviors. Gijbels et al. (2010) and Gijbels et al. (2012) found that self-directed learning orientation (SDLO) had a positive relationship with engagement in informal learning. SDLO is similar to proactive personality and relates to "the tendency to take an active and self-starting approach towards learning goals, and to persist in overcoming barriers and setbacks to learning"

(Gijbel et al., 2012, p. 423). Choi and Jacobs (2011) found that motivation, learning goal orientation, and self-efficacy had a positive relationship with engagement in informal learning. In a study of schoolteachers, Lohman (2006) found that respondents reported love of learning as an essential contributing factor for engagement in informal learning activities. Table 7 summarizes the research literature on the association between individual predispositions and informal learning.

Table 7*Empirical Findings Linking Individual Predispositions and Informal Learning*

Author(s) (Year)	Purpose	Methodology/ Sample	Informal Learning Measure	Findings	Implications for Study
Choi & Jacobs (2011)	Investigate effects of formal learning, personal learning orientation, and environment on IL.	- Quantitative, cross-sectional correlation design using survey data $n = 203$; middle manager in Korean commercial bank	12-item scale measuring learning with others, self-experimentation, and external scanning based on Lohman's (2005) 8-item scale.	$r = .23, .28, .28$ ($p < .05$) self-efficacy $r = .31, .44, .49$ ($p < .05$) learning goal orientation $r = .23, .34, .40$ ($p < .05$) motivation to learn $SPC = .619$ ($p < .01$) personal characteristics (cumulative effect of self-efficacy, goal orientation, and motivation to learn)	Found personal characteristics have a positive and significant effect on IL. Specifically, linked motivation, learning goal orientation, and self-efficacy to engagement in IL. Similarly, these variables have been shown to relate to learning agility, suggesting learning agility and IL have a similar nomological network.
Gijbels et al. (2010)	Investigate various antecedents' influence on work-related learning behaviors.	- Quantitative, case-control design using survey data $n = 115$; students in part-time program who had full-time jobs	Work-related learning scale: self-developed 10-item scale measuring frequency of behaviors on a 4-point scale.	$r = .49$ ($p < .05$) self-directed learning orientation	Self-directed learning orientation was associated with tendency to engage in work-related learning (which is similar to IL).
Gijbels et al. (2012)	Enlarge understanding of job characteristics and self-directed learning orientation on work-related learning.	- Quantitative, cross-sectional correlation design using survey data $n = 73$; workers from a large technology company	Work-related learning scale: self-developed 10-item scale measuring frequency of behaviors on a 4-point scale.	$r = .61$ ($p < .01$) self-directed learning orientation	Further evidence of self-directed learning orientations association with work-related learning (which is similar to IL).

Author(s) (Year)	Purpose	Methodology/ Sample	Informal Learning Measure	Findings	Implications for Study
Lohman (2006)	Examine factors that predict engagement in IL activities.	- Quantitative, cross-sectional design using survey data $n = 166$; schoolteachers	Self-report frequency of eight informal learning activities.	Mean 4.1 rating <i>Love of learning</i> (scale of 1 to 5, with 5 being highest rating)	Study demonstrated that learning motives play a role in engagement in IL activities. Study reported mean responses versus correlation statistics.
Moon & Na (2009)	Explore relationship between psychological variables and workplace learning.	- Quantitative study using self-assessment survey data and stratified sampling method $n = 685$; stratified sample consisting of workers in small and medium Korean manufacturing businesses	Small Business Workplace Learning Survey (Rowden & Ahmad, 2000); informal learning subscale	$r = .40$ ($p < .01$) learning competency $r = .35$ ($p < .01$) motivation $r = .28$ ($p < .01$) curiosity $r = .16$ ($p < .01$) self-esteem $r = .11$ ($p < .01$) locus of control	Demonstrated IL linked to multiple individual differences. Highest correlation with learning competency, the ability to adapt to a learning situation, and motivation.
Noe et al. (2013)	Investigate Big Five personality, self-efficacy, and zest association with IL.	- Quantitative study using self-assessment survey data collected at two times, 1 year apart $n = 180$; restaurant managers	Noe et al.'s (2013) 9-item measure	$r = .31$ ($p < .01$) zest $r = .17$ ($p < .05$) self-efficacy $r = .26$ ($p < .01$) extraversion $r = .17$ ($p < .05$) agreeableness $r = .16$ ($p < .01$) Open to Exp $r = .20$ ($p < .01$) emotional stability $r = .16$ ($p < .05$) conscientiousness <i>Nonsignificant; GMA</i>	Big Five personality associated with IL, which is also true of learning agility. IL not associated with general mental ability, which seems to be true of learning agility as well.

Author(s) (Year)	Purpose	Methodology/ Sample	Informal Learning Measure	Findings	Implications for Study
Sanders et al. (2011)	Investigate how to increase participation of lower educated employees in training programs.	• Secondary data analysis of longitudinal survey data • n = 213; lower educated employees	Borghans & Golsteyn's (2006) 2-item scale	• $r = .19$ ($p < .05$) perceived behavioral control	Perceived behavioral control is a measure similar to pre-training self-efficacy. Those individuals more confident in their ability to perform in training are more likely to engage in IL. Self-efficacy also relates to learning agility.
Tews et al. (2016)	Examine work–family conflict and core self-evaluations associated with IL.	• Quantitative study using self-assessment survey data collected at two times, 6 months apart • n = 225 managers in the restaurant industry	Noe et al.'s (2013) 9-item measure	• $r = .36$ ($p < .01$) core self-evaluations	CSE is a meta-competency composed of self-efficacy, emotional stability, and locus of control. Researchers hypothesized this related to motivation, which could relate to the motivation aspect of learning agility.
Van der Klink et al. (2014)	Explore how informal and formal learning relates to employability.	• Quantitative study using self-assessment survey data • n = 139 academic staff members at a university	Measure with dimension of interaction with supervisor, learning value, networking within, networking outside	• $r = .18, .23, .36$ ($p < .01$ to $.05$) <i>personal flexibility across dimension of informal learning</i>	Findings synthesized almost two decades of empirical evidence linking learning agility to leader success. Questionably high correlations and use of non-peer-reviewed sources limit findings.

Note. IL = informal learning; SPC = standardized path coefficients; GMA = general mental ability; CSE = core self-evaluations.

Outcomes of Informal Learning

Informal learning has important implications for work performance and other work-related outcomes. Commonly researched outcomes of informal learning research have related to attitudes, knowledge and skill acquisition, and performance. Multiple researchers have investigated informal learning and job performance. For example, Froehlich et al. (2014) found that informal learning correlated positively with core skills development and subjective job performance. Van der Klink et al. (2014) found a significant positive link between informal learning and salary as well as informal learning and promotions. Regarding work attitudes, Van der Klink et al. (2014) found a positive association between informal learning and employee engagement, while Rowden and Conine (2005) found that informal learning had a positive relationship with organizational commitment and overall job satisfaction. Additionally, Jeon and Kim's (2012) findings indicated that informal learning was related to greater task satisfaction. Overall, these results point to the association of informal learning with desirable work outcomes.

Summary of Informal Learning Empirical Findings

Findings from the empirical research on the antecedents of informal learning are largely mixed. Cerasoli et al.'s (2018) meta-analysis summarizes the relationship between informal learning and personal and situational antecedents, as well as the relationship between informal learning and outcomes. However, across individual studies, the relationship between informal learning and antecedents seems less consistent, likely due to the use of eclectic measures to operationalize informal learning. Additionally, some measures focus on various facets of informal learning that result in unique relationships (e.g., the relationship between age and informal learning may differ depending on the type of informal learning activity). By contrast, the research on outcomes of informal learning behaviors seems much more definitive, with an

apparent consensus that informal learning behaviors are positively associated with various desirable outcomes at the individual and organizational levels, including salary, promotions, satisfaction, organizational commitment, and job performance.

Personality, Informal Learning, and Learning Agility

This literature review has examined the theoretical underpinnings and empirical findings related to both informal learning and learning agility. The review has discussed how each of these constructs relates to personality, among other variables. Since the relationship among informal learning, learning agility, and personality was a key component of this study, this section re-examines how personality relates to informal learning and learning agility. The five-factor, or Big Five, model of personality is the prevailing personality model in the psychological literature (Barrick & Mount, 1991). This model divides personality into five factors: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (often labeled as emotional stability, which is simply the inverse of neuroticism). Noe et al. (2013) are among the few researchers who have empirically examined personality's relationship with informal learning. Conversely, multiple researchers have studied the relationship between learning agility and personality; however, the findings have been somewhat mixed. The following section examines each of the five personality dimensions in relation to informal learning and learning agility.

Openness to Experience, Informal Learning, and Learning Agility

Openness to experience refers to the likelihood of an individual being curious and open-minded, variety-seeking, and creative (Barrick & Mount, 1991; Hogan & Hogan, 2007). Individuals higher in this dimension are more receptive to change and more likely to experiment and try new things (Barrick & Mount, 1991; Judge et al., 2002). Several researchers have

suggested that openness to experience is key to pursuing learning activities and engaging in continuous learning (Davis & Barnett, 2010; London & Smither, 1999). DeRue et al.'s (2012) model of learning agility highlights openness to experience as a key antecedent of learning agility. Conceivably, openness to experience might influence the likelihood of an individual being learning-agile and engaging in informal learning activities, as both learning agility and informal learning require the individual to experiment with the environment to learn from experience.

Several researchers have demonstrated that openness to experience is linked to learning agility as well as informal learning. Noe et al. (2013) found a positive relationship between openness to experience and informal learning ($r = .16, p < .01$). Notably, Noe et al.'s study found that the relationship between openness to experience and informal learning was no higher, and in some cases lower, than the relationship between informal learning and other personality facets. This is somewhat surprising since evidence has suggested that openness to experience is related to engaging in learning activities (Davis & Barnett, 2010; London & Smither, 1999).

Connolly (2001) found that openness to experience correlated with only two facets of learning ability: mental agility ($r = .21, p < .05$) and results agility ($r = .23, p < .05$). In addition, Laxson (2018) found a significant relationship between openness to experience and overall learning agility ($r = .28, p < .05$). Smith et al. (2017) found that overall learning agility showed strong correlations in two scales similar to openness to experience: the Hogan Inquisitive Scale ($r = .39, p < .01$) and the Hogan Learning Approach Scale ($r = .29, p < .01$).

Conscientiousness, Informal Learning, and Learning Agility

Conscientiousness relates to the likelihood of an individual being planful, orderly, circumspect, and hardworking (Barrick & Mount, 1991; Roberts et al., 2009). Conceptually, the

relationship between conscientiousness and learning agility and informal learning is unclear. More conscientious individuals may be more planful in setting learning goals and work hard to achieve those goals, resulting in higher learning agility and higher informal learning behaviors. Empirical evidence suggests that conscientiousness is associated with higher self-reported learning after a formal training event (Woods et al., 2016), but this relationship may not hold true for experience-based learning that occurs outside a classroom setting.

Some researchers have argued that conscientiousness and learning agility likely have an inverse relationship (De Meuse, 2017), but they have provided little evidence to support this claim. Since highly conscientious individuals avoid risk and are more planful, they may not engage in ambiguous and novel situations, reducing the likelihood of learning from new experiences. Some research on the linkage between conscientiousness and adaptability, which refers to learning and performing in novel and ambiguous situations (LePine et al., 2000), may support a negative relationship between conscientiousness and learning agility. LePine et al. (2000) found that conscientiousness is negatively related to adaptability, which is conceptually similar to learning agility (De Meuse et al., 2010).

Noe et al. (2013) found a positive correlation between informal learning and conscientiousness ($r = .16, p > .01$). However, this association was among the lowest of all personality variables. The results for learning agility are more mixed. For instance, Smith et al. (2017) found that conscientiousness (as measured by the Hogan HPI Prudence Scale) was the only dimension of personality not related to overall learning agility scores. Laxson (2018) found that the relationship between conscientiousness and learning agility was negative but nonsignificant ($r = -.16, p > .18$).

Extraversion, Informal Learning, and Learning Agility

Extraversion relates to an individual's engagement in their external world, including the amount of their social interaction, level of engagement in activities, and energy levels (Barrick & Mount, 1991). Previous research has indicated that, due to the characteristic of being more energetic and outgoing, extraversion is positively associated with engagement in learning opportunities (Davis & Barnett, 2010). Extraverts (those with greater extraversion) tend to solicit feedback from others (Smither et al., 2005) and share knowledge with peers (Hoare, 2006). Conceptually, those who are more willing to seek out and engage in learning opportunities might be considered more learning-agile and more willing to engage in informal learning activities.

According to Noe et al. (2013), a key component of informal learning behavior is learning from peers, which may be more likely for extroverts who have a broader social network and, therefore, more opportunities for informal learning. Noe et al. found that extraversion had the highest association with informal learning among personality variables ($r = .26, p < .01$). Smith et al. (2017) found that two measures related to extraversion had a strong relationship with learning agility: Hogan HPI Ambition ($r = .45, p < .01$) and Hogan HPI Sociability ($r = .34, p < .01$). Additionally, ambition had the highest correlation with learning agility and correlated with all dimensions of learning agility (Smith et al., 2017).

Agreeableness, Informal Learning, and Learning Agility

Agreeableness relates to how well an individual gets along with others, with a focus on social skill, warmth, and charm (Barrick & Mount, 1991). Though it is unclear how being skilled in social interactions might impact learning from experience, one possible explanation is that individuals with more refined social skills have richer and more frequent interactions and, therefore, have more opportunities to learn from others. For example, De Meuse (2017)

suggested that individuals with high agreeableness will show higher learning agility, especially for those learning agility components related to interpersonal relationships, such as people agility. The same relationship may exist between agreeableness and informal learning, especially the learning-from-peers component of informal learning.

Empirical evidence has indicated that agreeableness and informal learning are positively correlated. Noe et al. (2013) found a small but positive significant relationship between the two constructs ($r = .17, p < .05$). Using two separate measures of learning agility, Ogisi (2006) found a positive relationship between agreeableness and the people agility dimension of learning agility ($r = .15, p < .01$; $r = .23, p < .01$). Smith et al. (2017) found that learning agility shared a positive correlation with overall learning agility scores ($r = .30, p < .01$), as well as each dimension of learning agility ($r = .15$ to $.34, p < .01$).

Emotional Stability, Informal Learning, and Learning Agility

Neuroticism is an individual's tendency to display emotional instability, such as moodiness, anger, and negative affect (Barrick & Mount, 1991). In the literature, researchers have sometimes referred to neuroticism as emotional stability, with these two dimensions simply being the inverse of one another. De Meuse (2017) hypothesized that neuroticism and learning agility would have a negative relationship, since highly neurotic individuals would have low tolerance for stress, thus preventing them from engaging with and learning from their environment. This rationale may hold true for informal learning as well, with highly neurotic individuals being less likely to challenge themselves to learn outside formal classrooms where learning may be expected and required. Further, Davis and Barnett (2010) posited that emotionally stable individuals will be more willing to learn from their mistakes; therefore,

because learning from mistakes is central to both learning agility and informal learning, high neuroticism might be negatively correlated with learning agility and informal learning.

Noe et al. (2013) found that neuroticism had a negative and statistically significant relationship with informal learning ($r = .20, p < .01$; note: the study used emotional stability, which accounts for the positive correlation coefficient). Ogisi (2006) found that neuroticism had a negative relationship with all dimensions of learning agility ($r = -.20$ to $-.45, p < .01$).

Summary of Personality's Connection to Informal Learning and Learning Agility

Research findings have suggested that personality plays a crucial role in learning agility and informal learning. Eichinger and Lombardo (2004) suggested that learning agility is largely distinct from personality, with the exception of openness to experience, which, the researchers indicated, “is to be expected” (p. 13). However, empirical findings have suggested that every personality dimension is related to learning agility, although these findings are inconsistent. Conceptually, openness to experience might be most closely related to both learning agility and informal learning, but empirical findings have indicated that other dimensions have even stronger correlations. Specifically, Noe et al. (2013) found that extraversion had the highest correlation with informal learning among the Big Five. Table 8 summarizes the prevailing research findings on personality's relationship to learning agility and informal learning.

Table 8*Research Findings on Personality's Relationship With Learning Agility and Informal Learning*

Personality Factor	Learning Agility	Informal learning
Openness to experience	+	+
Conscientiousness	No relationship	+
Extraversion	+	+
Agreeableness	+	+
Neuroticism	-*	-*

Note. * Several studies examined emotional stability and found a positive correlation (+), which equates to a negative relationship (-) with neuroticism given that emotional stability is the inverse of neuroticism.

Learning agility and informal learning share similar relationships with the five dimensions of personality, except for conscientiousness. While personality may be central to predicting learning agility and informal learning, learning agility as an individual difference may be more closely related to an individual's likelihood of engaging in informal learning behaviors. Therefore, this study hypothesized that learning agility would explain informal learning above and beyond personality scores:

Hypothesis 2: Learning agility will predict informal learning behaviors above and beyond personality.

Modeling the Relationship Between Learning Agility, Informal Learning, Personality, Reflective Thinking, and Motivation to Learn

To better understand the mechanisms through which learning agility leads to informal learning, this study sought to establish a parsimonious model to elucidate how individual differences relate to learning agility, which in turn leads to informal learning behaviors. DeRue et al.'s (2012) framework served as an undergirding theory for this work by suggesting that specific individual differences lead to learning agility, which then leads to "learning in and

across situations” (p. 265). Drawing on the literature reviewed, this study hypothesized that all five dimensions of the five-factor model of personality influence the learning agility model. The study also hypothesized that reflective thinking and motivation to learn influence the model.

Mediating Role of Motivation to Learn and Learning Agility

DeRue et al.’s (2012) framework suggests that learning agility mediates the relationship between individual differences and performance. Further, learning motives play a key role in participation in development activities and are influenced by personality (Major et al., 2006). Therefore, it is hypothesized that informal learning behaviors and learning agility play a mediating role in the connection between individual difference (personality and metacognition) and informal learning behaviors.

H3a: The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.

Learning Motives, Informal Learning, and Learning Agility

Major et al. (2006) defined *motivation to learn* as the willingness to participate in activities for the purpose of learning something new. Motivation to learn has been positively associated with voluntary participation in learning and development activities (Birdi et al., 1997; Major et al., 2006; Tharenou, 2001), but the research has devoted less attention to experiential learning, which might be more relevant to learning agility and informal learning. However, conceptually, it is likely that motivation to learn is a key contributor to both learning agility and informal learning. A central component of informal learning is that it is self-directed, and responsibility for learning lies with the learner (Marsick & Watkins, 1990). Individuals who are more motivated to learn might be more likely to participate in informal learning behaviors even when not required to do so or monitored, as would occur in a formal learning environment.

Learning agility, as defined by Lombardo and Eichinger (2000), includes a willingness and ability component. DeRue et al.'s (2012) model reinforces this idea with its inclusion of the closely related concept of goal orientation (Colquitt & Simmering, 1998).

No current empirical literature has linked motivation to learn and learning agility; however, Choi and Jacobs (2011) indicated that motivation to learn is positively associated with informal learning dimensions ($r = .23$ to $.40$, $p < .05$). It is likely that motivation to learn also shares a positive significant correlation with learning agility, but empirical evidence is lacking. Just as informal learning and learning agility are influenced by personality, so too is motivation to learn. Major et al. (2006) found a significant positive relationship between motivation to learn and three of the Big Five dimensions: openness to experience, extraversion, and conscientiousness. This study's model hypothesized the following:

Hypothesis 3b: Openness to experience is positively associated with motivation to learn.

Hypothesis 3c: Extraversion is positively associated with motivation to learn.

Hypothesis 3d: Conscientiousness is positively associated with motivation to learn.

Hypothesis 3e: Motivation to learn is positively associated with informal learning.

Hypothesis 3f: Motivation to learn is positively associated with learning agility.

Reflective Thinking, Informal Learning, and Learning Agility

DeRue et al.'s (2012) model of learning agility suggests that metacognition is a key individual difference related to learning agility. Metacognition is "one's knowledge concerning one's own cognitive processes and products or anything related to them" (Flavell, 1976, p. 232). A simpler way of thinking about metacognition is that it relates to "thinking about thinking" (DeRue et al., 2012, p. 266). Metacognitive activities may occur before an activity in the form of

planning, during an activity in the form of monitoring, and after an activity when an individual evaluates their actions (Akturk & Sahin, 2011).

Many conceptualizations of metacognition exist in the literature, and a common component of metacognition is reflective thinking. Reflective thinking, which relates to thinking about strategies to solve problems (Tuncer & Kaysi, 2013), closely aligns with DeRue et al.'s (2012) explanation of how metacognition relates to learning agility. The tendency to reflect on learning likely relates to informal learning behaviors and learning agility. Tannenbaum et al. (2010) suggested that metacognitive skills allow learners to be more self-directed and reflective, which would enable informal learning. DeRue et al. indicated that individuals with higher metacognitive ability would be able to draw connections more flexibly across situations and therefore be more learning-agile.

Much of the scholarship concerning reflective thinking's impact on informal learning and learning agility is theoretical. While the idea that reflective thinking would increase engagement in learning agility and informal learning seems plausible, empirical work is needed to test the relationship. In an empirical study of managerial informal learning and learning transfer, Enos et al. (2003) hypothesized that metacognitive skills would lead to managers seeking out informal learning activities and, additionally, would mediate the relationship between informal learning and transfer. However, the researchers did not test this hypothesis. This study's model hypothesized the following relationships:

Hypothesis 3g: Reflective thinking is positively associated with informal learning behaviors.

Hypothesis 3h: Reflective thinking is positively associated with learning agility.

Emotional Stability, Agreeableness, and Learning Agility

This study hypothesized that emotional stability and agreeableness impact learning agility directly, while the other five-factor model dimensions (i.e., openness to experience, extraversion, and conscientiousness) are related to motivation to learn, as previously discussed:

Hypothesis 3i: Emotional stability is positively associated with learning agility.

Hypothesis 3j: Agreeableness is positively associated with learning agility.

Learning Agility and Informal Learning

Consistent with Hypothesis 1, this study hypothesized that learning agility is positively associated with informal learning:

Hypothesis 3k: Learning agility is positively associated with informal learning behaviors.

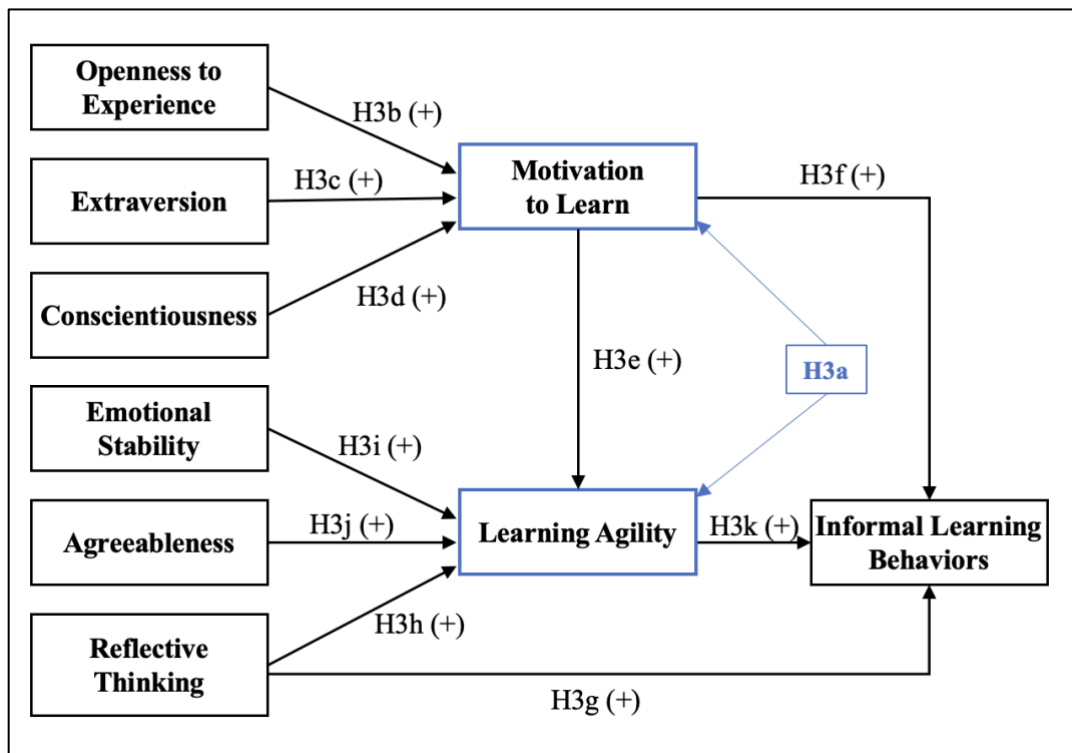


Figure 5 Research Question 3 Hypothesized Model

Summary of Research Questions and Hypotheses

The purpose of this study was to add conceptual clarity to the learning agility construct by examining learning agility's relationship with several theoretically connected concepts. The study examined how learning agility relates to informal learning behaviors. Additionally, it investigated motivation to learn, reflective thinking, and personality as antecedents of learning agility and modeled the relationship between these constructs, learning agility, and informal learning. The literature review offered several hypotheses for the relationships between and among the study's variables. This section summarizes the stated hypotheses and aligns the hypotheses with the study's research questions.

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
 - Hypothesis 1: Learning agility will predict informal learning behaviors.
- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
 - Hypothesis 2: Learning agility will predict informal learning behaviors above and beyond personality.
- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?
 - Hypothesis 3a: The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.

- Hypothesis 3b: Openness to experience is positively associated with motivation to learn.
- Hypothesis 3c: Extraversion is positively associated with motivation to learn.
- Hypothesis 3d: Conscientiousness is positively associated with motivation to learn.
- Hypothesis 3e: Motivation to learn is positively associated with informal learning.
- Hypothesis 3f: Motivation to learn is positively associated with learning agility.
- Hypothesis 3g: Reflective thinking is positively associated with informal learning behaviors.
- Hypothesis 3h: Reflective thinking is positively associated with learning agility.
- Hypothesis 3i: Emotional stability is positively associated with learning agility.
- Hypothesis 3j: Agreeableness is positively associated with learning agility.
- Hypothesis 3k: Learning agility is positively associated with informal learning behaviors.

The Need for Further Learning Agility Research

The main criticisms of learning agility have focused on its lack of conceptual clarity and theoretical grounding, and the uncertainty around learning agility as a unique construct. This review discussed these criticisms; however, the concept of learning agility was empirically derived (Lombardo & Eichinger, 2000), which is not inherently problematic, but the lack of theoretical grounding has led to confusion regarding the bounds of the construct. DeRue et al. (2012) proposed a more theoretical model of learning agility, but it deviated from the original, empirically derived definition and measure. Further, while some researchers have sought to develop measures of learning agility based on DeRue et al.'s conceptualization (e.g., the Burke

LAI), these measures still align closely with Lombardo and Eichinger's (2000) conceptualization.

This lack of conceptual clarity has likely contributed to some of the measurement issues described in the literature. For example, learning agility is conceptually related to learning from experience, yet it is unclear how certain dimensions relate to this concept. For instance, people agility involves working well with diverse groups of individuals and treating others constructively (Lombardo & Eichinger, 2000), but this does not seem inherently related to learning from experience. Further, the lack of a theoretical basis has also contributed to a lack of understanding about learning agility's relationship to other constructs. Wang and Beier (2012), for example, suggested that learning agility research has not incorporated similar concepts such as informal learning. Although the relationship between learning agility and personality varies across studies, further investigation is required to determine how learning agility is unique from personality. Additionally, there is strong empirical evidence linking the learning agility construct to leadership performance, but associations vary considerably. The empirical evidence is inconsistent, due likely to the use of inconsistent learning agility measures. This study investigating the relationship between informal learning and learning agility helps to better define the learning agility construct by exploring the linkage to a conceptually related construct.

CHAPTER 3

METHODOLOGY

This chapter describes the methodology of this study, which aimed to add conceptual clarity to the learning agility construct by first examining learning agility's association with informal learning behaviors. Additionally, the study examined personality, reflective thinking, and motivation to learn as antecedents of learning agility and modeled the relationship among all study variables. The following research questions guided the study:

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?

This chapter details the study's methodology and design, beginning with a description of the research models, followed by discussions of the instrumentation, sample data information, data preparation, data screening, data preparation, and study limitations.

Research Design Overview

This research comprised a correlational, quantitative study of archival, self-report survey data from federal leaders in a healthcare context. The study used an existing dataset containing measures of personality, learning agility, reflective thinking, motivation to learn, and informal learning behaviors. The dataset also captured participant demographic information. A

quantitative approach was used because the study sought to add conceptual clarity by examining learning agility's relationship to informal learning, which is conceptually similar. More specifically, the study aimed to provide construct validity evidence for learning agility by linking it to theoretically related concepts. Construct validity examines whether a construct measures what it claims, and one type of construct validity evidence is convergent validity, which entails determining if a measure relates to other measures to which it should be related (Messick, 1995). Assessing the relationship between learning agility, personality, reflective thinking, motivation to learn, and informal learning behaviors further develops the nomological network of learning agility—that is, its relationship with other variables—which helps provide evidence of construct validity (Cronbach & Meehl, 1955; Trochim, 1996). Convergent and construct validity are inherently quantitative issues as the relationship between variables is assessed by determining the statistical relationship between variables.

Research Models

This study proposed 13 hypotheses in relation to the research questions. This section describes the research models and hypotheses specific to each question.

Research Question 1 Model

The primary purpose of this study was to examine the relationship between learning agility and the conceptually related construct of informal learning. Wang and Beirer (2012) claimed that current conceptions of learning agility do not incorporate similar ideas related to learning from experience such as informal learning. Yet, as the researchers argued, a crucial component of learning agility is “learning in situ” (p. 294) rather than learning solely through formal developmental activities. Similarly, informal learning focuses on unstructured and experiential learning activities (Marsick & Watkins, 1990) and the trial-and-error processes of

learning from experiences and mistakes (Marsick et al., 2006). Lombardo and Eichinger's (2000) work on learning agility echoes the importance of learning from experience by suggesting that extracting lessons from experience is critical to leadership potential and success. Despite the apparent overlap between learning agility and informal learning theories, little, if any, empirical research has examined the relationship between the two. In this study, Research Question 1 and Hypothesis 1 addressed the relationship between learning agility and informal learning behaviors:

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
 - Hypothesis 1: Learning agility will predict informal learning behaviors.

In Research Question 1, learning agility was the independent variable, and informal learning behaviors was the dependent variable. Linear regression was used to address Research Question 1. Figure 6 depicts the model for Research Question 1.

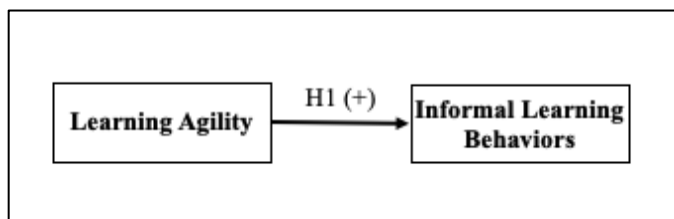


Figure 6 *Research Question 1 Model*

Research Question 2 Model

Personality is an established predictor of both informal learning behaviors (Noe et al., 2013) and learning agility (Connolly, 2001; Ogisi, 2006; Smith et al., 2017). In their model of learning agility, DeRue et al. (2012) maintained that personality, specifically openness to

experience, is a key individual difference related to learning agility. Although DeRue et al. only highlighted openness to experience, research on personality and learning agility has demonstrated that all facets of the five-factor model of personality are, to some extent, associated with learning agility (De Meuse, 2017; Smith et al. 2017). Since personality is an essential antecedent of both learning agility and informal learning, Research Question 2 sought to understand if learning agility provides any incremental validity beyond personality in predicting informal learning behaviors. Research Question 2 used two models: The first used the five dimensions of personality as predictors of informal learning behaviors, and the second built upon the first by adding learning agility as a predictor of informal learning behaviors. Figures 7 and 8 illustrate the conceptual models for Research Question 2, which, along with Hypothesis 2, addressed learning agility's incremental validity beyond personality in predicting informal learning behaviors:

- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
 - Hypothesis 2: Learning agility will predict informal learning behaviors above and beyond personality.

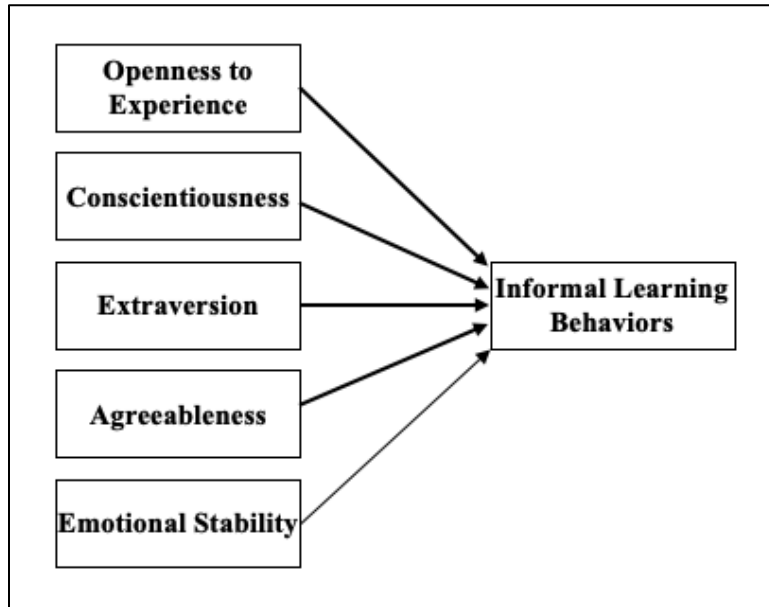


Figure 7 *Research Question 2 Model 1*

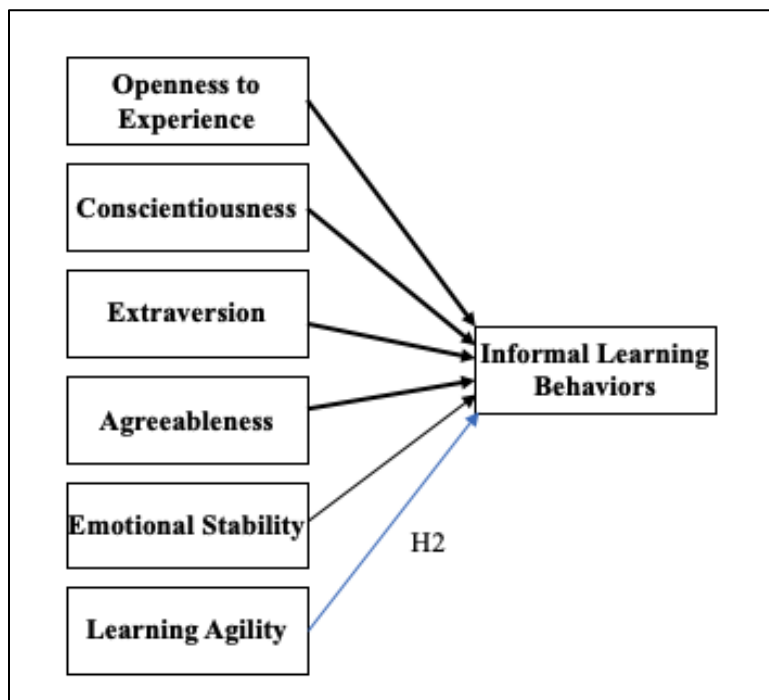


Figure 8 *Research Question 2 Model 2*

Hierarchical multiple linear regression was used to address Research Question 2. In Research Question 2 Model 1, the dimensions of personality served as the predictor variables, and informal learning behaviors represented the dependent variable. Research Question 2 Model 2 added learning agility as a predictor to determine if this additional independent variable added predictive value to the multiple regression model.

Research Question 3 Model

In addition to exploring the relationship between learning agility and informal learning behaviors, this study sought to better understand the antecedents of learning agility. Using DeRue et al.'s (2012) learning agility model as a guiding theoretical framework, this study examined how personality, reflective thinking, motivation to learn, and personality operated as antecedents of learning agility and informal learning behaviors. Research Question 3 and several supporting hypotheses comprised a proposed model of the relationships among the study variables.

- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?
 - Hypothesis 3a: The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.
 - Hypothesis 3b: Openness to experience is positively associated with motivation to learn.
 - Hypothesis 3c: Extraversion is positively associated with motivation to learn.
 - Hypothesis 3d: Conscientiousness is positively associated with motivation to learn.
 - Hypothesis 3e: Motivation to learn is positively associated with informal learning.

- Hypothesis 3f: Motivation to learn is positively associated with learning agility.
- Hypothesis 3g: Reflective thinking is positively associated with informal learning behaviors.
- Hypothesis 3h: Reflective thinking is positively associated with learning agility.
- Hypothesis 3i: Emotional stability is positively associated with learning agility.
- Hypothesis 3j: Agreeableness is positively associated with learning agility.
- Hypothesis 3k: Learning agility is positively associated with informal learning behaviors.

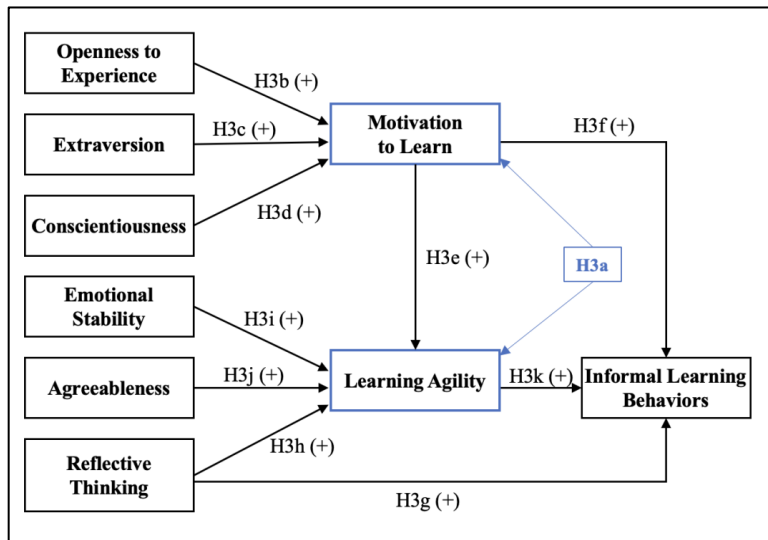


Figure 9 *Research Question 3 Model*

Study Data

This study employed secondary data analysis, which entails “any further analysis of an existing dataset which presents interpretations, conclusions or knowledge additional to, or different from, those produced in the first report on the inquiry as a whole and its main results” (Hakim, 1982, p. 1). The dataset was originally collected by a large federal healthcare agency as

part of an operational study to understand the qualities and behaviors of its leadership talent pool. The data were also used to identify the qualities of individuals participating in the organization's leadership development program and initiatives, and to better understand the difference between those individuals selected to participate in competitively selected leadership programs and those who were not selected.

Secondary data analysis is a viable research strategy if the existing data match the research purpose and research questions (Johnston, 2017). As noted earlier, this study aimed to provide conceptual clarity around the construct of learning agility by examining the relationship between learning agility and informal learning behaviors, and to examine reflective thinking, personality, and motivation to learn as antecedents of these two constructs. The dataset contained self-report measures of the study's constructs, thereby making the data suitable for addressing the research questions.

Sample and Data Collection Strategy

The dataset was collected by a large federal healthcare organization using a convenience sampling strategy. In convenience sampling,

No special screening criteria are set up by the researchers to make certain that individuals in the sample possess certain characteristics. Instead, the investigator simply collects data from whoever is available or can be recruited to participate in the study. (Huck, 2012, p. 101)

The federal healthcare organization administered its survey instrument to leaders who had applied to organizational leadership development programs in the 12 months prior to the survey launch. The organization is a U.S.-wide institution, and the sample population included individuals throughout the United States. The sample population included individuals in various

job functions, including administrative staff and medical personnel, and represented a mix of supervisory and nonsupervisory personnel in the organization. The organization collected data from 317 individuals, and survey participation was voluntary.

The organization utilized self-report survey instruments to collect the data, via three separate surveys. Survey participants first completed an internally developed survey that collected responses related to demographics (i.e., age and organization tenure), motivation to learn, reflective thinking, and informal learning behaviors. Upon completing this survey, participants were invited to complete the Learning Agility assessment and the Hogan Personality Inventory. Only those participants who completed all three survey instruments were included in the final dataset. There were no missing data in the dataset.

G*Power software was used to estimate a required sample size of 98 for the multiple regression analysis. This calculation assumes a small effect size of .15, an alpha level of .05, and a power level of .80. The path analysis for Research Question 3 used nine variables. Adhering to the heuristic of needing 20 data points per predictor (Kline, 2016), a sample size of 180 participant responses was needed for data analysis related to Research Question 3. The sample size of 317 participant responses exceeded the required sample size. This study utilized a cross-sectional design, meaning the survey data were collected at a single point in time (Creswell & Creswell, 2018). This data collection method was appropriate because the study did not investigate how variables change over time, which would have required longitudinal data collection.

Study Measures

The measures used in this study comprised a mix of academic and commercially available instruments. Utilizing existing measures, as opposed to creating measures specific to

this study, was appropriate since valid measures of this study's constructs of interest were readily available. These preexisting measures were created and had been refined through extensive development procedures (discussed in this section) and adequately addressed the study's variables. The following instruments were employed in this study: the Korn Ferry Learning Agility assessment, the Hogan Personality Inventory (HPI), Noe et al.'s (2013) measure of informal learning, Gorges et al.'s (2016) measure of motivation to learn, and Tuncer and Kayci's (2013) reflective thinking measure. The Korn Ferry Learning Agility measure and the HPI are commercial measurement instruments, while the remaining instruments were drawn from the academic literature.

This section details the psychometric properties of each measure, including the measurement development procedures, validity and reliability evidence, and response-scale format. Due to the proprietary nature of the commercial measures in this study, item-level data were unavailable. Instead, the data were analyzed and reported at the dimension level as raw scores, in the case of the HPI, and standardized scores, in the case of the Korn Ferry Learning Agility measure. The following subsections address each measure in greater detail.

Korn Ferry Learning Agility

The Korn Ferry Learning Agility instrument is a proprietary, self-report learning agility measure based on Lombardo and Eichinger's (2000) conceptualization of learning agility. Korn Ferry had previously developed two learning agility measures: (1) viaEDGE, a standalone self-report learning agility measure, and (2) a measure that was a component of its more extensive leadership assessments (i.e., Korn Ferry Leadership Potential and Korn Ferry Assess). In 2020, Korn Ferry replaced viaEDGE with the measure offered in its comprehensive leadership assessments and made this new measure—Korn Ferry Learning Agility—available as a

standalone assessment. This updated measure employs a forced-choice item-response theory (FC-IRT) methodology whereby respondents are given 6-item response blocks and asked to rate items in the block on a scale from *most preferred* to *least preferred*. The Korn Ferry measure is a psychometrically sound measure of learning agility that has received favorable reviews (e.g., Boyce & Boyce, 2021).

The Korn Ferry Learning Agility instrument measures four facets of learning agility: change agility, people agility, mental agility, and results agility. The measure includes a scale of situational self-awareness, though situational self-awareness is reported as a separate construct, not part of the learning agility composite scores. This conceptualization of learning agility is consistent with Lombardo and Eichinger's (2000) original model, which did not include self-awareness as a discrete component.

Korn Ferry Learn Agility scores were recorded and analyzed as sten (i.e., standard of ten) scores. Since this assessment is a commercial measure, item-level and raw scores are not available. Yet, using commercial measures of learning agility was necessary given that no psychometrically valid instruments were available in the academic literature. Further, many previous studies have utilized commercial learning agility measures and reported and analyzed data at the dimension level (e.g., Laxson, 2018).

Reliability and Validity

The Korn Ferry technical manual (Korn Ferry, 2016) estimates that test-retest reliability ranges from .82 to .83 for the learning agility dimensions. Additionally, internal consistency of the learning agility dimension is reported as Cronbach's alpha scores ranging from .74 to .78 at the subdimension level and .88 for the overall learning agility scale. Internal reliability was not calculated for this dataset since item-level information was not available.

The instrument's technical manual (Korn Ferry, 2016) provides details on construct validity by correlating the measure with previous Korn Ferry learning agility measures (i.e., an interview protocol and a multi-rater instrument). The analysis indicated that the learning agility instrument was correlated with overall learning agility interview scores ($r = .42, p < .01$) and multi-rater scores ($r = .73, p < .01$), suggesting that all these measures were measuring the same construct.

The technical manual (Korn Ferry, 2016) presents criterion validity in the form of effect sizes using Cohen's d ; it also reports the difference in learning agility dimension scores between individual contributors and top executives, ranging from .51 to .73, constituting a medium effect (Cohen, 1988).

Hogan Personality Inventory

The HPI is a 206-item measure of normal personality that has been widely used in business settings and in academic research and that has been favorably reviewed by psychometric test reviewers (e.g., Axford & LoBello, 1998; Prewett et al., 2013). In their review of the HPI, Prewett et al. (2013) indicated that, of the commercially available personality measures, the HPI offers perhaps the best criterion-related evidence for a variety of job-related outcomes, including managerial performance. The HPI aligns with the five-factor (or Big Five) model of personality, the prevailing model in personality psychology literature (Barrick & Mount, 1991).

The Big Five model divides personality into five factors: openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability. However, the HPI measures seven personality factors because the assessment divides extraversion and openness to experience into two factors each. The seven factors include adjustment, interpersonal sensitivity,

sociability, ambition, prudence, inquisitive, and learning approach. Table 9 details how the HPI aligns with the five-factor model of personality. Although the HPI does not use the same dimension labels as the five-factor model, multiple research studies have used the HPI to measure Big Five dimensions. For example, in a widely cited meta-analysis of the relationship between the five-factor model and leadership, Judge et al. (2002) included the HPI as a measure of the Big Five.

Table 9

Comparison of the Five-Factor Model and the Hogan Personality Inventory

Five-Factor Model Dimension	HPI Dimension Equivalent
Openness to experience	Inquisitive Learning approach
Conscientiousness	Prudence
Extraversion	Ambition Sociability
Agreeableness	Interpersonal sensitivity
Emotional stability	Adjustment

This study used the HPI dimensions to measure the facets of personality. For those five-factor model dimensions that have two equivalent HPI dimensions, the latter were combined into a composite score for that five-factor model dimension. Since the HPI is a commercial measure, item-level responses were not available for analysis; thus, the study used raw scale scores for analysis.

Openness to Experience

Openness to experience relates to how receptive an individual is to new activities and environments and to variety (Barrick & Mount, 1991; Hogan & Hogan, 2007). Based on Hogan

and Hogan's (2007) findings, the HPI divides openness to experience into two dimensions: inquisitive and learning approach. This study used a composite score from the HPI's inquisitive and learning approach scales to measure openness to experience. This approach is consistent with other studies that have utilized the HPI to measure five-factor model traits (e.g., Laxson, 2018).

The inquisitive scale "measures the degree to which a person is perceived as bright, creative, and interested in intellectual matters" (Hogan & Hogan, 2007, p. 25). The learning approach scale "measures the degree to which a person enjoys academic activities and values educational achievement for its own sake" (Hogan & Hogan, 2007, p.25).

Reliability and Validity. The inquisitive scale contains 25 items and has a Cronbach's alpha of .80. The HPI technical manual (Hogan & Hogan, 2007) reports that the short-term test-retest reliability (14- to 21-day interval) has a Pearson correlation of .84. The learning approach scale contains 14 items with a Cronbach's alpha of .78. The HPI technical manual reports that the short-term test-retest reliability (14- to 21-day interval) has a Pearson correlation of .85. Internal consistency (Cronbach's alpha) was not calculated for this study's sample group, since, due to the proprietary nature of the HPI instrument, item-level data were not available.

The HPI technical manual (Hogan & Hogan, 2007) provides detailed information on scale validity by reporting correlations with other tests. The median correlation between openness and inquisitive was .58, and between openness and learning approach was .30. These correlations summarized the relationship between these HPI scales and openness scales on the NEO Personality Inventory-Revised (PI-R), Big Five markers, Personal Characteristics Inventory, and the Inventario de Personalidad de Cinco Factores. These correlation values

suggest that the HPI inquisitive and learning approach scores measure the openness to experience construct of several other personality inventories.

Additionally, the technical manual (Hogan & Hogan, 2007) reports the correlations between inquisitive and learning approach scores, and scores on cognitive ability tests. For example, the test manual reports the connection between HPI scales and the Armed Services Vocational Aptitude Battery (ASVAB), which is a test of cognitive ability administered to all military recruits. Inquisitive and learning approach were the only two HPI dimensions with statistically significant relationships to overall ASVAB scores (inquisitive and ASVAB score, $r = .20, p < .001$; learning approach and ASVAB score, $r = .32, p < .001$). These findings are consistent with the expected relationship between openness to experience measures and intellect. Openness to experience is thought to be related to intellect because it may capture self-assessed ability (Cattell et al., 1970) or true variance in intelligence (Brand, 1994).

Conscientiousness

The study measured conscientiousness via the HPI's prudence scale. According to the HPI technical manual (Hogan & Hogan, 2007), the prudence scale relates to an individual's detail orientation, carefulness, and restraint in the form of self-control. This definition is consistent with the five-factor model's conceptualization of conscientiousness as relating to prudence, persistence, and a tendency to carefully plan (Digman, 1990).

Reliability and Validity. The HPI technical manual (Hogan & Hogan, 2007) provides details on the construct's reliability and validity. The prudence scale contains 31 items with a Cronbach's alpha of .71. The HPI technical manual reports that the short-term test-retest reliability (14- to 21-day interval) has a Pearson correlation of .69. The HPI technical manual also provides validity evidence by examining conscientiousness's association with other

personality measures. The median correlation between prudence and conscientiousness was .47. This median correlation summarized the relationship between these HPI scales and openness scales on the NEO PI-R, Big Five markers, Personal Characteristics Inventory, and the Inventario de Personalidad de Cinco Factores. These correlation values suggest that the HPI prudence scores measure the same construct as conscientiousness scales in several other personality inventories.

The HPI technical manual (Hogan & Hogan, 2007) also provides correlations between the prudence scale and cognitive ability test scores to demonstrate discriminant validity. Prudence scores were not related to cognitive ability as measured by several cognitive ability tests, including the ASVAB, the Bennett Mechanical Comprehension Test (BMCT), and the Watson Glasser Critical Thinking Appraisal (WGCTA) test, indicating that the assessment measures individual difference outside of cognitive ability (i.e., personality).

Extraversion

As with openness to experience, based on Hogan and Hogan's (2007) findings, the HPI divides extraversion into two dimensions: ambition and sociability. Extraversion relates to an individual's tendency to be energetic, social, ambitious, and assertive (Digman, 1990), a description that is consistent with the HPI's ambition and sociability scales. The HPI technical manual defines ambition as "the degree to which a person seems socially self-confident, leader-like, competitive, and energetic" (Hogan & Hogan, 2007, p. 19). The sociability scale pertains to the extent people enjoy, and need, social interaction (Hogan & Hogan, 2007, p. 19).

Reliability and Validity. The HPI technical manual (Hogan & Hogan, 2007) details the measures' reliability and validity. The HPI ambition scale contains 29 items with a Cronbach's alpha of .80. The HPI technical manual reports that the short-term test-retest reliability (14- to

21-day interval) has a Pearson correlation of .80. The sociability scale contains 24 items with a Cronbach's alpha of .83. The HPI technical manual reports that the short-term test-retest reliability (14- to 21-day interval) has a Pearson correlation of .86.

Construct validity is demonstrated by examining associations between the measures and other assessments, including personality and cognitive ability tests. The median correlation between ambition and extraversion was .52, and between sociability and extraversion was .58. These median correlations summarized the relationship between these HPI scales and extraversion scales on the NEO PI-R, Big Five markers, Personal Characteristics Inventory, and the Inventario de Personalidad de Cinco Factores. These correlation values suggest that the HPI ambition and sociability scores measure the extraversion construct of several other personality inventories. Correlations between the ambition and sociability scales, and several measures of cognitive ability demonstrated little to no relationship between the constructs. For example, correlations between these HPI scales and ASVAB scores were nonsignificant. Additionally, the ambition and extraversion constructs were not related to BMCT scores, which test problem-solving skills in mechanical operations. The lack of relationship with cognitive ability scores demonstrated discriminant validity evidence of the construct.

Agreeableness

Agreeableness relates to an individual's tendency to be cooperative, good-natured, and approachable (Digman, 1990; Hogan & Hogan 2007). The HPI measures agreeableness via the interpersonal sensitivity scale. According to the HPI technical manual, interpersonal sensitivity "concerns charm, tact, and interpersonal skills" (Hogan & Hogan, 2007, p. 60), which is very consistent with the five-factor model's definition of agreeableness.

Reliability and Validity. The HPI technical manual (Hogan & Hogan, 2007) reports reliability and validity evidence for the agreeableness measure. The interpersonal sensitivity scale contains 22 items with a Cronbach's alpha of .82. The HPI technical manual reports the short-term test-retest reliability (14- to 21-day interval) as having a Pearson correlation of .70. The technical manual provides construct validity evidence by correlating interpersonal sensitivity scores with agreeableness scores from other measures of personality. The median correlation was .50, suggesting that these tests measure the same construct. The median correlation summarized the relations between the HPI and the NEO PI-R, Big Five markers, Personal Characteristics Inventory, and the Inventario de Personalidad de Cinco Factores. Further, the technical manual reported the correlation between the agreeableness scale and measures of cognitive ability. The correlations indicated that there is no association between interpersonal sensitivity and cognitive ability, as measured by the ASVAB, WGCTA, and the BMCT, providing discriminant validity evidence for the construct.

Emotional Stability

The HPI measures emotional stability via the adjustment scale. Emotional stability relates to a person's tendency to be worry-free, calm, and even-tempered (Digman, 1990; Barrick & Mount, 1991; Hogan & Hogan, 2007). Similarly, the HPI technical manual defines adjustment as "the degree to which a person appears calm and self-accepting or, conversely, self-critical and tense" (Hogan & Hogan, 2007, p. 19).

Reliability and Validity. The adjustment scale comprises 37 items with a Cronbach's alpha of .82. The HPI technical manual (Hogan & Hogan, 2007) reports that the short-term test-retest reliability (14- to 21-day interval) has a Pearson correlation of .87. The technical manual provides construct validity evidence by correlating the adjustment scales with measures of

neuroticism from measures of the Big Five. The adjustment scale has a median correlation of .69 with measures of neuroticism, suggesting that the adjustment scale measures the same construct as the neuroticism scales. Further, the technical manual reported the correlation between the agreeableness scale and measures of cognitive ability. The correlations indicated no association between adjustment and cognitive ability, as measured by the ASVAB, WGCTA, and the BMCT, which provides discriminant validity evidence for the construct.

Gorges et al.'s (2016) Measure of Motivation to Learn

Motivation to learn relates to an individual's willingness to participate in activities to learn something new (Major et al., 2006). This study measured motivation to learn via Gorges et al.'s (2016) motivation to learn scale, a 4-item measure on a 5-point Likert response scale (1 = *never*, 5 = *all the time*). Gorges et al. established the motivation to learn scale based on items from a more extensive readiness-to-learn questionnaire. An example item from this scale is, "If I don't understand something, I look for additional information to make it clearer" (p. 5). (See Appendix A for the entire Motivation to Learn measure.)

Reliability and Validity

Gorges et al. (2016) tested the criterion validity of their measure by correlating the motivation to learn scores with engagement in non-formal education activities. They found a positive correlation ranging from $\beta = 0.07$ to $\beta = 0.25$, which the researchers interpreted as evidence of criterion validity. In a follow-up study, Gorges et al. (2017) reported internal consistency of .82 for a sample of U.S. respondents. Measure reliability was assessed in the current dataset by examining internal consistency reliability using Cronbach's alpha, which was .75, indicating an acceptable level of internal reliability consistent with previous findings.

Noe et al.'s (2013) Measure of Informal Learning

This study employed an adapted version of Noe et al.'s (2013) informal learning scale to measure informal learning behaviors. This scale is a 9-item measure, with three items measuring learning from oneself, three measuring learning from others, and three measuring learning from non-interpersonal sources. Noe et al.'s measure asks respondents to rate the frequency of behavior on a 5-point Likert scale from 1 (*never*) to 5 (*all the time*). An example of an item related to learning from oneself is, "Reflecting about how to improve my performance" (p. 331); an example item concerning learning from others is, "Interacting with a mentor" (p. 331); and an example item regarding learning from non-interpersonal sources is, "Searching the internet for job relevant information" (p. 331). (See Appendix A for the full informal learning measure.)

In an integrative literature review, Jeong et al. (2018) found variation in how researchers commonly measure informal learning; however, Noe et al.'s (2013) measure was cited as one of the most frequently used. Although Noe et al. indicated that their measure is a measure of informal learning, it is actually a measure of informal learning *behaviors*. Cerasoli et al. (2018) distinguished these concepts by specifying that informal learning entails knowledge and skills acquisition, whereas informal learning behaviors are activities that lead to knowledge and skills acquisition. Further, Noe et al.'s measure does not focus on incidental learning but instead focuses solely on intentional informal learning activities.

Reliability and Validity

Noe et al. (2013) developed and validated their informal learning scale based on findings from the informal learning literature (Bear et al., 2008; Doornbos et al., 2008; Lohman, 2005; Lohman & Wolf, 2001). The initial scale contained 12 items; however, after review by a subject-matter expert, the scale was reduced to nine items. Noe et al. (2013) used Hinkin and Trace's

(1999) analysis of variance approach to assess the content adequacy of the scale, concluding that their measure adequately assessed the construct of informal learning. A confirmatory factor analysis revealed a three-factor model (learning from oneself, learning from others, and learning from non-interpersonal sources); however, because these three factors were highly correlated ($r = .52$ to $r = .64$), the researchers opted for a more parsimonious one-factor model. Even though there are three items each for learning from oneself, learning from others, and learning from non-interpersonal sources, Noe et al.'s (2013) measure does not compute scores at the facet level; instead, it yields one score representative of informal learning.

Although Noe et al. (2013) did not report internal consistency in their original work, in a follow-up study, Tews et al. (2016) reported that the measure had an internal consistency of .87 in a group of restaurant managers throughout the United States ($n = 180$). Other researchers have used Noe et al.'s measure and found favorable psychometric properties. For example, Tews et al. (2017) used an adaptation of Noe et al.'s measure and found an overall internal consistency of .84. Though the researchers did not describe their adaptation in detail, their measure mirrored the 9-item structure of the original scale. Reliability of the informal measure scale was calculated with this study's dataset by examining internal consistency using Cronbach's alpha. The analysis yielded a Cronbach's alpha of .83, which is comparable to previous findings.

Tuncer and Kaysi's (2013) Reflective Thinking Measure

Metacognition relates to one's tendency to think about their approach to problems and how they carry out their cognitive processes (DeRue et al., 2012; Flavell, 1976). Reflective thinking, which entails planning and reflecting on actions and activities, is a critical component of metacognition and likely relates to the reflective thinking processes found in both informal learning and learning agility. Reflective thinking was measured using an adapted version of the

reflective thinking subscale of Tuncer and Kaysi's (2013) Metacognitive Thinking Skills scale. The researchers' original Metacognition scale consists of 18 items. The response scale consists of a 5-point Likert-style response scale ranging from *Never* to *All the Time*.

Using exploratory factor analysis, Tuncer and Kaysi (2013) determined that the measure had four distinct factors: thinking skills, reflective thinking skills toward problem-solving, decision-making skills, and alternative skills of evaluation. This study used only one of these factors: reflective thinking skills toward problem-solving. This dimension aligns more closely with the theoretical model's process of thinking about problem solving (DeRue et al., 2012). The dimension contains five items, an example of which is, "While solving problems, I ask questions to myself in order to find different ways of solution" (Tuncer & Kaysi, 2013, p. 73).

Reliability and Validity

Tuncer and Kaysi (2013) developed their Metacognition scale through a comprehensive literature review. The original scale contained 80 items, but 23 were removed after further literature and expert review, resulting in a 57-item version. Factor analysis and further statistical review resulted in an 18-item measure with four factors. Tuncer and Kaysi found that the Reflective Thinking scale had a Cronbach's alpha of .76. The internal consistency of the Reflective Thinking scale was assessed with this study's data by calculating the Cronbach's alpha, which was .75, comparable to Tuncer and Kaysi's finding of .76 in their study.

Standardization of Response Scales

For the data collected in this study, the Motivation to Learn, Reflective Thinking, and Informal Learning measures used the same response prompt and response scale. The response prompt stated, "In answering the following items, consider your attitude and approach to learning to complete work assignments." The response options were as follows: 1 = *Never*; 2 =

Rarely; 3 = *Sometimes*; 4 = *Often*; 5 = *All the Time*. This frequency response scale was designed to assess the frequency of learning motives, reflective thinking activities, and informal learning behaviors. This study used a standardized response scale across the three measures to enable quicker response times by respondents and simplify survey instructions.

In research, a frequency scale is appropriate for behaviors (i.e., reflective thinking and informal learning behaviors) because this type of response scale captures how often individuals engage in certain types of behaviors. However, motivation to learn is not a behavior; instead, motivation might be considered an attitude or psychological state (Murphy & Alexander, 2000). Therefore, it is essential to consider if a frequency scale is appropriate for motivation. Tong et al. (2020) investigated frequency and agreement scales to measure the job attitudes of work engagement and job burnout. They found that a frequency response scale “provides a more valuable method of detecting the dynamic nature of burnout/engagement, which offers methodological guidance for future research involving dynamic constructs” (p. 542). Therefore, the use of a frequency response scale, such as the one used in this study’s research design, was deemed appropriate to better capture the dynamic nature of learning motives.

Data Preparation

Several data-preparation steps were undertaken before data screening and analysis. The secondary dataset was in Microsoft Excel format, and the Excel document was used for the initial screening. The secondary dataset contained scales scores for the HPI assessment and the Learning Agility assessment. No further preparatory steps were taken for these variables. The informal learning behavior, reflective thinking, and metacognition scores required coding; the response options were 1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *All the Time*. The responses were recorded as 1 to 5 entries. Scale scores for informal learning behavior, reflective

thinking, and informal learning behavior were calculated as the mean scores of scale items. The mean scores for each dimension were used in the analysis.

In addition to the study variable, the dataset contained demographic characteristics, including age, gender, supervisory status, and years of federal service. Age and years of federal service were recorded in years, and no additional data-preparation steps were taken for these demographic variables. Gender was coded 0 for female and 1 for male. Supervisor status was coded 0 for non-supervisory personnel and 1 for supervisory personnel.

Data Analysis

The data were analyzed using regression, multiple regression, and path analyses. R version 4.2.1 was used for data analysis. As part of the initial analysis, descriptive data for the variables were reviewed, and a correlational analysis was used to explore sample averages and variability, as well as any bivariate association between the variables. Zientek and Thompson (2009) explained that reporting correlation matrices and descriptive data (e.g., mean and standard deviation) is standard practice for researchers reporting their results. Not only is this level of analysis recommended by the American Psychological Association (APA), but it also helps researchers better understand their data, and it serves as a building block for further analysis.

Research Question 1 utilized regression analysis. To further build upon this analysis, hierarchical multiple regression analysis was used to address Research Question 2. The first model for Research Question 2 used the five personality factors as predictors of informal learning behaviors. The second model added learning agility as a predictor variable. The delta r -squared was analyzed to determine if learning agility added any predictive ability beyond personality in predicting informal learning behaviors.

Regression and multiple regression were employed in this study because they serve as robust and widely accepted methods for investigating and quantifying the relationship between two variables (Creswell & Creswell, 2018). These methodologies allow researchers to understand the relationship between an independent variable and a dependent variable, in the case of simple linear regression, or the relationship between multiple independent variables and a dependent variable, in the case of multiple linear regression. Multiple linear regression simultaneously takes into account the effect of multiple independent variables on the dependent variable. This analysis demonstrates how each independent variable influences the dependent variable while holding other independent variables constant. Simple linear regression and multiple linear regression were the methodologies best suited for answering Research Questions 1 and 2 since they helped address the predictive inquiries posed in these research questions.

Finally, path analysis was used to address Research Question 3. Path analysis is an extension of multiple regression, allowing for estimation of several regression relationships (Schumacker & Lomax, 2004; Stage et al., 2004). This methodology is particularly useful for examining and testing theoretical models (Schumacker & Lomax, 2004), such as the model identified for Research Question 3. Path analysis allows researchers to test direct and indirect effects for multiple variables in a model (Stage et al., 2004).

Path analysis utilizes single-indicator measurement, in which there is only “one observed measure of each hypothetical construct” (Kline, 2016, p. 127). In this regard, path analysis involves observed variables, whereas structural equation modeling (SEM) is concerned with latent variable analysis. This study used observed variables—the mean score of each construct—as measures of the constructs. Since path analysis entails single-indicator measures, it is vital that the measures have good psychometric qualities, as poorly measured constructs can cause

improper estimation of the model (Cole & Preacher, 2014; Kline, 2016). In the current study, item-level data were unavailable to create latent variables for several of the study values, making path analysis the appropriate approach.

The distinction between path analysis and structural equation modeling (SEM) is sometimes unclear. Kline (2016) referred to path analysis as a member of the SEM family that is used when “there is just a single observed measure of each construct” (p. 129). Full SEM analysis involves latent variable analysis and confirmatory factor analysis (Schumacker & Lomax, 2004), which is not possible for cases when single observed measures are used to represent a hypothesized construct. While SEM has become increasingly popular, path analysis is not obsolete and is a commonly used methodology in research studies (Kline, 2016). For the sake of clarity, this study’s methodology for Research Question 3 is referred to as path analysis, not SEM. (Chapter 4 details the study’s quantitative analysis and results.)

Data Screening

The analyses for this study included linear regression, multiple regression, and path analysis. Prior to conducting each analysis, the data were analyzed to verify that the assumptions of regression were met, including normality, linearity, and homoscedasticity. The data were also analyzed to identify missing data, outliers, issues with multicollinearity, and influential values. A total of 317 participants were included in the secondary dataset.

Missing Data

The dataset was screened for missing data. This secondary dataset did not include any observations in which missing data were present. The initial survey design did not allow survey submission unless the participant had responded to all survey items.

Outlier Analysis

Potential outliers were identified before analyzing the data in response to the study's research questions. This step ensured that outlier cases did not skew the statistical analysis results, resulting in possible misinterpretation of the relationships between the study's variables. Outliers were identified by calculating the standard score (z-score), which is a widely accepted technique for identifying outliers (Kline, 2005). This method normalizes the distribution of the data and detects cases that deviate significantly from the mean. Per the guidance recommended by Tabachnick et al. (2013), any z-score exceeding ± 3.29 standard deviations from the mean was considered an outlier.

Upon applying the criterion suggested by Tabachnick et al. (2013), seven cases were identified as outliers for extreme scores on the Reflective Thinking, Motivation to Learn, Emotional Stability, and Agreeableness scales. Upon identification of outliers, it is important to diagnose and treat the outlier cases (Polit, 2010). This process may include deletion, substitution, or transformation, depending on the underlying cause of the extreme cases (Tabachnick et al., 2013). Given the secondary nature of the dataset, no further information about the survey respondents was available to help discern why these seven cases might have been outliers. Therefore, the cases were removed before conducting further analysis. The outlier removal process was consistent with standard data preparation protocols to prevent outlier data from influencing the statistical analysis results. The final sample size for this study was 310 participants. Despite the slight reduction, the sample size was still sufficient for the analysis.

Assumption of Univariate Normality

Prior to further analysis of the data, Shapiro-Wilk tests were conducted to determine if the data met the assumption of univariate normality. Additionally, skewness and kurtosis were

analyzed to further investigate normality. The findings of the Shapiro-Wilk test were statistically significant for all the variables of interest ($p < .05$), which suggests departure from normality for this study's variables. However, the skewness for all data fell within the -2.0 and 2.0 range, and kurtosis for all data fell within -7.0 and 7.0, which suggests normality (Byrne, 2010; George & Mallery, 2010; Hair et al., 2010). This analysis indicated that the skewness and kurtosis statistics for all the variables of interest fell within the acceptable ranges for univariate normality. Further, with larger sample sizes, the effects of non-normality distribution are less concerning (Hair et al, 2010). Hair et al. (2010) recommended that violations of normality are not problematic when the sample size exceeds 200 cases because the effects of a non-normal distribution diminish with larger sample sizes. Given the normality of the skewness and kurtosis values and the sample size of 310, the effects of non-normality were deemed inconsequential, and the analysis proceeded as initially proposed. Table 10 presents the findings of univariate normality for the variables of interest.

Table 10

Tests of Univariate Normality for Variables

Variable	Shapiro-Wilk Test		Skewness	Kurtosis
	Test Statistic	p		
Learning agility	0.99	.002	-0.40	-0.22
Informal learning behaviors	0.99	.002	0.01	-0.54
Reflective Thinking	0.96	<.001	-0.19	-0.49
Motivation to learn	0.76	<.001	-1.05	-0.01
Openness to experience	0.99	.048	-0.13	-0.34
Conscientiousness	0.99	.002	-0.23	-0.46
Extraversion	0.98	<.001	-0.39	-0.26
Agreeableness	0.89	<.001	-1.07	0.54
Emotional stability	0.97	<.001	-0.38	-0.72

Research Question 1 Regression Assumptions

A scatterplot of residuals versus fitted data was analyzed to check for a linear relationship between the variables of interest. As shown in Figure 10, the data are equally spread with no distinct pattern, indicating a linear relationship. A Q-Q scatter plot was used to assess the assumption of normality of residuals. As depicted in Figure 11, the data closely follow the trend line supporting the assumption of normality of residuals. A visual assessment of homoscedasticity was conducted by examining the residual scatterplot. Figure 10 also displays random dispersion, indicating that the assumption of homoscedasticity was met.

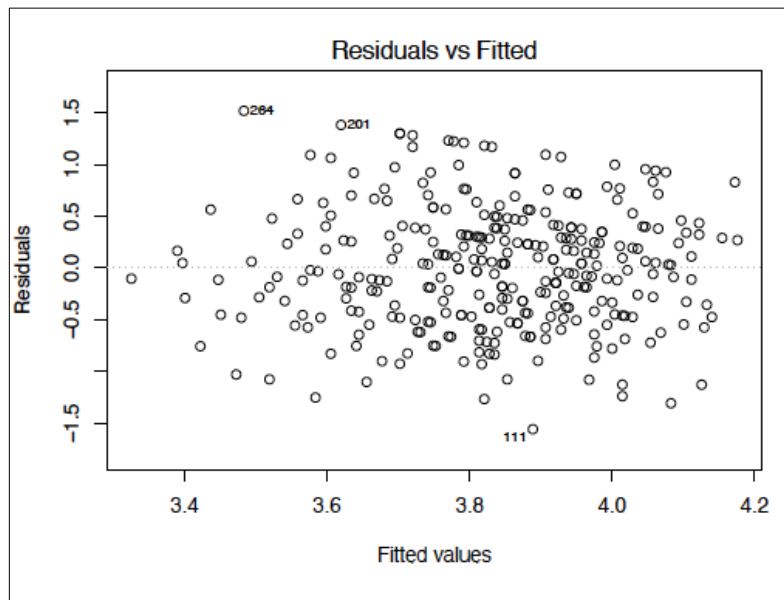


Figure 10 *Residuals Versus Fitted Values for Research Question 1*

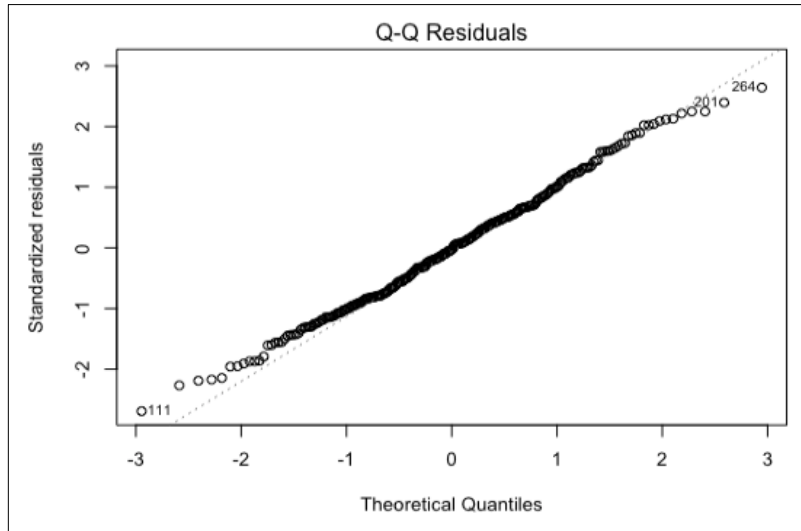


Figure 11 Q-Q Scatterplot for Research Question 1

Prior to conducting the analysis for Research Question 1, Cook's distance and Leverage was calculated to identify influential cases. The leverage analysis identified influential values using the formula $\frac{2(k+1)}{n}$, where k is the number of predictors and n is the sample size. This analysis indicated 25 observations that might be influential. Further analysis using Cook's distance found no cases with a Cook's distance greater than 1, which is a general rule of thumb for identifying cases with strong influence (Field, 2013). Influential values should not be automatically removed; instead, further investigation should be conducted to determine the accuracy of the observation (e.g., errors in coding the information). However, since this was a secondary dataset, further investigation was not possible. Additionally, no values exceeded the Cook's distance threshold, so the analysis was conducted without removing any observations.

Research Question 1 included further analysis with age as an added predictor. Before performing the multiple regression analysis, absence of multicollinearity was tested by examining the variance inflation factors (VIFs). Table 11 presents the findings of the VIF

analysis. VIF values below 10 indicate that multicollinearity is not a concern (Stevens, 2012; Wooldridge, 2015). All VIF values for the regression model were below 10, indicating that multicollinearity is not a concern with this model.

Table 11

VIFs for Regression Model for Research Question 1

Variable	VIF
Age	1.016
Learning agility	1.016

Research Question 2 Linear Regression Assumptions

Before conducting the regression analysis, the data were analyzed to ensure that the assumptions of linearity, normality of residuals, and homoscedasticity were met. A scatterplot of residuals versus fitted data was analyzed to check for a linear relationship between the variables of interest. Figure 12 shows that the data are equally spread with no distinct pattern, indicating a linear relationship. A Q-Q scatter plot was used to assess the assumption of normality of residuals. As depicted in Figure 13, the data closely follow the trend line supporting the assumption of normality of residuals. A visual assessment of homoscedasticity was conducted by examining the residual scatterplot depicted in Figure 12. The random dispersion in the scatterplot indicates that the assumption of homoscedasticity was met.

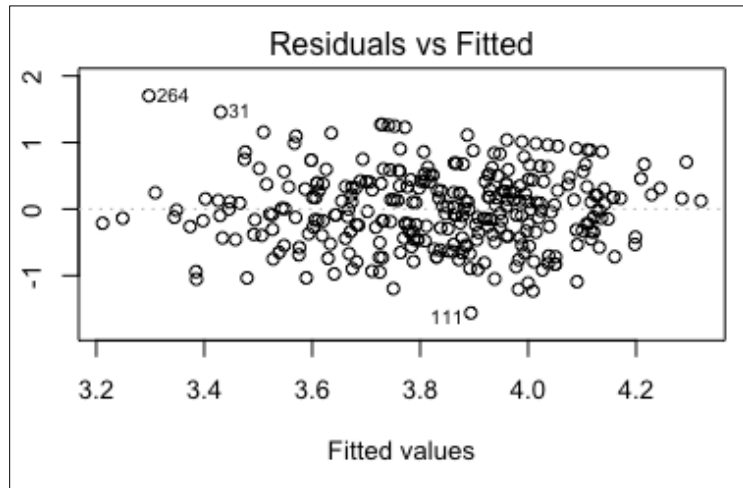


Figure 12 *Residuals Versus Fitted Values for Research Question 2*

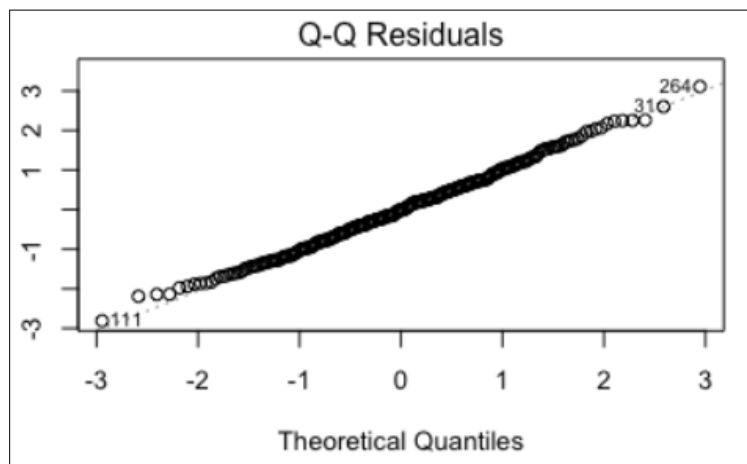


Figure 13 *Q-Q Scatterplot for Research Question 2*

Before conducting the multiple linear regression analysis, the variables were analyzed to ensure the absence of multicollinearity. Multicollinearity of data occurs when the variables in the regression model are highly correlated, which can result in inaccurate estimates of regression coefficients and p-values. The absence of multicollinearity was tested by examining VIFs in the regression model, which were all below 10, indicating that the absence of multicollinearity

assumption was met. Table 12 presents the findings of the VIFs for the variables related to Research Question 2.

Table 12

VIFs for Regression Model for Research Question 2

Variable	VIF
Openness to experience	1.316
Conscientiousness	1.459
Extraversion	1.477
Agreeableness	1.493
Emotional stability	1.687
Learning agility	1.407

Prior to conducting the analysis for Research Question 2, Cook's distance was calculated to identify influential cases. The leverage analysis identified influential values using the formula $\frac{2(k+1)}{n}$, where k is the number of predictors and n is the sample size. This analysis indicated 13 observations that might be influential. Further analysis was conducted using Cook's distance, and no values exceeded the threshold of 1. Since no values exceeded the Cook's distance threshold, the analysis was conducted without removing any observations.

Research Question 3 Path Analysis Assumptions

Prior to conducting the analysis, the variables were examined for multicollinearity. As with multiple regression analysis, it is important to ensure that multicollinearity does not exist between the variables, as multicollinearity can skew the regression coefficient and prevent accurate interpretations of the true relationship among a study's variables. Bivariate correlations were examined instead of the VIF analysis presented for the previous research questions. VIF

analysis is more complex for path analysis, given the complexity of the path analysis model and the inclusion of indirect and direct effects. However, bivariate correlations lower than .80 indicate the absence of multicollinearity (Vatcheva et al., 2016). The correlation coefficients for the variables of interest were under .80. The correlations are presented in Table 13.

Table 13

Bivariate Correlations Between Variables of Interest

Variable	1	2	3	4	5	6	7	8
1. Openness	1.00							
2. Conscientiousness	-.07	1.00						
3. Extraversion	-.07	-.14*	1.00					
4. Agreeableness	.12*	.25**	.39**	1.00				
5. Emotional stability	.19**	.48**	.20**	.47**	1.00			
6. Reflective thinking	.24**	-.13*	.14*	.01	.06	1.00		
7. Motivation to learn	.25**	-.00	.24**	.10	.14*	.38**	1.00	
8. Learning agility	.44**	-.07	.40**	.23**	.25**	.26**	.34**	1.00
9. Informal learning	.25**	.05	.25**	.16**	.21**	.50**	.47**	.28**

* $p < .05$. ** $p < .01$.

Study Limitations

As with any study, there were some limitations to this study's research approach. The study used convenience sampling, which was not randomized and may have led to a sampling error because the group under investigation was not fully representative of the members of the organization (Faulkner & Faulkner, 2018). According to Faulkner and Faulkner (2018), convenience sampling is a type of nonprobability sampling and therefore limits the generalizability of results. However, this study did not attempt to draw conclusions about the specific workforce population; rather, it investigated the association between the study's constructs. Also, according to Faulkner and Faulkner, convenience sampling is a commonly used

and accepted strategy in social science research. Because this study focused on a specific group to examine the association between the constructs, further research will be needed to confirm that the relationship also holds for other groups.

Another limitation of the sampling strategy was the voluntary nature of the sample, which may have led to a nonresponse bias, whereby the group that responded to the survey and those that did not respond may have differed, meaning that those who chose to respond may have been unique in some way (Huck, 2012). Again, this was not a significant concern because no conclusions were drawn about a larger population.

Determining causation between this study's independent and dependent variables would require an experimental (or quasi-experimental) study. An experiment would allow conclusions to be drawn about a causal relationship between learning agility and informal learning behaviors. However, an experimental study requires random assignment into control and treatment groups—which did not occur with this sample. Since the study did not use an experimental design, the research questions were framed to investigate association, not causation. This research used a correlational design involving survey data.

Limitations of Measures

There were some limitations associated with the measures used in this study. For example, some researchers have argued that self-report measures can be prone to socially desirable responses or faking by assessment takers (Holden, 2007). For instance, individuals completing the survey may have responded in ways they thought demonstrated their learning agility and informal learning behaviors because they believed these traits are desirable for the organization. This could have distorted scores. Though many have concluded that socially desirable responses do not impact the validity of self-report measures (Hough, 1998; Ones et al.,

1996), researchers generally remain divided on the issue. As mentioned previously, the Korn Ferry Learning Agility measure uses forced-choice item-response theory (FC-IRT), which removes the transparency of Likert-style responses and may potentially decrease faking and socially desirable responses.

An additional limitation of the study relates to common method variance, which can occur when the same rater provides responses (i.e., all self-report data), the data are collected concurrently, and a common medium is used to collect the data (i.e., surveys; Podsakoff et al., 2003). These issues can cause variables to covary due to the data collection methods rather than because of the true relationship of the variables. However, using different response scales can help remedy common method variance (Podsakoff et al., 2003). This study's informal learning, reflective thinking, motivation to learn, and personality measures used a Likert response scale, while the learning agility measure used the FC-IRT response scale, which helped reduce the effects of common method bias. Podsakoff et al. (2003) noted that common scale formats may cause covariation, but this study mitigated this issue since different response scales were used.

Another possible limitation was related to the use of secondary data. When using secondary data, the researcher does not have input into the research collection process and may not be fully aware of the data collection methods (Johnston, 2017). Fortunately, the researchers who compiled the original dataset were available for this study, which helped enhance understanding of the data collection process. The data collection methods used were adequately rigorous. The data came from a sample of leaders in a federal healthcare organization and was initially used to better understand the characteristics of leaders in the organization. This study used the data for further analysis beyond the initial collection purposes, consistent with Hakim's (1982) definition of secondary data analysis.

Appropriateness for Study

As with any well-conceived data collection strategy, there were pros and cons to this study's data collection approach. As discussed, there were limitations to this study's secondary data analysis, sampling strategy, and measures. However, despite these limitations, the data collection strategy was appropriate for addressing this study's research questions and possessed sufficient rigor. The secondary data analysis was suitable given that the existing data were appropriate for the research purpose and questions. Additionally, after reviewing the data collection procedures, they were found to be sufficiently rigorous. The convenience sampling strategy prevented drawing conclusions about a broader population; however, this study assessed the relationship between the construct of informal learning and learning agility and did not seek to make conclusions about the broader workforce within the organization. Future research should seek to replicate this study's results with other sample groups to ensure that the associations identified hold for additional samples. Finally, the use of self-report measures may have led to socially desirable responses or covariation due to common method bias. However, self-report data are commonly used in social science research (Faulkner & Faulkner, 2018), and the Korn Ferry measure uses FC-IRT, which removes the transparency associated with Likert scales.

CHAPTER 4

RESULTS

This chapter presents the results of the quantitative data analysis utilized to address the study's research questions. This study aimed to clarify the learning agility construct by examining its association with informal learning behaviors. Exploring the relationship between these two constructs resulted in an enhanced understanding of how the willingness and ability to learn from experiences influence one's tendency to learn outside structured learning activities. Additionally, the study examined personality, reflective thinking, and motivation to learn as antecedents of learning agility and modeled the relationship among all study variables. Understanding the relationship between these variables clarifies their influence on learning and adapting in today's ever-changing organizational environments.

This research comprised a correlational, quantitative study of archival, self-report survey data from federal leaders in a healthcare context. The quantitative analysis sought to advance the conceptual understanding of how learning agility influences informal learning behaviors by providing empirical evidence of the relationship between these variables and identifying antecedents of learning agility and informal learning behaviors. This chapter also discusses the study's descriptive and inferential statistical analyses, including demographic information about the sample population. Further, the chapter details the analysis for each research question, as described in Chapter 3. The following research questions and associated hypotheses guided the study:

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
 - H1: Learning agility will predict informal learning behaviors.
- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
 - H2: Learning agility will predict informal learning behaviors above and beyond personality.
- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?
 - Hypothesis 3a: The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.
 - Hypothesis 3b: Openness to experience is positively associated with motivation to learn.
 - Hypothesis 3c: Extraversion is positively associated with motivation to learn.
 - Hypothesis 3d: Conscientiousness is positively associated with motivation to learn.
 - Hypothesis 3e: Motivation to learn is positively associated with informal learning.
 - Hypothesis 3f: Motivation to learn is positively associated with learning agility.
 - Hypothesis 3g: Reflective thinking is positively associated with informal learning behaviors.
 - Hypothesis 3h: Reflective thinking is positively associated with learning agility.

- Hypothesis 3i: Emotional stability is positively associated with learning agility.
- Hypothesis 3j: Agreeableness is positively associated with learning agility.
- Hypothesis 3k: Learning agility is positively associated with informal learning behaviors.

Descriptive Findings

The secondary data for this study—collected via a self-report survey—contained demographic information about respondents’ age, gender, supervisory status, and organizational tenure. Table 14 presents the demographic characteristics of the sample population. As shown, more than half of the participants were female ($n = 182$; 58.71%). The mean age of participants was 47.59 years, with most participants falling in the 40–59 age range ($n = 216$; 69.68%). The sample group was primarily consisted of supervisory personnel ($n = 216$; 69.68%). The mean number of years of federal service for the sample population was 11.79, and slightly over half of the participants had more than 10 years of federal service ($n = 167$; 53.87%).

Table 14*Demographic Information About Survey Respondents*

Variable	Mean	SD	Frequency	Percent
Gender				
Male			128	41.29%
Female			182	58.71%
Age	47.59	8.36		
30–39			66	21.29%
40–49			113	36.45%
50–59			103	33.23%
60–69			26	8.39%
70–79			2	0.65%
Supervisor Status				
Supervisor			216	69.68%
Non-supervisor			94	30.32%
Years of Federal Service	11.79	6.96		
0–5			50	16.13%
6–10			93	30.00%
11–15			96	30.97%
16–20			42	13.55%
21–25			15	4.84%
26–30			12	3.87%
31–35			2	0.65%

Additionally, descriptive statistics for the study's variables of interest were calculated. This analysis provided a quantitative summary of the data distribution for each variable; Table 15 highlights the summary statistics. Informal learning behaviors scores ranged from 2.33 to 5.00, with $M = 3.83$ and $SD = 0.60$. Learning agility scores ranged from 1.07 to 7.00, with $M = 4.60$ and $SD = 1.18$. Motivation to learn scores ranged from 3.50 to 5.00, with $M = 4.70$ and $SD = 0.39$. Reflecting thinking scores ranged from 2.60 to 5.00, with $M = 4.15$ and $SD = 0.54$. Agreeableness scores ranged from 11.00 to 22.00, with $M = 18.85$ and $SD = 2.47$. Emotional stability scores ranged from 10.00 to 37.00, with $M = 26.36$ and $SD = 6.16$. Openness to experience scores ranged from 6.00 to 39.00, with $M = 25.59$ and $SD = 5.92$. Conscientiousness

scores ranged from 10.00 to 30.00, with $M = 21.45$ and $SD = 3.77$. Extraversion scores ranged from 15.00 to 50.00, with $M = 36.68$ and $SD = 6.95$.

Table 15

Summary Statistics for Variables of Interest

Variable	<i>N</i>	Min	Max	<i>M</i>	<i>SD</i>
Informal learning behaviors	310	2.33	5.00	3.83	0.60
Learning agility	310	1.07	7.00	4.60	1.18
Motivation to learn	310	3.50	5.00	4.70	0.39
Reflective thinking	310	2.60	5.00	4.15	0.54
Agreeableness	310	11.00	22.00	18.85	2.47
Emotional stability	310	10.00	37.00	26.36	6.16
Openness to experience	310	6.00	39.00	25.59	5.92
Conscientiousness	310	10.00	30.00	21.45	3.77
Extraversion	310	15.00	50.00	36.68	6.95

Mean variable of interest scores were also calculated by demographic category. The results of this analysis are presented in Table 16.

Table 16*Variable Means by Demographic*

Variable	ILB	LA	RefT	MtL	ES	Agr	Ext	Open
Gender								
Male	3.86	4.50	4.13	4.70	25.90	19.02	35.97	24.64
Female	3.79	4.73	4.17	4.68	27.08	18.66	37.68	26.82
Age								
30–39	3.72	4.34	4.07	4.61	25.70	18.85	36.02	24.30
40–49	4.41	4.55	4.55	4.03	24.60	18.56	36.34	25.39
50–59	4.52	4.69	4.64	3.99	28.17	19.08	37.37	25.98
60–69	4.82	5.01	4.70	4.20	28.38	19.35	36.69	28.18
70–79	4.18	4.28	4.72	4.08	32.00	20.50	41.50	18.50
Supervisor Status								
Supervisor	3.83	4.67	4.15	4.69	26.36	18.84	36.93	25.96
Non-supervisor	3.83	4.40	4.13	4.70	26.46	18.95	36.09	25.18
Years of Federal Service								
0–5	4.49	4.65	4.56	4.05	26.98	19.26	38.14	26.52
6–10	4.45	4.58	4.59	4.07	26.56	18.98	36.70	25.46
11–15	4.40	4.57	4.57	3.95	25.60	18.58	35.14	24.77
16–20	4.45	4.61	4.66	4.04	26.43	18.74	37.31	25.83
21–25	4.60	4.84	4.41	3.85	26.80	18.60	39.00	26.80
26–30	4.36	4.49	4.65	4.11	28.00	19.08	37.33	24.67
31–35	3.56	3.43	4.82	3.88	27.50	21.50	38.00	31.00

Note. ILB = Informal Learning Behavior; LA = Learning Agility; RefT = Reflective Thinking; MtL = Motivation to Learn; ES = Emotional Stability; Agr = Agreeableness; Ext = Extraversion; Open = Openness to Experience.

Inferential Statistics

The zero-orders correlations in the analysis provided an initial indication of the relationship between the study's variables and served as a building block for further analysis to investigate the study's research questions. Specifically, the zero-order correlations indicated that informal learning behaviors and learning agility had a positive significant association ($r = .28, p < .01$). Additionally, each individual dimension of learning agility had a positive significant correlation with informal learning behaviors: change agility and informal learning behaviors ($r =$

.27, $p < .01$); mental agility and informal learning behaviors ($r = .23$, $p < .01$); people agility and informal learning behaviors ($r = .13$, $p < .05$); and results agility and informal learning behaviors ($r = .12$, $p < .01$). These correlation values provided initial support for Hypothesis 1.

All subdimensions of informal learning behaviors were associated with the overarching learning agility construct: informal learning behaviors (self) and learning agility ($r = .27$, $p < .01$); informal learning behaviors (others) and learning agility ($r = .15$, $p < .01$); informal learning behaviors (non-interpersonal sources) and learning agility ($r = .26$, $p < .01$).

At the subdimensional level, informal learning behaviors (self) and informal learning behavior (non-interpersonal sources) had several positive significant correlations with the subdimensions of learning agility. However, informal learning behaviors (others) was not significantly associated with any subdimension of learning agility.

The zero-order correlations indicated that age was not significantly related to informal learning behaviors; however, age and learning agility had a significant positive correlation ($r = .13$, $p < .05$). Table 17 displays the zero-order correlations for the variables included in this study.

Table 17*Zero-Order Correlations*

Variable	1	2	3	4	5	6	7	8	9	10
1. Gender										
2. Age	-.03									
3. Tenure	.05	.19**								
4. Supervisor	-.04	.11	.04							
5. Reflective thinking	-.03	.04	-.09	.01						
6. Motivation to learn	.04	.12*	.03	-.03	.38**					
7. ILB (self)	.06	.01	-.07	-.02	.50**	.45**				
8. ILB (others)	.10	.04	-.04	.01	.35**	.29**	.38**			
9. ILB (nonInt)	.00	.14*	-.07	-.03	.36**	.37**	.52**	.40**		
10. ILB	.07	.09	-.08	-.01	.50**	.47**	.77**	.77**	.82**	
11. CA	-.12*	.13*	-.04	.13*	.23**	.36**	.27**	.10	.29**	.27**
12. MA	-.06	.12*	-.00	.03	.26**	.37**	.25**	.10	.22**	.23**
13. PA	.04	.01	-.06	.03	.10	.05	.13*	.09	.08	.13*
14. RA	-.10	.08	-.03	.05	.10	.13*	.05	.11	.12*	.12*
15. LA	-.09	.13*	-.05	.09	.26**	.34**	.27**	.15**	.26**	.28**
16. Emotional stability	-.09	.23**	-.01	-.01	.06	.14*	.11*	.16**	.22**	.21**
17. Agreeableness	.08	.09	-.03	-.02	.01	.10	.07	.15**	.14*	.16**
18. Conscientiousness	.14*	.10	-.03	.01	-.13*	-.00	-.05	.13*	.02	.05
19. Extraversion	-.12*	.06	-.01	.05	.14*	.24**	.16**	.15**	.27**	.25**
20. Openness	-.18**	.11	-.02	.03	.24**	.25**	.20**	.09	.29**	.25**

Note. ILB = individual learning behavior; NonInt = non-interpersonal sources; CA = change agility; MA = mental agility; PA = people agility; RA = results agility; LA = learning agility.

* $p < .05$. ** $p < .01$.

Table 17 (cont.)*Zero-Order Correlations*

Variable	11	12	13	14	15	16	17	18	19
11. CA									
12. MA	.61**								
13. PA	.08	.22**							
14. RA	.20**	.27**	.26**						
15. LA	.71**	.79**	.57**	.62**					
16. Emotional stability	.21**	.20**	.14*	.12*	.25**				
17. Agreeableness	.14*	.13*	.32**	.03	.23**	.47**			
18. Conscientiousness	-.21**	-.13*	.06	.12*	-.07	.48**	.25**		
19. Extraversion	.35**	.30**	.23**	.18**	.40**	.20**	.39**	-.14*	
20. Openness	.34**	.49**	.18**	.17**	.44**	.19**	.12*	-.07	-.07

Note. ILB = individual learning behavior; NonInt = non-interpersonal sources; CA = change agility; MA = mental agility; PA = people agility; RA = results agility; LA = learning agility.

* $p < .05$. ** $p < .01$.

Results Associated With the Research Questions

Research Question 1

Research Question 1 asked, “To what extent, if any, does learning agility predict informal learning behaviors?” The proposed hypothesis for this research question posited that learning agility would predict informal learning behaviors. Linear regression was used to analyze Research Question 1, with learning agility serving as the predictor variable and informal learning behaviors as the outcome variable. Before conducting the regression analysis, the data were analyzed (as detailed in Chapter 3) to ensure that the assumptions of linearity, normality of residuals, and homoscedasticity were met.

Linear regression analysis indicated that learning agility scores significantly predicted scores on the informal learning behaviors scale; $F(1, 308) = 26.67$, $p < .001$, $R^2 = .079$. The R-squared value indicated that the learning agility scale score explained approximately 7.9% of the

informal learning behaviors score variance. According to the analysis, learning agility is a significant predictor of informal learning behaviors ($b = 0.144$, $t = 5.163$, $p < .001$). The analysis indicated that for every 1-unit increase in learning agility, informal learning behaviors increased by 0.144 units. These regression analysis results support the hypothesis for Research Question 1: Learning agility predicts informal learning behaviors. Table 18 displays the statistical output for this simple linear regression analysis.

Table 18

Linear Regression Results of Learning Agility Predicting Informal Learning Behaviors

Variable	b	SE	β	t	p
Learning agility	0.144	0.028	.282	5.163	< .001

Note. Overall model fit: $F(1, 308) = 26.662$, $p < .001$, $R^2 = .079$.

As discussed previously, several demographic characteristics were included in the sample data, including age, gender, and federal tenure. The zero-order correlation analysis indicated that age was the only demographic characteristic related to this study's variables of interest for Research Question 1. Age and learning agility had a significant positive correlation ($r = .13$, $p < .05$), while age and informal learning behaviors did not have a significant relationship. Given the association between age and learning agility in the zero-order correlation table, as well as the relationship between age and informal learning behaviors in previous research findings (Cerasoli et al., 2018), further analysis was conducted to control for age. This analysis (described in Chapter 3) entailed a multiple regression analysis with age and learning agility as predictors of informal learning. Before conducting the multiple regression analysis, absence of multicollinearity was tested by examining the variance inflation factors (VIFs) as detailed in Chapter 3.

The findings for the multiple regression analysis indicated that the regression model was statistically significant, $F(2, 307) = 13.799, p < .001, R^2 = .082$, adjusted $R^2 = .076$. The results indicated that age and learning agility significantly predict informal learning behaviors, with approximately 7.6% (when considering the adjusted r-squared value) of the variance in informal learning behavior scores explained by age and learning agility. Learning agility ($b = 0.140, t = 4.998, p < .001$) was a significant predictor, indicating that informal learning behaviors increased by approximately 0.140 units with every 1-unit increase in learning agility. However, age was not a significant predictor in the regression model. This multiple regression analysis further supported Hypothesis 1: Learning agility predicts informal learning behaviors. However, adding age to the analysis had little impact compared with the initial analysis, which did not include age. Therefore, age was not included in further analysis. Table 19 presents the findings of the multiple linear regression model.

Table 19

Multiple Linear Regression With Age and Learning Agility Predicting Informal Learning Behaviors

Variable	<i>b</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>
Age	0.004	0.004	.053	0.970	.333
Learning agility	0.140	0.028	.275	4.998	< .001

Note. Overall model fit: $F(2, 307) = 13.799, p < .001, R^2 = .082$, Adjusted $R^2 = .076$.

Research Question 2

Research Question 2 asked, “To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?” This study hypothesized that learning agility would predict informal learning behaviors above and beyond personality. A hierarchical linear

regression was conducted in two steps to examine Research Question 2. Step 1 of the regression analysis used personality factors (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability) as predictors of informal learning behavior. Learning agility was added as an additional predictor variable in Step 2 of the analysis. Before conducting the regression analysis, the data were analyzed to ensure that the assumptions of linearity, normality of residuals, and homoscedasticity were met. Additionally, the data was analyzed to ensure absence of multicollinearity. (These analysis steps are detailed in Chapter 3.)

The analysis for Step 1 of the linear regression model was significant, $F(5, 304) = 7.623$, $p < .001$, $R^2 = .111$, adjusted $R^2 = .097$, indicating that personality factors significantly predicted informal learning behaviors. Based on the adjusted r-squared value, the regression model indicated that approximately 9.7% of the variance in informal learning behaviors could be explained by personality factors. The analysis for Step 2 of the linear regression model was also significant, $F(6, 303) = 7.468$, $p < .001$, $R^2 = .129$, adjusted $R^2 = .112$, which indicated that personality factors and learning agility significantly predicted informal learning behaviors.

The delta r-squared between Steps 1 and 2 of the hierarchical linear regression model was .015 (adjusted r-squared used for calculation), indicating that adding learning agility to the regression model explained an additional 1.5% of the variance in informal learning behaviors. Therefore, Hypothesis 2 was supported: Learning agility predicts informal learning behaviors above and beyond personality factors. Table 20 provides the summary statistics for each step of the analysis.

Table 20*Regression Model Fit Statistics*

Variable	<i>F</i>	<i>Model df</i>	<i>Error df</i>	<i>p</i>	<i>R</i> ²
Step 1 (personality factors)	7.623	5	304	<.001	.097
Step 2 (personality factors and learning agility)	7.468	6	303	<.001	.112

Note. *R*² value reported as adjusted *R*².

To better understand how each variable contributed to the model, further analysis of the individual predictors was conducted. In Step 1 of the model, only two variables were significant predictors: openness to experience ($b = 0.017$, $t = 2.849$, $p = .005$) and extraversion ($b = 0.015$, $t = 2.610$, $p = .010$). The analysis indicated that with every 1-unit increase in openness to experience, informal learning behaviors increased by 0.017 units, assuming all other variables were constant. Further, the analysis indicated that informal learning behaviors increased by 0.015 units for every 1-unit increase in extraversion, assuming all other variables were constant.

In Step 2 of the model, when learning agility was added as a predictor, only extraversion ($b = 0.012$, $t = 2.048$, $p = .041$) and learning agility ($b = 0.080$, $t = 2.462$, $p = .014$) were significant predictors. The analysis indicated that informal learning behaviors increased by 0.012 units with every 1-unit increase in extraversion, given that all other variables remained constant. With every 1-unit increase in learning agility, informal learning behaviors increased by 0.08 units, assuming all other variables remained constant. Table 21 summarizes the findings for Steps 1 and 2 of the hierarchical linear regression analysis.

Table 21

Hierarchical Regression With Personality Factors and Learning Agility Predicting Informal Learning Behaviors

Variable	<i>b</i>	<i>SE</i>	β	<i>Adjusted R</i> ²	Δ <i>Adjusted R</i> ²
Step 1				.097***	.097***
Constant	2.432***	0.333			
Openness to experience	0.017**	0.006	.166**		
Conscientiousness	0.004	0.010	.026		
Extraversion	0.015**	0.006	.168**		
Agreeableness	0.000	0.016	.002		
Emotional stability	0.013	0.007	.131		
Step 2				.112*	.015*
Constant	2.354***	0.325			
Openness to experience	0.012	0.006	.116		
Conscientiousness	0.007	0.010	.043		
Extraversion	0.012*	0.006	.133*		
Agreeableness	-0.002	0.016	-.007		
Emotional stability	0.010	0.007	.105		
Learning agility	0.080*	0.032	.157*		

Note. Step 1 model fit: $F(5, 304) = 7.623, p < .001, R^2 = .111$, adjusted $R^2 = .097$; Step 2 model fit: $F(6, 303) = 7.468, p < .001, R^2 = .129$, adjusted $R^2 = .112$; Change between steps: $F(1, 303) = 6.062, p = .014, R^2$ change = .017, adjusted R^2 change = .015.

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

Research Question 3

Research Question 3 asked, “What is the relationship between and among motivation, reflective thinking, personality, learning agility, and informal learning behaviors?” This study proposed the following hypotheses related to Research Question 3:

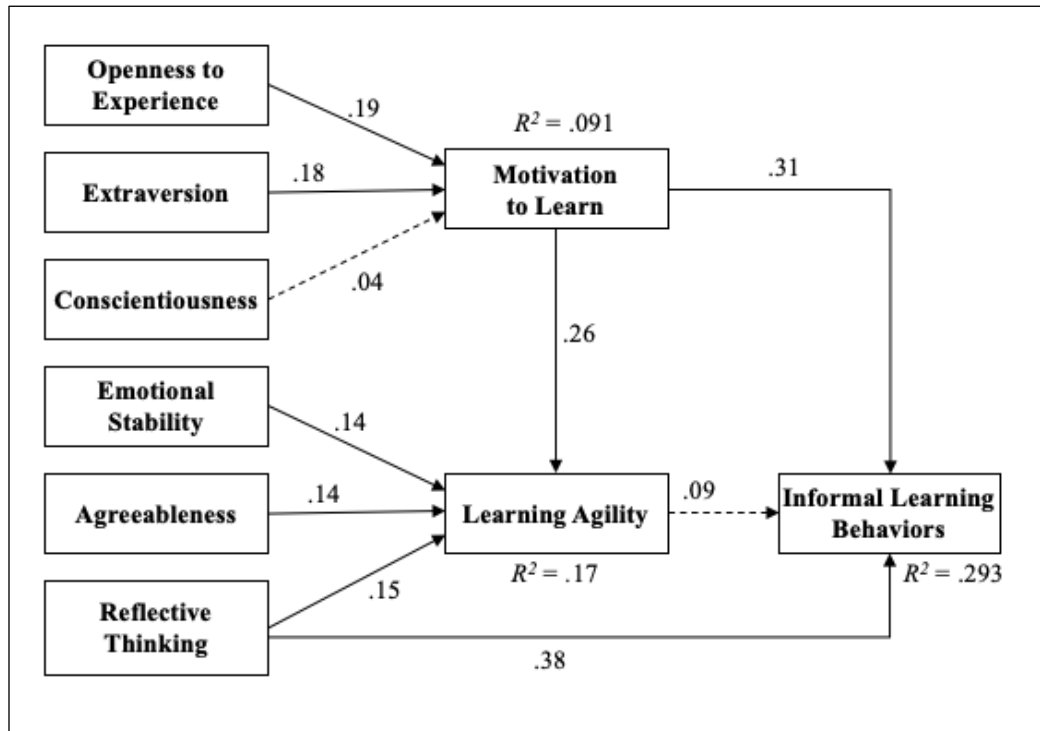
- Hypothesis 3a: The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.
- Hypothesis 3b: Openness to experience is positively associated with motivation to learn.
- Hypothesis 3c: Extraversion is positively associated with motivation to learn.

- Hypothesis 3d: Conscientiousness is positively associated with motivation to learn.
- Hypothesis 3e: Motivation to learn is positively associated with informal learning.
- Hypothesis 3f: Motivation to learn is positively associated with learning agility.
- Hypothesis 3g: Reflective thinking is positively associated with informal learning behaviors.
- Hypothesis 3h: Reflective thinking is positively associated with learning agility.
- Hypothesis 3i: Emotional stability is positively associated with learning agility.
- Hypothesis 3j: Agreeableness is positively associated with learning agility.
- Hypothesis 3k: Learning agility is positively associated with informal learning behaviors.

Path analysis was used to model the hypotheses related to Research Question 3. Prior to conducting the analysis, the variables were examined for multicollinearity, as discussed in Chapter 3.

Path Model 1

The first analysis conducted on the path model (before further interpreting path coefficients) was an examination of model fit (Figure 14). To determine model fit, several goodness of fit indices and their associated fit statistics were examined: the Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). Additionally, a chi-square test was conducted. Table 22 describes the fit indices and cutoff values utilized in this study.



Note. Solid lines represent significant paths at the .05 level. Dotted lines represent nonsignificant paths. Standardized regression weights displayed.

Figure 14 *Path Model 1*

Table 22*Fit Indices and Cut-Off Values*

Fit Index	Characteristics	Cut-Off value
χ^2	Compares the original and the model-implied variance-covariance matrices to determine how well the proposed model fits the data.	A statistically nonsignificant result ($p > .05$) indicates that the model fits the data reasonably well (Beaujean, 2014)
SRMR	The standardized difference between the observed covariance and predicted covariance.	.08 or lower (Hu & Bentler, 1999)
RMSEA	A standardized measure that estimates the difference between the model prediction and the observed data.	.06 or lower (Hu & Bentler, 1998) .08 (Hooper et al., 2008) .10 or lower (Quintana & Maxwell, 1999)
CFI	Assesses the degree of fit between the hypothesized and null measurement models by comparing the tested and baseline model non-centrality parameters.	.90 or higher (Hooper et al., 2008) .95 or higher (Hu & Bentler, 1998, 1999)
TLI	Compares the proposed model to the null model and adjust for model complexity.	.95 or high (Hu & Bentler, 1999)

Note. SRMR = Standardized Root Mean Square Residual; Root Mean Square Error of Approximation = RMSEA; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.

The chi-squared test for model fit was statistically significant, $\chi^2(11) = 112.242, p < .001$. In path analysis, a statistically significant chi-squared test indicates poor model fit. The CFI and TLI values were .836 and .446, respectively. The RMSEA had a value of .172. These fit statistics indicated a poor model fit, as they did not meet the cut-off values outlined in Table 22. Table 23 presents the fit statistics for the path model.

Table 23*Fit Statistics for Path Model 1*

χ^2	<i>df</i>	<i>p</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>SRMR</i>
112.242	11	<.001	.836	.446	.172	.090

Table 24 displays the factor loadings for Path Model 1. Eight of the 10 regression paths were significant; however, because the overall model had poor fit, the hypotheses were not supported. Table 25 summarizes the direct and indirect effects from the model.

Table 24*Regression Weights for Path Model 1*

Dependent Variable	Independent Variable	<i>R</i> ²	Unstandardized Regression Weights		Standardized Regression Weights
			Estimate	<i>t</i>	
Motivation to learn		.091			
	Openness to experience		.013	3.474*	.188
	Extraversion		.010	3.372*	.183
Learning agility	Conscientiousness	.170	.004	.688	.037
	Motivation to learn		.762	4.905*	.257
	Reflective thinking		.334	2.986*	.155
	Emotional stability		.026	2.663*	.138
	Agreeableness		.067	2.751*	.143
Informal learning behaviors		.293			
	Learning agility		.043	1.705	.087
	Motivation to learn		.452	6.137*	.307
	Reflective thinking		.410	7.916*	.384

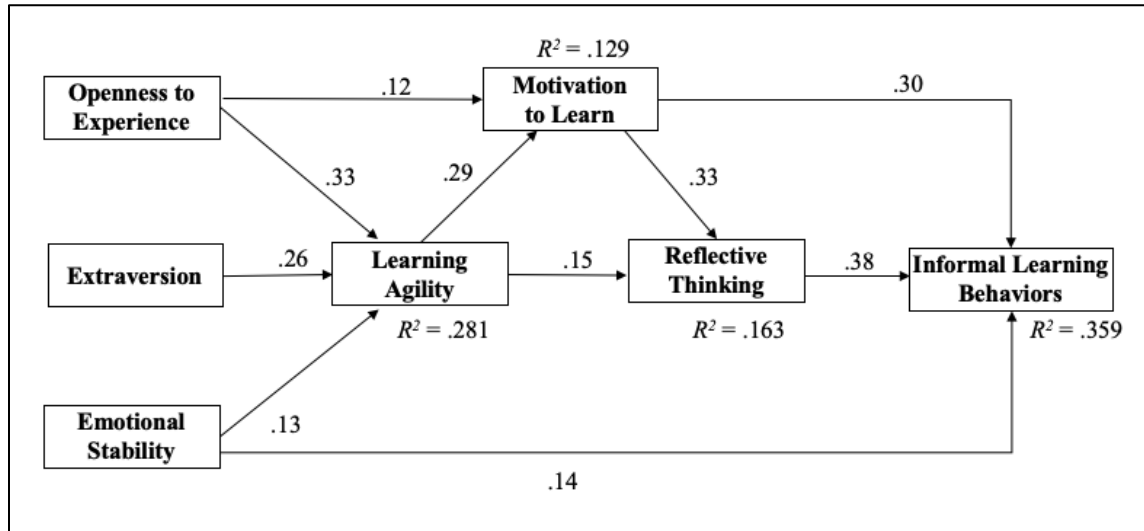
Note. *Denotes that regression path is statistically significant, $p < .05$.

Table 25*Direct and Indirect Effects for Path Model 1*

Effects	RefT	Agree	ES	Consc	Ext	Open	MtL	LA
Standardized direct effects								
Motivation to learn	.000	.000	.000	.037	.183*	.188*	.000	.000
Learning agility	.155*	.143*	.138*	.000	.000	.000	.257*	.000
Informal learning	.384*	.000	.000	.000	.000	.000	.307*	.087
Standardized indirect effects								
Motivation to learn	.000	.000	.000	.000	.000	.000	.000	.000
Learning agility	.000	.000	.000	.010	.047	.048*	.000	.000
Informal learning	.014*	.012*	.012	.012	.060	.062*	.022	.000
Standardized total effects								
Motivation to learn	.000	.000	.000	.037	.183	.188*	.000	.000
Learning agility	.155*	.143	.138*	.010	.047	.048*	.257*	.000
Informal learning	.397*	.012*	.012	.012	.060	.062*	.330*	.087

Note. RefT = Reflective Thinking; Agree = Agreeableness; ES = Emotional Stability; Consc = Conscientiousness; Ext = Extraversion; Open = Openness to Experience; MtL = Motivation to Learn; LA = Learning Agility. * $p < .05$.

Due to poor model fit of the hypothesized model, a revised model was developed to further explore the relationships between and among the study's variables. The revised model was informed by the literature and the variable relationships found in the analysis of Research Questions 1 and 2. Additionally, the revised model was more parsimonious and included only the following variables: openness to experience, extraversion, emotional stability, motivation to learn, learning agility, reflective thinking, and informal learning behaviors. Figure 15 illustrates Path Model 2.



Note. Solid lines represent significant paths at the .05 level. Standardized regression weights displayed.

Figure 15 Path Model 2

The fit indices for Path Model 2 indicated that the model was a good fit for the data, $\chi^2(8) = 13.635$, $p = .091$. The CFI value was .985, and the TLI value was .962. The RMSEA value for the model was .048. Table 26 presents the fit statistics for this model.

Table 26

Fit Statistics for Path Model 2

χ^2	<i>df</i>	<i>p</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>	<i>SRMR</i>
13.635	8	.091	.985	.962	.048	.041

The unstandardized and standardized factor loadings for the regression paths are presented in Table 27. All 10 regression paths were statistically significant. Openness to experience ($\beta = 0.12$, $p < .05$) and learning agility ($\beta = 0.29$, $p < .05$) had significant positive relationships with motivation to learn. Openness to experience ($\beta = 0.33$, $p < .05$), extraversion

($\beta = 0.26, p < .05$), and emotional stability ($\beta = 0.13, p < .05$) had significant positive relationships with learning agility. Motivation to learn ($\beta = 0.33, p < .05$) and learning agility ($\beta = 0.15, p < .05$) had significant positive relationships with reflective thinking. Reflective thinking ($\beta = 0.38, p < .05$), motivation to learn ($\beta = 0.30, p < .05$), and emotional stability ($\beta = 0.14, p < .05$) had significant positive relationships with informal learning behaviors. The R-squared value for the model suggests that approximately 35.9% of the variation in informal learning behaviors was explained by the model. Table 28 presents the standardized direct and indirect effects for Path Model 2.

Table 27

Regression Weights for Path Model 2

Dependent Variable	Independent Variable	R^2	Unstandardized Regression Weights		Standardized Regression Weights
			Estimate	t	
Motivation to learn		.129			
	Openness to experience		.008	2.113*	.119
	Learning agility		.097	4.909*	.291
Learning agility		.281			
	Openness to experience		.066	6.821*	.329
	Extraversion		.044	5.355*	.258
	Emotional stability		.026	2.760*	.133
Reflective thinking		.163			
	Motivation to learn		.455	5.966*	.330
	Learning agility		.067	2.530*	.146
Informal learning behaviors		.359			
	Reflective thinking		.423	7.716*	.380
	Motivation to learn		.461	6.089*	.301
	Emotional stability		.014	3.158*	.144

Note. *Denotes that regression path is statistically significant, $p < .05$.

Table 28*Direct and Indirect Effects for Path Model 2*

Effects	Ext	ES	Open	LA	MtL	RefT
Standardized direct effects						
Learning agility	.258*	.133*	.329*	.000	.000	.000
Motivation to learn	.000	.000	.119*	.291*	.000	.000
Reflective thinking	.000	.000	.000	.146*	.330*	.000
Informal learning	.000	.144*	.000	.000	.301*	.380*
Standardized indirect effects						
Learning agility	.000	.000	.000	.000	.000	.000
Motivation to learn	.075*	.039*	.096*	.000	.000	.000
Reflective thinking	.062*	.032*	.119*	.096*	.000	.000
Informal learning	.046*	.024*	.110*	.180*	.126*	.000
Standardized total effects						
Learning agility	.258*	.133*	.329*	.000	.000	.000
Motivation to learn	.075*	.039*	.215*	.291*	.000	.000
Reflective thinking	.062*	.032*	.119*	.242*	.330*	.000
Informal learning	.046*	.168*	.110*	.180*	.427*	.380*

Note. Ext = Extraversion; ES = Emotional Stability; Open = Openness to Experience; LA = Learning Agility; MtL = Motivation to Learn; RefT = Reflective Thinking. * $p < .05$.

The analysis for Research Question 3 examined the two path models. The hypothesized model, Path Model 1, had poor fit; however, a revised model, Path Model 2, fit the data well. Table 29 compares the fit indices for the two models. A chi-square test was conducted to determine if the difference between the two models was statistically significant. The results were significant, $\Delta\chi^2(3) = 98.59$, $p < .001$, indicating that Path Model 2 provided a statistically significantly better fit to the data compared to Path Model 1.

Table 29*Fit Indices for the Measurement Models*

Measurement Model	χ^2	SRMR	RMSEA	CFI	TLI	Model Fit
Path Model 1	112.242 ($df = 11, p < .001$)	.090	.172	.836	.464	Poor
Path Model 2	13.635 ($df = 8, p = 0.091$)	.041	.048	.985	.962	Good

Chapter Summary

This study aimed to add conceptual clarity to the learning agility construct by examining learning agility as a predictor of informal learning behaviors. Further, the study examined reflective thinking, personality, and motivation to learn as antecedents of learning agility and informal learning behaviors, and modeled the relationship between and among all the study variables.

This chapter presented the results of the quantitative data analysis for addressing the study's research questions. This chapter also presented results of descriptive and inferential statistical analyses, including analysis of demographic information on the sample population. Table 30 provides a summary of the research hypotheses and findings outlined in this chapter.

Table 30*Summary of Research Hypotheses*

Research Question	Hypothesis	Description	Results
RQ1	Hypothesis 1	Learning agility will predict informal learning behaviors.	Supported
RQ2	Hypothesis 2	Learning agility will predict informal learning behaviors above and beyond personality.	Supported
RQ3	Hypothesis 3a	The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.	Partially supported
	Hypothesis 3b	Openness to experience is positively associated with motivation to learn.	Supported
	Hypothesis 3c	Extraversion is positively associated with motivation to learn.	Partially supported
	Hypothesis 3d	Conscientiousness is positively associated with motivation to learn.	Not supported
	Hypothesis 3e	Motivation to learn is positively associated with informal learning.	Supported
	Hypothesis 3f	Motivation to learn is positively associated with learning agility.	Supported
	Hypothesis 3g	Reflective thinking is positively associated with informal learning behaviors.	Supported
	Hypothesis 3h	Reflective thinking is positively associated with learning agility.	Supported
	Hypothesis 3i	Emotional stability is positively associated with learning agility.	Supported
	Hypothesis 3j	Agreeableness is positively associated with learning agility.	Not supported
	Hypothesis 3k	Learning agility is positively associated with informal learning behaviors.	Partially supported

For Research Question 1, a linear regression was conducted with learning agility as a predictor variable and informal learning behaviors as an outcome variable. The results of the analysis were statistically significant, $F(1, 308) = 26.62, p < .001, R^2 = .079$. Learning agility ($b = 0.144, t = 5.163, p < .001$) was a significant predictor, indicating that with every 1-unit increase in learning agility, informal learning behaviors increased by approximately 0.144 units. Since age was a significant predictor of learning agility in the zero-order correlation analysis, and since age has been shown to inversely correlate with informal learning behaviors (Cerasoli et al., 2018), a second regression analysis was conducted to control for age. This analysis used age and learning agility as predictors of informal learning behaviors. The findings for this regression analysis were significant, $F(2, 307) = 13.799, p < .001, \text{adjusted } R^2 = .076$. However, age was not a significant predictor in this regression model, and the overall model added little predictive value over analysis that did not include age. Therefore, age was not included in further analysis. The analysis for Research Question 1 supported Hypothesis 1.

Research Question 2 utilized hierarchical linear regression to determine if learning agility added predictive validity above and beyond personality in predicting informal learning behaviors. The analysis found that learning agility predicted an additional 1.5% variance in informal learning behaviors above and beyond personality factors. The analysis for Research Question 2 supported Hypothesis 2.

Path analysis was used to address Research Question 3. The hypothesized path model examining the relationship between motivation to learn, reflective thinking, personality, and learning agility had poor model fit. A revised model was found to be a better fit for the data. All regression paths in the updated model were statistically significant and indicated positive relationships between the model variables.

Chapter 5 discusses the study's findings and presents conclusions based on the findings. Additionally, Chapter 5 explores how this study's findings connect to previous empirical findings. It also describes implications for theory and practice, considers the limitations of the research and explores possible directions for future studies.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This study aimed to add conceptual clarity to the learning agility construct by investigating the link between learning agility and the conceptually similar construct of informal learning behaviors. Further, this study explored how learning agility and informal learning behaviors related to personality, reflective thinking, and motivation to learn by modeling the relationship among these variables.

This study set out to address a knowledge gap regarding the learning agility construct and its theoretical underpinnings. Learning agility has been linked to leadership effectiveness and potential and has been touted as the most critical competency required to navigate the ever-changing complexity of today's leadership context (De Meuse, 2017). However, despite the promising empirical evidence connecting learning agility to critical leadership dimensions, many researchers have criticized the construct as lacking clarity and theoretical grounding (Arun et al., 2012).

To help provide a deeper theoretical understanding of learning agility, this study investigated learning agility's relation to several theoretically similar concepts. The research was theory-driven, rooted in several prominent learning theories and frameworks: DeRue et al.'s (2012) learning agility framework; Marsick and Watkins' (1990) informal learning model (as measured by Noe et al.'s (2013) measure of informal learning behaviors); Lee and Song's (2020) theoretical framework of learning agility; and Lombardo and Eichinger's (2000) conceptualization of learning agility.

The quantitative research design entailed a correlational study of archival self-report data from a federal healthcare context. The secondary dataset included survey responses related to the constructs of learning agility, informal learning behaviors, personality, reflective thinking, and motivation to learn. A total of 317 survey responses were received, and after the removal of outliers, 310 survey responses were used in the final analysis. Quantitative analysis procedures included descriptive statistics, simple linear regression, multiple linear regression, hierarchical linear regression, and path analysis.

The following research questions guided this study:

- RQ1: To what extent, if any, does learning agility predict informal learning behaviors?
- RQ2: To what extent, if any, does learning agility predict informal learning behaviors beyond personality factors?
- RQ3: What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?

This chapter includes a summary of the findings and discusses conclusions based on the results. It also describes implications for theory and practice, considers the study's limitations, recommends future research, and highlights the significance of the research.

Summary of Findings

The initial analysis for this study involved compiling descriptive statistics and calculating zero-order correlations for the variables of interest. The zero-order correlations provided valuable insights into the relationship between the study variables, and they offered an initial indication of the relationship between learning agility and other study variables. Learning agility had a positive correlation with reflective thinking ($r = .26, p < .01$), motivation to learn ($r = .34$,

$p < .01$), and informal learning behaviors ($r = .28, p < .01$). Further, learning agility was significantly associated with all factors of personality except conscientiousness: emotional stability ($r = .25, p < .01$), agreeableness ($r = .23, p < .01$), extraversion ($r = .40, p < .05$), and openness to experience ($r = .44, p < .05$). These findings were consistent with prior research indicating a linkage between learning agility and personality (Connolly, 2001; Laxson, 2018). The study findings showed that informal learning behaviors were significantly associated with all factors of personality except conscientiousness: emotional stability ($r = .21, p < .05$), agreeableness ($r = .16, p < .05$), extraversion ($r = .25, p < .05$), and openness to experience ($r = .25, p < .05$).

The zero-order correlation analysis also provided insights into the subdimensional associations between learning agility and informal learning behaviors. There were multiple associations between the subdimensions of these two constructs; however, informal learning behaviors (others) was not associated with any subdimension of learning agility. This was particularly surprising in the case of people agility, given that this dimension is associated with adeptness at interacting with others (Lombardo & Eichinger, 2000), conceivably in service of learning from those interactions.

Analysis of data related to Research Question 1 indicated that learning agility scores predicted informal learning behaviors ($F(1, 308) = 26.67, p < .001, R^2 = .079$), which supported Hypothesis 1. While this relationship was statistically significant, the R-squared value indicated a weak effect (Cohen, 1998). Research Question 2 investigated the extent to which learning agility predicts informal learning behaviors above and beyond personality. As suggested by the zero-order correlations and previous research findings (Connolly, 2001; Laxson, 2018), personality is associated with both learning agility and informal learning behaviors. The

regression model using personality to predict informal learning produced findings that were significant ($F(5, 304) = 7.623, p < .001, R^2 = .111$, adjusted $R^2 = .097$), indicating that personality explained approximately 9.7% of the variance in informal learning behaviors. When learning agility was added to the regression model, the R-squared value increased, $F(6, 303) = 7.468, p < .001, R^2 = .129$, adjusted $R^2 = .112$. While this demonstrated that learning agility provided predictive power to the model, the delta R-squared between the two models was marginal. Additionally, the overall R-squared of Model 2 indicated a weak effect (Cohen, 1998). Notably, only extraversion ($b = 0.012, t = 2.048, p = .041$) and learning agility ($b = 0.080, t = 2.462, p = .014$) were significant predictors in Model 2.

Research Question 3 asked, “What is the relationship between and among motivation to learn, reflective thinking, personality, learning agility, and informal learning behaviors?” A path analysis was conducted to examine Research Question 3. The hypothesized model exhibited poor model fit, so further interpretation of that model was not conducted. A revised model, based on the empirical literature and analysis from Research Questions 1 and 2, was tested. This revised model, which consisted of openness to experience, extraversion, emotional stability, learning agility, motivation to learn, reflective thinking, and informal learning behaviors, exhibited a favorable model fit and explained approximately 35.9% of the variation in informal learning behaviors.

Table 31 summarizes the study’s hypotheses and results.

Table 31*Summary of Research Hypotheses*

Research Question	Hypothesis	Description	Results
RQ1	Hypothesis 1	Learning agility will predict informal learning behaviors.	Supported
RQ2	Hypothesis 2	Learning agility will predict informal learning behaviors above and beyond personality.	Supported
RQ3	Hypothesis 3a	The effect of personality and reflective thinking on informal learning behaviors is mediated by motivation to learn and learning agility.	Partially supported
	Hypothesis 3b	Openness to experience is positively associated with motivation to learn.	Supported
	Hypothesis 3c	Extraversion is positively associated with motivation to learn.	Partially supported
	Hypothesis 3d	Conscientiousness is positively associated with motivation to learn.	Not supported
	Hypothesis 3e	Motivation to learn is positively associated with informal learning.	Supported
	Hypothesis 3f	Motivation to learn is positively associated with learning agility.	Supported
	Hypothesis 3g	Reflective thinking is positively associated with informal learning behaviors.	Supported
	Hypothesis 3h	Reflective thinking is positively associated with learning agility.	Supported
	Hypothesis 3i	Emotional stability is positively associated with learning agility.	Supported
	Hypothesis 3j	Agreeableness is positively associated with learning agility.	Not supported
	Hypothesis 3k	Learning agility is positively associated with informal learning behaviors.	Partially supported

Conclusions

Based on this study's findings as well as those from the empirical literature, three primary conclusions can be drawn: (1) Learning agility lacks conceptual clarity and robust measurement tools; (2) personality plays a critical role in learning from experience; and (3) learning from experience is a complex process involving the interplay of personality, motives, and cognition.

Conclusion 1: Learning Agility Lacks Conceptual Clarity and Robust Measurement Tools

This study sought to add conceptual clarity to learning agility by examining its association with the conceptually similar construct of informal learning behaviors. The study demonstrated that much work is still needed to fully understand the learning agility construct, which relates to the willingness and ability to learn from experience and apply those lessons to future experiences. While learning agility has seen prevalent use in organizations, researchers have criticized its lack of conceptual clarity and its atheoretical approach (Arun et al., 2012; DeRue et al., 2012). There are several models of learning agility (e.g., Burke et al., 2016; Lee & Song, 2020; Lombardo & Eichinger, 2000), leading to confusion and misalignment in understanding and measurement of the construct. Many of the models, with the exception of Lee and Song's (2020) work, require further theoretical work to situate learning agility within the broader literature on learning from experience. This theoretical examination might result in a more consistent conceptualization of the construct.

While no single agreed upon learning agility model exists, the original learning agility framework suggested that learning agility is a multi-dimensional framework comprising mental agility, people agility, results agility, and change agility (De Meuse, 2017). Subsequent models of learning agility have added to and/or renamed these dimensions, but the original framework

still serves as a foundation for many learning agility models. How certain learning agility dimensions relate to the construct's definition of learning from experience is poorly understood. For example, the current study's analysis challenges the connection between learning agility's people agility dimension and learning from experience. People agility, which relates to working with diverse people and treating others constructively, ostensibly in the service of learning from experience, was not related to informal learning behaviors (others), a factor related to learning from others. This finding calls into question learning agility's conceptual framework, possibly indicating that the learning agility measure is not accurately measuring the people agility dimension.

This study's findings related to Research Question 1 raise further questions about the theoretical basis, conceptualization, and measurement of learning agility. The analysis found that learning agility predicted informal learning behaviors, but the relationship was weak. If learning agility is conceptualized and measured as a construct related to learning from experience, then it follows that the relationship between learning agility and informal learning behaviors would be moderate to strong. This expectation is based on the idea that learning agility entails a proactive approach to learning from experiences, not formal educational settings—in other words, participating in informal learning behaviors.

The weak correlation between these two constructs invites further inquiry into what it means to be learning agile. Perhaps learning agility does not entail increased participation in informal learning behaviors but, instead, an enhanced ability to extract lessons from informal learning behaviors. This subtle distinction represents a nuanced viewpoint of learning agility, suggesting that the construct might capture an individual's efficacy in learning from their experiences rather than the frequency with which individuals participate in those experiences. It

is possible, then, that learning agility is more cognitive than behavioral, although previous findings have suggested that learning agility is not related to intelligence (Connolly, 2001). Instead, it could relate to cognitive processes that allow individuals to extract deeper lessons from their experiences or possibly to an aptitude for applying those experiences to novel situations. Another explanation for the weak relationship could be that the measure of learning agility does not, in fact, adequately measure the construct, resulting in a weaker-than-expected relationship. This uncertainty around how learning agility manifests underscores the need for a clearer understanding of the construct.

Since there is little agreement on the conceptual framework for learning agility, it is no surprise that there is inconsistency in how learning agility is measured. The different models of learning agility create variations in the measurement of the construct, making cross-study comparisons challenging. Many of the existing measures do not report convergent validity with other measures of learning agility, which limits understanding of similarities and differences between the measures. Without this information, it remains unclear whether the various learning agility measures even measure the same core construct. Further, most learning agility measures are proprietary, limiting access to underlying data, methodologies, item descriptions, and psychometric data. Currently, there are no valid measures in the academic literature for free use. Commercial measures put up a paywall to studying learning agility and limit transparency, peer review, and free exchange of information to improve the measures. The lack of robust measurement tools makes the endeavor of better understanding the learning agility construct challenging.

Conclusion 2: Personality Plays a Critical Role in Learning From Experience

This study's findings suggest strongly that personality plays a vital role in learning from experience, including both learning agility and informal learning behaviors. Previous empirical findings have also supported these relationships. Emotional stability, agreeableness, and openness to experience appear to be the most crucial personality dimensions for learning from experience. The present study suggests that openness to experience may have the most substantial relationship with learning from experience.

The path analysis from this study highlighted openness to experience, emotional stability, and extraversion as foundational traits of the learning-from-experience process. Openness to experience likely fosters the curiosity and open-mindedness needed to participate in learning activities. Extraversion might enhance one's willingness to learn from others, and emotional stability might provide the willingness to learn from mistakes and persevere in the face of setbacks. In this model, it is unclear how agreeableness might allow others to participate in informal learning behaviors and extract lessons from those experiences, although this study's bivariate correlation analysis suggested that agreeableness relates to both informal learning behaviors and learning agility. More agreeable individuals might collaborate with others more frequently, facilitating the social learning process.

The relationship between conscientiousness and learning from experience is less certain. While previous empirical research has found that conscientiousness is not related to learning agility (Laxson, 2018; Smith et al., 2017), Noe et al.'s (2013) work found that conscientiousness positively correlates with informal learning behaviors. In the current study, conscientiousness was not related to informal learning behaviors. Conscientiousness is typically considered the best work performance predictor of the Big Five personality model (Wilmot & Ones, 2019), as it

relates to being planful, diligent, and rule-abiding, all seemingly desirable traits in an employee. Yet, the focus on being planful might be at odds with the flexibility and adaptability required in unstructured and dynamic learning environments. It remains unclear how conscientiousness might impact informal learning behaviors and learning agility differently.

Conclusion 3: Learning From Experience Is a Complex Process Involving the Interplay of Personality, Motives, and Cognition

Much of the previous empirical research has involved examining the outcomes of learning from experience, such as job performance, leadership performance, or leadership potential (De Meuse, 2019). While it is critical to understand the outcomes of learning from experience, more work is needed to understand the process by which learning from experience unfolds. Studies focusing on antecedents of learning from experience (e.g., Noe et al., 2013; Tews et al., 2016) have typically focused on immediate predictors. However, learning from experience is not a simple, straightforward event but, instead, a dynamic, complex interchange of multiple constructs. This study illustrates that learning from experience is better understood as a complex process situated at the intersection of personality, motives, and cognition. Examining the mechanisms through which learning from experience occurs helps provide conceptual clarity to learning from experience constructs, such as learning agility. Additionally, a better understanding of the learning-from-experience process elucidates how different learning-from-experience constructs, such as learning agility and informal learning behaviors, relate to one another.

As discussed earlier, personality is critical in the learning-from-experience process. Openness to experience, extraversion, and emotional stability were foundational elements in this study's final path model. Past research has centered on personality as an immediate predictor of

learning agility and informal learning behaviors. This study's findings indicated that this relationship could be partially mediated through other constructs such as learning motives and reflective thinking. The path model suggests that personality relates to learning agility and motivation to learn, which then influences reflective thinking and informal learning behaviors.

An individual's motivation to learn is essential to the learning-from-experience process. This study examined the motivation to learn construct based on an individual's intrinsic desire to learn. Informal learning is self-directed and occurs outside a formal setting (Marsick & Watkins, 1990), and intrinsic motivators play a critical role in the self-directed processes. Learning from experience often lacks traditional educational cues, such as those from teachers, curricula, formal learning goals, and deadlines. In this less structured environment, learners have autonomy in determining when, where, and how they learn, making motivation to learn an essential factor. Extrinsic motivators, though not examined in this model, might provide additional insights into how learning from experience occurs. Although intrinsic motivators relate inherently to the self-directed process of learning from experience, extrinsic factors, such as work deadlines, praise from bosses and colleagues, and career advancement, could drive individuals to take a more self-directed approach to their learning.

Cognition is another lens for viewing the complex process of learning from experience. Multiple studies have suggested that IQ is unrelated to learning from experience or learning agility (Connolly, 2001; Eichinger & Lombardo, 2004). However, the cognitive process entails more than raw intellect. Learning from experience may relate less to intellect and more to how individuals process their ideas and experience—for example, engaging in reflective thinking in service of learning from their experiences. In their model of learning agility, DeRue et al. (2012) utilized the term *metacognition*, which represents being aware of one's own way of thinking, or,

more simply put, “thinking about thinking” (p. 266). Reflective thinking, an element of metacognition, relates to thinking about problem-solving strategies (Tuncer & Kaysi, 2013). Reflective thinking—a component of this study’s path model—might guide individuals in their self-directed learning behaviors and may lead individuals to develop learning strategies that entail the trial-and-error process of learning from mistakes that is critical to informal learning.

Implications for Theory and Practice

This study’s findings have important implications for both theory and practice. The main theoretical implication is that this study elucidates the process by which informal learning behaviors occur and how learning agility fits into that process. Further, this study helps refine the nomological network of both learning agility and informal learning behaviors. From a practical standpoint, the findings highlight that much work is still needed to understand the learning agility construct. Thus, organizations should exercise discernment when incorporating this construct into their talent management strategies.

Theoretical Implications

This study concluded that learning agility lacks conceptual clarity and robust measurement tools. While much work is still needed to better understand the learning agility construct, this research provides a better understanding of the multifaceted process through which learning from experience occurs and how learning agility fits into this process. Historically, there has been a lack of understanding around the mechanisms by which learning agility allows individuals to learn from their experiences. DeRue et al. (2012) provided a theoretical framework for the learning agility process that also informed the theoretical framework for this study. This study’s theoretical model built on this framework—which consists of individual differences such as meta-cognition and openness to experience, learning

agility, and performance—by incorporating informal learning behaviors into the learning agility framework. Prior to this study, little, if any, work had been done to empirically examine DeRue et al.’s (2012) framework. Not only did this research comprise an empirical examination of DeRue et al.’s framework, but it also added components based on the broader learning-from-experience literature. While the initial path model had poor model fit, a revised path model fit the data. Figure 16 provides an updated theoretical framework for the learning-from-experience process based on the revised path model.

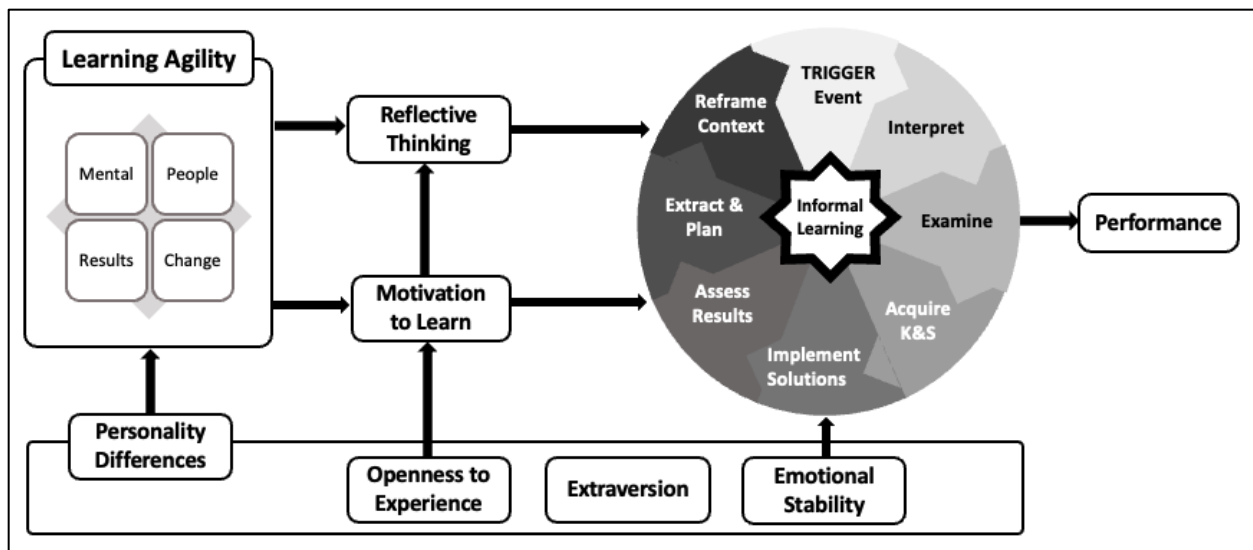


Figure 16 *Revised Theoretical Framework for Learning-From-Experience Process*

This revised theoretical framework adds motivation to learn and reflective thinking to the learning agility and informal learning process. These additional elements speak to the complexity of the learning-from-experience process and provide fuller insight into the underlying mechanisms that influence the process. Additionally, the empirical analysis in this study demonstrated that motivation to learn and reflective thinking exist within the nomological

network of learning agility and informal learning behaviors. Learning agility has been criticized as being an atheoretical construct (Arun et al., 2012). A better understanding of learning agility's nomological networks helps refine the theoretical understanding of the construct. Learning agility has now been empirically linked to constructs with strong theoretical foundations. For example, informal learning has a robust theoretical basis in experiential learning theories, such as the work of Dewey (1938), Lewin (1947), and Kolb (1984). These empirical and theoretical linkages help provide better conceptual clarity for the construct and also help delineate its theoretical and conceptual boundaries.

Although many of the variable relationships in this study have not been previously examined in the empirical literature, there is some empirical evidence linking a few of the study's constructs. For example, Noe et al. (2013) examined the relationship between informal learning behaviors and personality. This study's findings essentially replicate Noe et al.'s previous findings. However, Noe et al. found a relationship between informal learning behaviors and conscientiousness ($r = .16, p < .05$), whereas the current study found a non-significant relationship. Choi and Jacobs (2011) found that informal learning behavior had a positive relationship with motivation to learn ($r = .23$ to $.40, p < .05$). The current study's finding also found a positive relationship between these constructs. Finally, the current study replicates findings linking personality and learning agility, which indicate that learning agility is associated with the Big Five personality dimensions except conscientiousness. Table 32 summarizes these previous empirical findings in relation to the current findings.

Table 32*Previous Empirical Findings Compared to Current Findings*

Author(s) (Year)	Original Findings	Current Findings	Implications
Choi & Jacobs (2011)	Correlations between ILB and motivation to learn • $r = .34, (p < .05)$ learning with others • $r = .40, (p < .05)$ self-experimentation • $r = .23, (p < .05)$ external scanning	Correlations between ILB and motivation to learn • $r = .29, (p < .01)$ ILB (others) • $r = .45, (p < .01)$ ILB (self) • $r = .37, (p < .01)$ ILB (non-interpersonal)	The current study replicated the relationships in the original study and indicates the relationship between ILB and motivation to learn might be stronger than found in the original finding.
Noe et al. (2013)	Correlations between ILB and personality • $r = .26 (p < .01)$ extraversion • $r = .17 (p < .05)$ agreeableness • $r = .16 (p < .01)$ open to experience • $r = .20 (p < .01)$ emotional stability • $r = .16 (p < .05)$ conscientiousness	Correlations between ILB and personality • $r = .25 (p < .01)$ extraversion • $r = .16 (p < .01)$ agreeableness • $r = .25 (p < .01)$ open to experience • $r = .21 (p < .01)$ emotional stability • non-significant conscientiousness	The current study replicated many of the original findings; however, the current study found a non-significant relationship between ILB and conscientiousness. The current study found that ILB and Openness to experience had a stronger relationship than the original study.
Ogisi (2006) Laxson (2018)	Correlations between LA and personality • $r = .34 \text{ to } .45 (p < .01)$ extraversion • $r = .30 (p < .01)$ agreeableness • $r = .28 (p < .05)$ open to experience • $r = .20 \text{ to } .45 (p < .01)$ emotional stability • non-significant conscientiousness	Correlations between LA and personality • $r = .40 (p < .01)$ extraversion • $r = .23 (p < .01)$ agreeableness • $r = .44 (p < .01)$ open to experience • $r = .25 (p < .01)$ emotional stability • non-significant conscientiousness	The current study replicated the finding from the original study including the finding that conscientiousness has a non-significant relationship with learning agility. The current study's findings suggest the relationship between LA and openness to experience is stronger than found in the original studies.

Note. ILB = informal learning behaviors; LA = learning agility.

This study provides insight into important mediators in the learning-from-experience process. Personality has been linked to informal learning behaviors (Noe et al., 2013), but the mediating role of learning agility, reflective thinking, and motivation to learn provides a better

understanding of the mechanisms through which this linkage occurs. Further, this study's revised path model indicates learning agility's association with informal learning behaviors is mediated by motivation to learn and reflective thinking. Learning agile individuals are those willing and able to learn from their experience to perform in new situations. Motivation to learn likely drives the tendency to learn from experience by increasing participation in informal learning behaviors. Further, the tendency to engage in reflective thinking whereby individuals reconsider how they approach challenges might also encourage them to experiment with new strategies and informal learning behaviors.

This study demonstrated that learning agility predicts informal learning behaviors, though it seems that the relationship between these two constructs should be stronger given their conceptual overlap. More measurement refinement of the learning agility construct may yield a stronger relationship between learning agility and informal learning behaviors. Additionally, as the relationship between these two variables is further investigated, identifying additional moderators and mediators in the learning-from-experience process may help better explain their relationship. While this study showed a connection between learning agility and informal learning behaviors, the weak relationship underscores the uniqueness of these two constructs, highlighting the need to better understand the demarcation between learning agility and informal learning behaviors. This is the first study examining the empirical linkage between learning agility and informal learning behaviors, so more studies should be conducted to further investigate the relationship between these two constructs.

A final theoretical contribution of this study is a better understanding of subdimension relationships between learning agility and other constructs. Learning agility's structure has shifted and evolved over time. For example, self-awareness was included as a subdimension, but

recent conceptualizations have removed this dimension (De Meuse, 2017). Some critics of the construct, such as DeRue et al. (2012), suggested the definition of learning agility was too broad and sought to define it more narrowly. This study's findings suggest that a narrower definition of learning agility, which excludes people agility, should be considered. This study demonstrates that the people agility dimension of learning agility was not related to informal learning behavior (others), motivation to learn, or reflective thinking. Previous scholars have questioned how people agility relates to learning from experience (Arun et al., 2012). This study's findings indicate that people agility may not be inherent to learning agility, and a more parsimonious conceptualization consisting of mental agility, change agility, and results agility should be explored. Alternatively, the people agility dimension might need refinement in how it is defined and measured.

Practical Implications

Learning agility has primarily been of interest in the practitioner sphere, with academic research on the construct lagging (De Meuse & Harvey, 2022). Despite learning agility's increasing promise, this study demonstrated that practitioners should be discerning in how they use learning agility in their talent management strategies. Researchers have criticized learning agility for its lack of conceptual clarity (DeRue et al., 2012), yet few empirical studies have sought to refine the construct. Many empirical studies on learning agility have shown learning agility's strong connection to performance and potential (De Meuse, 2019) without fully identifying or understanding the mechanisms by which learning agility leads to those outcomes. The present study sought to model the relationship between learning agility and several related constructs, and the results indicate that there is still much to learn about learning agility's framework and how individual dimensions of the construct relate to learning from experience.

This study also showed that the learning agility construct lacks measurement rigor; therefore, organizations should be careful about making talent decisions based on learning agility assessment results. Making data informed talent decisions is critical to effective talent management strategies, but these decisions must be based on rigorous and validated data sources. Given its lack of conceptual clarity, learning agility does not reach the appropriate level of rigor. Many organizations might be tempted to reference promising meta-analytic findings to support the use of the construct; however, given the limitations of these studies, it is not advisable. Many of the studies referenced in De Meuse's (2018) metanalysis originate from non-peer-reviewed sources, which is not surprising given that "academic scholars...generally have not investigated the construct" (De Meuse & Harvey, 2022, p. 210). Further, these meta-analytic results cannot be generalized because of the inconsistency in measuring the learning agility construct. These measurement variations can lead to inconsistent talent management decisions and poor organizational outcomes.

Undeniably, the concept undergirding learning agility—willingness and ability to learn from experience and successfully perform in novel situations—is imperative to navigating the complexity of today's workplace landscape successfully. However, this critical construct has not been fully operationalized. It is not well established that current learning agility measures truly measure the same core construct. Therefore, depending on the measure utilized by organizations and practitioners, the construct being measured, and its relation to critical talent outcomes, could differ drastically. Thus, while learning agility might be a fascinating construct for self-awareness or developmental conversations, it should not be used to make impactful talent management decisions, such as succession planning, hiring, or promotions.

For practitioners seeking to measure an individual's willingness to learn from experience and adapt to future demands, a better alternative might be the openness to experience dimension of the Big Five. This dimension of the Big Five relates to intellectual curiosity, imagination, and creativity (McCrae & Costa, 2003). The current study's findings demonstrate that openness to experience is associated with learning agility ($r = .44, p < .01$), informal learning behaviors ($r = .25, p < .01$), motivation to learn ($r = .25, p < .01$), and reflective thinking ($r = .24, p < .01$). It seems that openness to experience, as a core individual difference, is fundamental to an individual's propensity to learn from experience and exhibit adaptiveness. This relationship is not surprising, given that a fundamental component of openness to experience is curiosity (Silvia & Christensen, 2020). More curious individuals are likely more prone to experiment with new concepts and ideas, a key component of learning from experience (Marsick & Watkins, 2018).

Although learning agility might be better utilized for development interventions, the extent to which learning agility is malleable remains unclear. Learning agility's strong linkage to personality traits might suggest that learning agility, like personality, is relatively stable over time. However, this study's path analysis findings provide insight into specific behaviors that practitioners might focus on to encourage learning agile behaviors. For example, this study highlights reflective thinking as a mediator in the learning-from-experience process. Prior research has demonstrated that metacognition, which includes reflective thinking, can be developed (Zimmerman & Schunk, 2001). Developmental interventions encouraging reflective thinking skills could help individuals better learn from their experience by encouraging them to challenge their prior assumptions and mental models (Harvey & Prager, 2021). This is an area requiring further research, but the current study provides directions for future studies.

Another practical implication of this study is that it provides evidence that learning agility's utility extends beyond leadership outcomes. Learning agility was initially conceptualized as a construct relevant to leadership potential and performance (Lombardo & Eichinger, 2004). Indeed, learning from experience and adapting to perform in novel situations is a critical leadership skill. However, learning agility isn't only beneficial in leadership roles, but it is a critical skill for any professional operating in the quickly evolving workplace landscape. Lee and Song (2020) suggest that learning agility's reach be expanded beyond a construct reserved for leaders. This study's findings echo this sentiment. Given that learning agility is connected to essential learning constructs and outcomes, such as motivation to learn, reflective thinking, and informal learning behaviors, organizations and practitioners should expand their application of learning agility beyond a measure of leadership potential. Encouraging learning agility throughout the organization can help encourage adaptive and sustainable organizations.

Study Limitations

This study had several limitations that should be addressed by continued research into the learning agility construct. The use of secondary data analysis resulted in some methodological limitations. The secondary dataset consisted of several commercial measures that did not contain item-level data, preventing factor analyses and latent variable analysis procedures. The study relied on path analysis instead of more robust structural equation modeling (SEM) procedures. Although it is a robust and prevalent statistical methodology, path analysis can be impacted by measurement error in the variables (Cole & Preacher, 2014), whereas SEM procedures would have been less impacted (Kline, 2016).

The secondary data were collected via convenience sampling, which might impact the generalizability of the results (Faulkner & Faulkner, 2018). Further, survey participation was

voluntary, which could have resulted in nonresponse bias (Huck, 2012). The use of self-report instruments may have resulted in faking or socially desirable response patterns (Holden, 2007).

In addition, the sample data were collected from one organization, and the findings in this study may only hold for this specific population. Therefore, the results of this analysis require validation with diverse sample groups, and it is crucial to exercise caution when generalizing the current results to broader populations.

A primary conclusion of this study is that learning agility lacks conceptual clarity and rigorous measurement instruments. The measurement messiness of learning agility limits the validity of empirical research into the construct. Given the various measures of learning agility, it is unclear if a different measure would have yielded the same results. Further, most, if not all, learning agility measures are proprietary commercial measures, and many instrument vendors will not provide item-level data, preventing the use of specific statistical procedures.

In summary, this study had several limitations that should be addressed in future research with alternative methodologies that attempt to replicate the study results among other populations. The secondary dataset drove the use of path analysis, and the results of this type of analysis can be impacted by measurement error, potentially making the analysis less reliable. If non-proprietary measures of learning agility become available that allow for access to item-level responses, future research might entail more robust SEM procedures. Further, data collection procedures using different sampling strategies should be conducted to further validate the conclusions of this study.

Areas for Future Research

Over 10 years ago, Arun et al. (2012) claimed that “if learning agility is to be raised to the status of a scientific construct, then much work is still needed” (p. 292). Unfortunately, this

criticism still rings true. Though the current study has enhanced our understanding of learning agility, it also illuminates several research areas that are needed to raise learning agility to the status of a scientific construct.

One obvious area for further investigation is learning agility's conceptual framework. Learning agility is currently understood as a multi-dimensional construct. The original conceptualization, which serves as the basis for many current frameworks, suggested that mental agility, results agility, people agility, and change agility dimensions make up the learning agility construct (Lombardo & Eichinger, 2000). However, critics have questioned how some of these dimensions relate to learning from experience (Arun et al., 2012), and this study's finding support their critiques, especially those related to the people agility dimension. Thus, future research should revisit the dimensional structure of learning agility to better understand the construct's composition. These future studies might explore how individual dimensions support learning from experience and the process by which this occurs.

Along with understanding learning agility's framework, research should focus on measurement. This study's findings, as well as future studies on learning agility, may be limited by measurement inadequacies. Currently, there are multiple measures of learning agility, almost all of which are proprietary, and it is unclear how these proprietary measures relate to one another. Although multiple commercial measures claim to measure learning agility, many have differing subdimensions, so it is not known if these instruments measure the same construct. Convergent validity studies of the current measures would provide meaningful data on their relatedness. Unfortunately, the proprietary nature of learning agility measures creates a paywall to using these measurement tools. An area of critical research would be the development of a measure in the academic literature that researchers could use at no cost. Such an academic

measure would provide greater transparency to the measurement development process and invite critique and collaboration from the larger academic community. Additionally, academic measures of learning agility that are available for free use in research studies would serve as a catalyst for more learning agility research.

This study adds to the evidence demonstrating the strong linkage between personality traits and learning agility. A question for future research is: How does learning agility differ from personality? This question is reminiscent of the academic discourse on emotional intelligence. While emotional intelligence is prevalent in the practitioner space and has also gained traction in the research community, some scholars have questioned if this construct is just a repackaging of personality traits, given that emotional intelligence and personality overlap considerably (Antonakis et al., 2009). Similarly, some scholars have suggested that learning agility is a “case of repacking old wine in new bottles” (Wang & Beier, 2012, p. 293). Further research should examine how and if learning agility is distinct from what is already measured through personality traits.

This study examined learning agility at the individual level of analysis by investigating the construct’s connection with individual differences and behaviors. A critical area of future research is how team and organizational culture might impact individual learning agility. DeRue et al.’s (2012) model of learning agility suggests that cultural and environmental factors undergird the learning agility process, but little research has been conducted in this area. Teams with high psychological safety might create an environment where the experimentation and possible failure required to learn from experience are not punished. Conversely, a team where individuals are apprehensive about taking interpersonal risks and fearful of making mistakes might discourage individual learning agility. This same idea can be extrapolated to the

organizational level. Learning organizations, organizations focused on continuous improvement and learning (Watkins & Marsick, 1993), might provide the ideal environment for individuals to be curious, seek out new information and diverse ideas, and experiment with new concepts.

Significance of the Study

The maxim “The more you know, the more you know you don’t know,” often attributed to Aristotle, certainly rings true for the current state of knowledge around the learning agility construct. This study advances the understanding of learning agility while highlighting how much we still do not know about the construct. It has been over 10 years since the *Industrial-Organizational Psychology* journal published its special edition on learning agility. Many of the articles in that edition highlighted areas where learning agility research was lacking, particularly as it related to the theoretical underpinnings and measurement of the construct (Arun et al., 2012; Hezelett & Kuncel, 2012; Wang & Beier, 2012). This study echoes the sentiment expressed in that focal edition: Much work is still needed to better understand the learning agility construct. Despite the lack of understanding of the construct, organizations have embraced the concept, while “the academic community has shown little interest in the term, ignoring or rejecting the concept almost completely—almost cavalierly” (De Meuse & Harvey, 2022, p. 208).

This study is significant because it has responded to the call for the academic community to contribute to the learning agility conversation. Acknowledging that many questions about learning agility remain unanswered, this study also makes several significant contributions to theory and practice concerning the construct, adding to the empirical knowledge about the construct’s nomological network.

Further, this study is the first to model the relationship between learning agility, informal learning behaviors, motivation to learn, reflective thinking, and personality. Understanding how

learning agility relates to these constructs provides a richer and more nuanced understanding of learning agility. Further, it provides directions for further theoretical and empirical work to help clarify the conceptual understanding of the learning agility construct. This study models the process by which learning from experience occurs. Examining learning agility in a model that includes personality, learning motives, reflective thinking, and informal learning behaviors helps elucidate how learning agility allows individuals to learn from their experiences. This model illustrates the contextual and nuanced nature of learning from experience and speaks to the individualized experiential learning journey.

Perhaps the most actionable takeaway from this study is how it informs the use of learning agility in talent management practice. Learning agility has become increasingly integral to many organizations' talent management strategies across various industries (Church et al., 2015), which is not surprising given that recent empirical research has touted the construct as the most significant predictor of performance and potential (De Meuse, 2019). However, this study calls for a more deliberate approach to learning agility application by demonstrating empirically that a better understanding of learning agility is needed.

This study's findings and conclusions endorse the calls to better understand the theoretical basis and the measurement of learning agility. By highlighting concerns about the conceptualization and measurement of learning agility, this study serves as a caution to organizations, emphasizing the need for a discerning approach to using learning agility in their talent management strategies. This approach counters the potentially premature declaration of learning agility as the premier predictor of leadership potential and performance (De Meuse, 2017). This cautionary approach might indicate that learning agility is best suited for

developmental applications versus selection and succession planning applications, given the current lack of clarity around and precise measurement of the construct.

Despite the limited comprehension of learning agility, the construct holds significant promise. Considering the ever-growing complexity of the rapidly evolving workplace, the ability to learn from experience and adeptly maneuver novel challenges is becoming increasingly important. Perhaps the most significant implication of this study is that it serves as an essential step toward understanding what remains unknown about a construct that may very well be the best predictor of the leadership potential needed to conquer the challenges of—and create opportunities for—an increasingly uncertain future. Ironically, the study of learning agility might require a form of learning agility within the academic community—a willingness to apply what is known and alter the lack of academic emphasis on the construct so that researchers might inform practice, especially given the growing prevalence of the construct in organizational contexts.

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APPENDIX A

STUDY MEASURES

Motivation to Learn

In answering the following items, consider your attitude and approach to learning to complete work assignments.

1 - Never; 2 - Rarely; 3 - Sometimes; 4 - Often; 5 - All the Time

1. "I like learning new things."
2. "I like to get to the bottom of difficult things."
3. "I like to figure out how different ideas fit together."
4. "If I don't understand something, I look for additional information to make it clearer." (Gorges et al., 2017, p. 7)

Reflective Thinking

In answering the following items, consider how you typically go about thinking through and solving a problem.

1 - Never; 2 - Rarely; 3 - Sometimes; 4 - Often; 5 - All the Time

1. "After solving a problem, I think if I could find a better way."
2. "While solving problems, I ask questions to myself in order to find different ways of solution."
3. "When I cannot solve a problem, I ask questions to myself to understand why I cannot solve it."
4. "After I solve a problem, I compare my results with my friends' result and evaluate the solution."

5. “When I read a problem, I think of similar problems that I solved before and make connections concerning the differences between the new problem and the old ones.”
(Tuncer & Kayci, 2013, p.73)

Informal Learning

In answering the following items, consider how often you engage in the below activities in a typical work week.

1 - Never; 2 - Rarely; 3 - Sometimes; 4 - Often; 5 - All the Time

Learning from oneself

1. I reflect about how to improve my performance.
2. I experiment with new ways of performing my work.
3. I use trial and error strategies to learn and better perform.

Learning from others

4. I interact with a mentor to learn.
5. I interact with my supervisor(s) to learn.
6. I interact with my peers to learn.

Learning from non-interpersonal sources

7. I read professional or work-related materials and publications.
8. I search the Internet for job relevant information.
9. I read management or leadership materials.

Adapted from Noe et al. (2013), p. 331.