OVERCOMING THE SHADOW OF EXPERTISE:

HOW HUMILITY, LEARNING GOAL ORIENTATION, AND LEARNING IDENTITY HELP EXPERTS BECOME MORE FLEXIBLE

by

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DEDICATION

To my husband Việt Dũng

whose love and support help me be myself

To my father Vinh and my mother Thủy

who love me no matter how unconventional I may be in their eyes

To my sister Anh and my brother Khoa

who accompanied me in the hardest times of my life

To my Master

whose wisdom illuminates my path

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Overcoming the Shadow of Expertise: How Humility, Learning Goal Orientation, and Learning Identity Help Experts Become More Flexible

Abstract

by

MAI P. TRINH

Although experts are valuable assets to organizations, they suffer from the curse of knowledge and cognitive entrenchment which prevents them from being able to adapt to changing situational demands. Research using the cognitive approach to study expertise has little to offer in resolving these problems. In this study, I use Dweck's (1988) goal orientation framework to offer alternative explanations and solutions for expert performance pitfalls. I propose that experts' performance goal orientation resulting from social pressures to perform is what makes them inflexible, but this mechanism can be moderated by learning goal orientation, learning identity, and humility.

In study 1 and study 2, I developed and validated a scale measuring learning identity, the degree to which individuals see themselves as learners and enjoy the learning process. Learning identity complements learning goal orientation to capture individuals' holistic motivation to learn. Results yielded a six-item scale with good factor structure and sufficient evidence of construct validity.

In study 3, data from a small sample of healthcare professionals in Northeast Ohio suggested that performance goal orientation partially explained the mechanism of why experts may be inflexible. Humility, both as self-report and

other-report measure, was found to be the most consistent moderator of this indirect effect. Experts with low levels of humility suffered from the negative effects of performance goal orientation, leading them to be less flexible compared to their counterparts with higher levels of humility. Experts who reported high levels of humility, on the other hand, were perceived to be more flexible as their expertise increased. Meanwhile, learning goal orientation partially moderated the indirect effect of expertise on flexibility through performance goal orientation, and learning identity did not moderate this effect. These findings lead to new ways to resume conversations on how to get experts unstuck and how to develop educational curriculum around humility and lifelong learning.

Keywords: expertise, flexibility, goal orientation, humility, learning identity

CHAPTER I: INTRODUCTION

At its peak in the early 2000s, Nokia was valued at $250 billion and in 2007 it held about 49% of the global smartphone market share. By 2010 this number reduced to 34%, and in September 2013, Nokia had to sell its handset business to Microsoft for $7.2 billion, only a fraction of its worth as one of the most valuable companies on earth in the past. The rapid downfall of the tech giant was largely attributed to its inability to respond to disruptive innovations, specifically the appearance of the Apple iPhone and its operating system (OS) in 2007. While its competitor Samsung quickly adopted Google's Android OS, Nokia continued to improve its own smartphone OS—Symbian. It believed that it should be independent in terms of software, which had been proven by the company's past success. Nokia was confident that Symbian and its later descendant, an OS named MeeGo, could compete with the iPhone, but it turned out that consumers did not respond well to their buggy OS (Vuori & Huy, 2016). During the press conference announcing Nokia being sold to Microsoft, Nokia's CEO famously said while tearing up: "We didn't do anything wrong, but somehow, we lost" (Jawabra, 2015).

Nokia did not do anything wrong; it was expert in what it was doing. It only failed to catch up with change. In today's world where Heraclitus's famous saying "the only constant in life in change" has never been truer, acquiring and training experts to be able to quickly respond to the changing environments proves to be a major challenge. While knowledge experts tend to perform, make decisions, and solve problems better than novices (Dreyfus & Dreyfus, 2005; Ericsson & Charness,

1994; Kahneman & Klein, 2009; Salas, Rosen, & DiazGranados, 2010; Sonnentag & Kleine, 2000), research has shown that they are slower in adapting to change. Experts suffer from the "curse of expertise" (Camerer, Loewenstein, & Weber, 1989; Hinds, 1999), making them unable to unlearn things they already know even when the situation demands it. They are slow to respond to situational changes, such as when instructions change (Marchant, Robinson, Anderson, & Schadewald, 1991) or when their problem-solving strategies are severely affected by external conditions (Canas, Quesada, Antoli, & Fajardo, 2003).

I set out to seek explanations for experts' inflexibility and what can be done to help them overcome this problem. Despite abundant evidence about experts' lack of flexibility compared to novices, no tangible solution has been found. From a macro perspective, Hinds and Pfeffer (2003) suggested that organizations could try using people with intermediate level of knowledge instead of experts, as well as implementing organizational practices aiming to promote and reward knowledge sharing between experts and novices. While these recommendations could potentially generate organizational level impact, not using experts in organizations equals forgoing the advantages that experts bring, which may be counterproductive to the organization's success (Baumann & Bonner, 2004; Bunderson, 2003; Littlepage & Mueller, 1997). From a cognitive standpoint, prior research argues that experts' inflexibility is due to cognitive biases and rigidity resulted from their own training (Bilalić, McLeod, & Gobet, 2007; Dane, 2010). Nevertheless, there has been no empirical evidence to date testing these explanations in the organizational

context. Furthermore, while they can explain why experts are less flexible compared to novices, they do not explain why some experts may be more flexible than others.

The popular press has attributed Nokia's rapid decline to "a failure to implement technologies that have already been developed, an arrogant disregard for changing customer demands, a complacent attitude towards new competitors" (Birkinshaw, 2013). But it was more than that. Vuori and Huy's recent qualitative study of Nokia (2016) revealed that Nokia's top executives had placed unrealistic pressures to perform on middle managers while not willing to listen to the truth, which created widespread fear throughout the organization. Consequently, middle managers withdrew negative information from top managers, leading the latter to be overconfident about Nokia's technological capabilities and to neglect long-term R&D investments, ultimately resulting in the downfall of the tech giant. Ironically, what happened was the exact opposite of what their CEO at the time said to be important: "Managers must humbly accept that their own perspectives need to be broadened by others… People who have been humbled by being down and out can have more courage when things get tough… [Humility] gives you the strength to resist the safe conformity of bench-marking and instead try to think differently. It allows you… to say that things have changed, and we need to change, too" (Kallasvuo, 2007, p. 16). Had this belief been practiced at Nokia, its story may have become very different.

In this dissertation, I explain why some experts may be more or less flexible than others using Dweck's (1986) goal orientation framework. I argue that today's

knowledge experts are under a great deal of pressure to maintain their superior performance, credibility, and reputation, which makes them prone to adopt a performance goal orientation (PGO) (Dweck, 1986; Dweck & Leggett, 1988). This PGO in turn makes them risk-averse, afraid to make mistakes, and likely to miss out on opportunities to learn or try different approaches, hence inflexible (Elliott & Dweck, 1988). I empirically test three moderators that would help loosen up experts' performance mindset and help them become more flexible: (1) learning goal orientation (LGO), which is the disposition to focus on learning and improving one's skills (Dweck, 1986), (2) learning identity, which characterizes people who see themselves as learners and enjoy the learning process, and (3) humility, which manifests in an accurate view of oneself and one's limitations (Bauer & Wayment, 2008). Long viewed as a linchpin of wisdom in Eastern philosophical traditions, humility has received increasing attention from researchers as a cornerstone of organizational learning (Vera & Rodriguez-Lopez, 2004). Humility facilitates learning and development by helping people be open to new paradigms, acknowledge their own limitations and mistakes, accept failures as-is, be able to ask for advice, develop others, and perform better (Vera & Rodriguez-Lopez, 2004). Altogether, I propose that experts with a strong LGO, a strong learning identity, and/or a high level of humility will overcome pressures to perform and tend to be more flexible than their counterparts without these virtues.

This dissertation is structured as followed: In chapter II, I review the literature about expertise and inflexibility, develop my conceptual arguments using

the goal orientation framework, and offer hypotheses that will then be tested empirically. In chapter III, I specify in more details the concept of learning identity, then develop and validate a learning identity scale in two studies. In chapter IV, I present an empirical study conducted to test the hypotheses stated in chapter II. Discussion and implications for practice and future research follow in chapter V.

CHAPTER II: LITERATURE REVIEW

Pitfalls in Expert Performance

Expert: "A person that has made every possible mistake within his or her field."

~ Niels Bohr (1885-1962), Danish scientist and Nobel laureate

To better understand expert performance, it is helpful to first consider the concept of expertise and how it has been defined in the extant literature. In this section, I first review the use of expertise in psychological and organizational sciences, then present evidence of pitfalls in expert performance, namely the lack of flexibility in changing situations.

Conceptualizing Expertise

In the history of expertise research, scholars have taken two main approaches to studying expertise. The first, called the relative approach (Chi, 2006), compares the performance of experts and novices in terms of basic cognitive processes such as memory and categorization. This approach flourished after the classic study of de Groot (1946) in which expert chess players were found to perform well above beginners in terms of the ability to reconstruct midgame boards that they had seen for only 5 seconds. In this approach, expertise is defined relatively to novice in a continuum, with the assumption that it is something that can be acquired. The goal of studying relative expertise is to gain understanding as to which cognitive skills are present in experts and not novices in order to train less experienced people to acquire those skills (Chi, 2006). Another group of researchers, most notably Ericsson and associates, takes a different approach called the expert performance approach

(Ericsson & Ward, 2007) or the absolute approach (Chi, 2006). Instead of studying basic cognitive processes, they concentrated on the behavioral aspect of expertise and tried to understand the mechanisms underlying consistent superior performance in order to draw implications for training and interventions. Expertise is defined as a high level of domain-specific knowledge and skills acquired through experience and practice (Chi, Glaser, & Rees, 1982; Dreyfus & Dreyfus, 1986; Ericsson & Charness, 1994; Feltovich, Prietula, & Ericsson, 2006). The study of expert performance in this approach is captured by three stages: (1) identify the environment in which experts excel and develop tasks representative of this environment, (2) assess the underlying mechanisms that account for excellent performance in these representative tasks, and (3) examine how these mechanisms affect and are affected by experience, learning, and practice, in order to develop implications for effective coaching (Williams & Ericsson, 2008). Studies using this approach have revealed that the acquisition of expertise is gradual and takes at least 10 years of intense preparation and deliberate practice (Ericsson, 2004; Ericsson & Charness, 1994; Ericsson, Krampe, & Tesch-Romer, 1993; Ericsson & Ward, 2007).

These two approaches differ not only in the way expertise is defined but also in the domains of expertise they study. The first approach often studies knowledge experts in the lab, such as chess players, medical doctors, financial analysts, or tax accountants—those whose performance largely depend on their general mental ability and cognitive skills. Meanwhile, the second approach focuses more on experts in sports, music, and performing arts, in which physical and/or aesthetic

ability is also required as proof of expertise. Criteria of extraordinary performance are also more clearly defined with this second population, as winning or losing is often the direct evidence of performance. While both approaches provide valuable insights into the superior skills of experts, the former is more applicable in organizations where performance is evaluated in terms of intellectual and not physical or artistic outcomes. Because knowledge experts' problem-solving and decision-making are the foci of this study, I adopt Asare and Wright's definition of expertise as "knowledge in a particular domain, including the ability to identify and evaluate relevant evidence, recognize patterns, consider transaction and opportunity costs, and properly represent a decision problem" (1995, p. 172).

Experts' Lack of Flexibility

Experts' inflexibility within their domain of expertise is well documented as a limitation preventing their effectiveness and consistent superior performance (Dane, 2010). Flexibility is loosely defined as one's ability to adapt to changes, adjust to new circumstances, and update one's own knowledge and skills to meet situational demands. During and after the process of acquiring expertise, many experts develop habitual responses (Wood & Neal, 2007) and have difficulty changing their behaviors (Betsch, Haberstroh, Glöckner, Haar, & Fiedler, 2001) even when such responses become incompatible with the new situation (Bagozzi & Dholakia, 2005). Camerer and colleagues (1989) coined the term "the curse of knowledge" to describe how experts were inclined to keep gathering irrelevant information despite their best interest to ignore this irrelevant information. Experts

were unable to forget what they already knew, and falsely recalled more information than provided in a lab experiment (Castel, McCabe, Roediger, & Heitman, 2007). Similarly, Marchant and colleagues (1991) reported in a series of 3 experiments studying introductory tax students and experienced tax practitioners that when new rules were introduced, they interfered with experts' reasoning and reduced experts' performance, while students were able to learn quickly and their performance improved.

From the relative approach's point of view, two cognitive explanations have emerged to explain why experts tend to be less flexible than novices. In a series of lab experiments having people solve chess puzzles, Bilalic and colleagues demonstrated that expert chess players were prone to the Einstellung effect, which occurs when the appearance of the first solution coming to mind prevents a better solution from being found (Bilalić, McLeod, & Gobet, 2008). The authors observed that even though the expert players reported that they were looking for a better solution after finding the first one, their eye movements showed that they continued looking at features of the problem related to the solutions they had already thought of. The presence of the first, non-ideal solution reduced experts' problem solving ability by three standard deviations of skill levels (Bilalić et al., 2007). This behavior is similar to the confirmation bias in psychology (Jonas, Schulz-Hardt, Frey, & Thelen, 2001; Nickerson, 1998; Tversky & Kahneman, 1974): once experts hold a certain opinion about something, they will tap into their vast expert knowledge to find evidence to defend their opinion (Mercier, 2011).

The second explanation came from Dane's (2010) cognitive entrenchment framework about the trade-off between expertise and flexibility. He looked at the cognitive structure of expert knowledge and suggested that as novices learned to become experts, their cognitive schemas became larger, more complex, more interrelated, more detailed, and more accurate. Reinforced over time by the continual repeated practice and application, these schemas also tended to be more stable, thus leading to experts being "cognitively entrenched" or unable to move beyond their specific domain schemas. As someone becomes an expert, (s)he is already fixated on the "best" way to problem-solve and is not likely to change his/her way of doing things. Dane also proposed that there were two possible solutions to help experts become more flexible: being engaged in a dynamic environment within their domain, or focusing more on outside-of-domain tasks (Dane, 2010). Unfortunately, no study to date has empirically tested these two propositions, nor quantified cognitive entrenchment in organizations.

While both Dane's and Bilalic's explanations suggest reasons why experts are less flexible than novices, they do not explain why some experts may be more or less flexible than others. The cognitive mechanisms revealed in their theoretical frameworks would suggest that experts at the same level in the same domain would be cognitively biased or entrenched in the same manner, which is not what we observe in reality (Dreyfus & Dreyfus, 2005). Furthermore, Bilalic observed that the greater the level of expertise, the less chess experts were susceptible to the Einstellung effect (2007), but it was unclear why that happened. Since the relative

approach offers little to answer my research question, I look further into research using the absolute approach for an alternative explanation.

Using the absolute approach, Ericsson (2004) argued that experts' inflexibility was the result of a lack of continuous deliberate practice. Deliberate practice distinguishes professionals who reach a stable performance plateau within a short period of time and expert performers who keep improving their performance for years. He explained this distinction in terms of automaticity:

> As individuals adapt to a domain and their performance skills become automated, they are able to execute these skills smoothly and without apparent effort. As a consequence of automation, performers lose conscious control over execution of those skills, making intentional modifications difficult. Once the automated phase of learning has been attained, performance reaches a stable plateau with no further improvements, which is consistent with [Sir Francis] Galton's assumption of a performance limit… The key challenge for aspiring expert performers is to avoid the arrested development associated with automaticity and to acquire cognitive skills to support their continued learning and improvement. The expert performer counteracts the tendencies toward automaticity by actively acquiring and refining cognitive mechanisms to support continued learning and improvement. (Ericsson, 2004, p. S70/S73)

In other words, in order to continue learning, adapting, and improving their performance, experts need to constantly challenge themselves to change, acquire performance feedback, and refine their skills. All of these prove difficult to sustain over time. Research has shown that reduced regular practice is the primary reason expert performance declines (Ericsson, 2004; Krampe & Charness, 2006), while the lack of feedback or willingness to seek feedback inflates experts' confidence and reduces their judgment accuracy (Fischer & Budescu, 2005; McKenzie, Liersch, &

Yaniv, 2008; Oskamp, 1965; Sniezek & Van Swol, 2001). The limitations of this explanation are that it was drawn mostly from experts in competitive fields such as sports and music, and that empirical evidences of the causes (for example, how much an expert changes from performance feedback) have been surprisingly scarce (Williams & Ericsson, 2008). This explanation also focuses mainly on the behavioral aspect of expertise, which is difficult to observe and measure in organizational settings.

In my quest to explain why some experts in organizations are more flexible than others and find solutions to help experts become more flexible, I move beyond the cognitive and behavioral realms to explore motivational factors affecting experts' performance and their ability to adapt. Though not directly explaining why, a great deal of research has suggested that experts' inflexibility is not a result of their inability to adapt, but rather a lack of willingness to absorb new information and change. When helping or teaching novices, experts fail to adjust their explanations to the novices' level of understanding (Hinds, Patterson, & Pfeffer, 2001), leading to novices having to ask for additional information not addressed in experts' explanations (Wittwer, Nückles, & Renkl, 2008). When working with other experts, they do not listen to advice (Tost, Gino, & Larrick, 2012; Yaniv & Kleinberger, 2000), ostracize others with different expertise (Jones & Kelly, 2013), and perform worse if too many experts are together in a group (Ashton, 1986; Groysberg, Polzer, & Elfenbein, 2010). When communicating with managers on key issues, they may ignore managerial commands (Kellogg, 2009), refuse to be supervised (Alvesson,

2004), and cannot explain their expert insights in lay terms for managers to understand (Eppler, 2007). In the next section, I use a goal orientation framework to explain why organizational experts may often be motivated to be inflexible.

A Goal Orientation Framework of Expert Inflexibility

Shanteau asserted that "to be accepted as an expert, it [was] necessary to act like one" (1992, p. 257). Experts' qualifications, superior performance, broad base of knowledge and rich experience earn them special status in organizations (Huising, 2014). People are more likely to listen to not only those who are experienced and knowledgeable (Soll & Larrick, 2009; Yaniv, 2004; Yaniv & Kleinberger, 2000), but also those who express confidence in their advice to others (Sniezek & Van Swol, 2001; Soll & Larrick, 2009; Van Swol & Sniezek, 2005). This social perception creates pressure for experts to present themselves as confident in their judgments and decisions (Bonner & Bolinger, 2013; Littlepage & Mueller, 1997) and to be consistent in what they say and do, because inconsistency is often perceived as incompetent or irrational (Dessalles, 2007; Kurzban & Aktipis, 2007; Mercier, 2011). In fact, it is much more difficult for an expert to gain reputation than to lose it (Sniezek & Van Swol, 2001; Tinsley, O'Connor, & Sullivan, 2002; Yaniv & Kleinberger, 2000). All of these social pressures force experts to create a professional image of themselves—one that is all-knowing, confident, never making any mistake or changes (Sperber et al., 2010; Yanow, 2009). As a consequence of trying to protect their credibility, many experts fall victim to defensive mechanisms (Argyris, 1985, 1994) and become reluctant to seek feedback or knowledge from others. Leonard and Sensiper (1998) described

cases in which nurses were hesitant to suggest patient treatments to physicians who were of higher status, even though nurses may have good ideas based on their intensive experience and direct care of the patients. Edmondson and colleagues (2000) reported similar situations in operating rooms, where nurses and other low-status members of the operating team hesitated to share their expertise with surgeons because surgeons responded negatively to advice from them.

These mechanisms leading to experts' inflexibility could be explained using Dweck's goal orientation framework (Dweck, 1986, 1999; Dweck & Leggett, 1988). A PGO propels individuals to demonstrate their competence via task performance, while LGO makes them focus on continuous learning and development. Depending on which orientation is stronger, people respond differently to learning opportunities. Learning goal oriented people tend to see advice and feedback as useful in helping them improve performance and task mastery; while performance goal oriented people view feedback as an often derogatory evaluation of their competency (VandeWalle, 2003). Individuals with a strong LGO seek challenges that foster learning and persist in order to learn and improve their competence, while performance goal oriented individuals try to avoid failure and any display of incompetence (Dweck & Leggett, 1988). Later empirical studies in organizations have revealed that PGO and LGO are not two ends of a spectrum but instead two independent constructs (Button, Mathieu, & Zajac, 1996; Ford, Smith, Weissbein, Gully, & Salas, 1998). In other words, individuals may have both a high PGO, striving to prove their competence to others, seeking favorable judgments and avoiding

negative judgments, and at the same time have a high LGO, aspiring to develop competence by acquiring and mastering new skills.

Elliott and Dweck (1988) reported about individuals who had a strong PGO and believed that their current skills were high. They focused more on finding solutions and passed up opportunities to improve their skills on a task where it was easy to make mistakes. This finding bears striking resemblances to the case of experts in organizations who are under constant pressure to build and maintain their credibility and reputation and gives insight into why experts are often more inflexible than novices. Knowing this mechanism will also help us understand why some experts may be more flexible than others. I propose that due to this immense pressure to perform, experts are prone to adopt a PGO and this focus on performance in turn prevents them from being able to learn and change.

Hypothesis 1: Performance goal orientation mediates the relationship between expertise and flexibility.

While PGO consistently puts pressure on experts to perform, LGO can mitigate this process. Since previous research has shown that motivation to learn leads to actual learning (Colquitt & Simmering, 1998), people who seek to improve their skills would be more motivated to try different approaches to learning and doing things, hence being able to apply new learnings and adapt quickly should situations demand so. Thompson (1999) discovered that professionals who were more self-directed in their learning behaviors had higher adaptive flexibility than those who were not. Moreover, learning goal oriented experts will be more likely to

see others' advice and feedback as opportunities for growth and development instead of as threats to their status and reputation. VandeWalle and Cummings (1997) reported that people with LGO perceived feedback from others as more valuable and less costly, thus they engaged in more feedback seeking behaviors. A recent meta-analysis by Anseel and colleagues' (2015) reveals a positive relationship between LGO and feedback seeking behaviors, suggesting that people who want to learn and develop themselves give greater weight to the value of feedback over the self-representation cost associated with feedback (e.g., negative image, being seen as inferior). Consistent with these findings, I argue that although all experts receive similar pressures to perform, the effects of PGO on flexibility would be weaker among those with high LGO. In other words, experts with a strong LGO would value their own learning and development more than their image of being the one who knows all and would be able to balance learning and performance. Hence they would be likely to be more flexible compared to those with a weaker LGO.

> *Hypothesis 2: The indirect effect of expertise on flexibility will be conditional on LGO such that this effect will be more negative among those with lower LGO than among those with higher LGO.*

While LGO highly correlates with learning behaviors and acts as a proxy for the ability to learn from experience, it is mainly based on cognitive and behavioral motivations, such that an individual believes that learning is important and therefore tries to learn (see the scale items in Appendix IV). The LGO construct does not capture affective motivation, as explained in a more detailed argument in

chapter III. To augment this, I develop a learning identity construct as a complement to LGO. Learning identity characterizes people who see themselves as learners and believe in their ability to learn (Kolb & Kolb, 2009a). Learning identity helps experts overcome learning anxiety, as described by Edgar Schein: "Learning anxiety comes from being afraid to try something new for fear that it will be too difficult, that we will look stupid in the attempt, or that we will have to part from old habits that have worked for us in the past. Learning something new can cast us as the deviant in the groups we belong to. It can threaten our self-esteem and, in extreme cases, even our identity" (2002, p. 104). I propose that experts with stronger learning identities would be more flexible by investing in their own learning and development while withstanding pressures to perform, compared to experts who have weaker learning identities. Having a strong learning identity makes experts more likely to keep looking for new ideas and continue to refine and develop their skills. In so doing, they will be able to update their cognitive schemas, consequently being able to take counter measures for automaticity to prevent being cognitively entrenched. Accordingly, I expect that experts with a stronger learning identity would suffer less inflexibility resulted from their PGO than those with a weaker learning identity.

> *Hypothesis 3. The indirect effect of expertise on flexibility will be conditional on learning identity such that this effect will be more negative among those with weaker learning identity than among those with stronger learning identity.*

Humility as a Virtue to Improve Expert Flexibility

"Let us be a little humble; let us think that the truth may not be entirely with us."

~ Jawaharlal Nehru (1889-1964), former prime minister of India

A major issue with experts' inflexibility that is not directly explained by the goal orientation framework is their rigidity in opinion and overconfidence. Research has shown that subjective experience of power could inflate one's perception of personal control (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009) and increase one's confidence in their own judgments and opinions (Brinol, Petty, Valle, Rucker, & Becerra, 2007; See, Morrison, Rothman, & Soll, 2011). Experts engage in egocentric advice discounting, overweighting their own opinions and underweighting others' (Krueger, 2003; Yaniv, 2004; Yaniv & Kleinberger, 2000). Even when comparing their judgment with chance events judged to be equally likely, experts still favor their own expert knowledge over the uncertainty (Heath & Tversky, 1991). Consequently, it leads them to resist being dependent on others (Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008) and to refuse to listen to others' input (Tost et al., 2012), therefore reducing their judgment accuracy (See et al., 2011). These recent findings are consistent with previous research about how (high) power and status are among the most detrimental factors preventing new learning in groups and organizations (Brooks, 1994; Edmondson, 2002).

Experts' sense of overconfidence is not likely to be resolved by having a strong LGO or learning identity, but instead by developing a sense of humility. Researchers generally agree that humility is a multi-dimensional, adaptive strength (Tangney, 2000; Templeton, 1997) that reflects a grounded view of self and others, an

awareness that something is greater than the self, a sense of appreciation towards others, and openness to feedback (Ou et al., 2014; Owens, Johnson, & Mitchell, 2013; Owens, Rowatt, & Wilkins, 2011). Vera & Rodrigue-Lopez (2004) posit that unlike arrogant, narcissistic, egotistical, prideful, and selfish leaders, humble leaders benefit the firm because they possess such qualities as being open to new paradigms, being eager to learn from others, acknowledging their own limitations and mistakes and attempting to correct them, accepting failure with pragmatism, asking for advice, respecting others, and sharing honors and recognition with collaborators.

Even though there has been no empirical study linking expertise and humility, some evidence exists about how one's humility brings about positive organizational outcomes through improving one's relationship with others. Personal humility coupled with a strong sense of professional resilience are what make leaders not just good, but great (Collins, 2001). Owens and Hekman (2012) revealed that humble leaders created positive relationships with their followers by being compassionate about followers' developmental journey and validating followers' feelings of uncertainty. By being humble, leaders facilitate team learning and increase employee engagement and job satisfaction (Owens et al., 2013). Humble CEOs also make followers feel empowered, which in turn increase their work engagement, affective commitment, and job performance (Ou et al., 2014). Because humility "requires a severe appraisal of oneself combined with a reasonably generous appraisal of others" (Newman, 1982, p. 283), it will reduce experts' tendency to engage in egocentric discounting of advice. Going back to the example

of the surgeon in an operating room, a humble surgeon would encourage members of his team to offer their insights and feedback as they see fit. A humble expert will have a high-level of self-awareness and know what (s)he is capable of as well as knowing what is her/his limit. For experts, having humility means acknowledging that they do not have all the answers, that some other possibilities exist, and that someone else might have the better idea. Recognizing their shortcomings provides a call to broaden their perspectives (Ackerly, 2013), and to have a mental attitude and willingness to ask not only "How do I know?" but also "How would I know if I were wrong?" (Yanow, 2009). This pursuit of the "truth," or their own continuing learning and development, would become more important to experts than their reputation. Therefore, having humility will reduce experts' perceived social pressure to perform and give them more liberty to try something new and change for the better (Vera & Rodriguez-Lopez, 2004). Therefore, having humility will reduce experts' perceived social pressure to stay consistent and give them more liberty to try something new and change for the better (Vera & Rodriguez-Lopez, 2004). Thus, I expect that experts with higher levels of humility will be able to better withstand pressure to perform and therefore be more flexible than those with lower humility.

> *Hypothesis 4: The indirect effect of expertise on flexibility will be conditional on humility such that this effect will be more negative among those with lower humility than among those with higher humility.*

The conceptual model capturing all four hypotheses is presented in Figure 1.

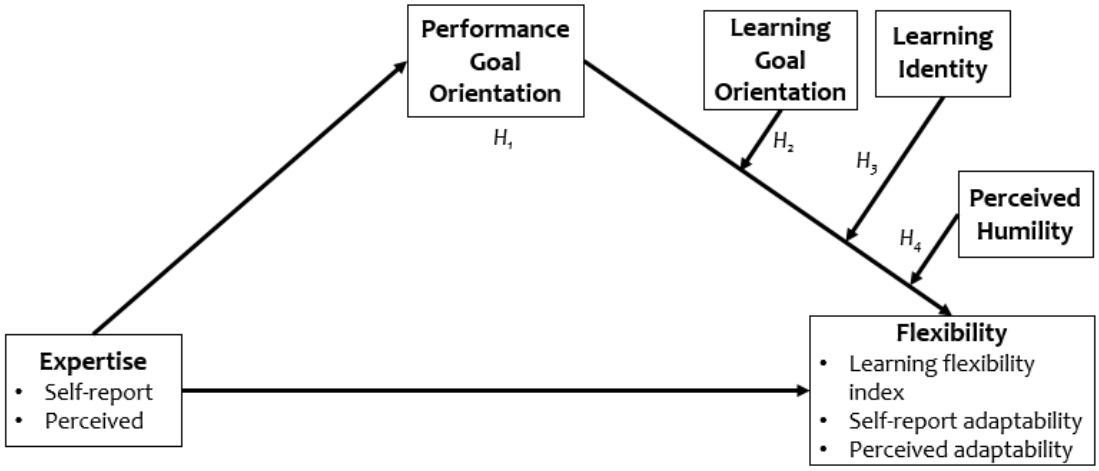

Figure 1. Conceptual model.

CHAPTER III: DEVELOPING AND VALIDATING THE LEARNING IDENTITY SCALE

"Live as if you were to die tomorrow. Learn as if you were to live forever."

~ Mahatma Gandhi

Introduction and Literature Review

In contemporary organizations where changes occur so frequently, the ability to learn from past experience and adapt to new situations is the key to why some people succeed while others do not (DeRue, Ashford, & Myers, 2012; Garvin, Edmondson, & Gino, 2008). Past studies showed that the ability to learn from key job assignments distinguished successful executives from derailed ones (McCall, Lombardo, & Morrison, 1988) and determines expatriates' success of overseas assignments (Porter & Tansky, 1999; Spreitzer, McCall, & Mahoney, 1997). Similarly, the ability to learn from experience at the workplace separates those with high potential and will continue to improve from those whose performance will plateau over time (Lombardo & Eichinger, 2000). What determines one's ability to learn from work and life experience? How do people develop or cultivate this ability? The research studies described in this chapter aim to answer these questions.

This chapter seeks to develop a conceptual framework of learning identity, defined as an individual's disposition to learn from life experience and identify him- or herself as a learner. I will review related constructs in the existing literature and distinguish learning identity from each of those constructs. Furthermore, in two separate studies, I develop and validate a measure of learning identity, which can be

used for subsequent theory building and empirical testing of propositions. I propose that learning identity is a holistic construct that integrates values, beliefs, and emotions, explaining variance above and beyond similar existing constructs.

Previous research on the ability to learn from experience has suggested that it appears to be a meta-concept comprising many individual attributes and competencies, such as cognitive intelligence (Hunter & Schmidt, 1996), Big Five personality traits (LePine, Colquitt, & Erez, 2000), proactive personality, motivation to learn and seek developmental opportunities (Colquitt & Simmering, 1998; Major, Turner, & Fletcher, 2006; Spreitzer, McCall, & Mahoney, 1997), and resilience in unexpected and uncertain situations (Weick & Sutcliffe, 2011), to name a few. Because it is too complex to be measured as a whole, researchers have used proxies to assess the ability to learn from experience. The three most widely used proxies are learning agility, motivation to learn, and LGO, all of which focus on motivational aspects of learning.

Learning agility refers to "the willingness and ability to learn from experience, and subsequently apply that learning to perform successfully under new or first-time conditions" (de Meuse, Dai, & Hallenbeck, 2010, p. 120). It demonstrates the extent to which someone can learn from experience, engage feedback, develop new skills, grow professionally and change over time. Despite gaining much attention from practitioners, learning agility has been criticized for its ambiguous conceptualization and lack of rigor and parsimony in measurement. Conceptually, there is no clear evidence that learning agility is a unique concept (DeRue et al.,

2012; Wang & Beier, 2012). DeRue and colleagues (2012) argue that the definitions of learning agility confound (1) the willingness to learn with the ability to learn, and (2) the nature of learning agility and successful performance. Consequently, learning agility has become an equivocal label for anything related to experiential learning or individuals' ability to learn from experience. Operationally, the instrument measuring learning agility—the CHOICES® Architect—contains about 40% double-barreled questions (e.g. "Knows that change is unsettling; can take a lot of heat, even when it gets personal."), does not measure learning agility in the way it was originally conceptualized by Lombardo and Eichinger (2000), and is not parsimonious (DeRue et al., 2012). Additionally, little empirical results have been established about the relationship between learning agility and its potential antecedents and consequences. Learning agility has been found to be unrelated to age, gender, ethnicity, intelligence, goal orientation, and personality (de Meuse, Dai, Hallenbeck, & Tang, 2008; Eichinger & Lombardo, 2004), unrelated to whether one is promoted and only has a small to moderate positive correlation with performance after promotion rated by supervisor (DeRue et al., 2012; Eichinger & Lombardo, 2004).

Unlike learning agility, motivation to learn as a motivational proxy for ability to learn has been well grounded in the training literature. Motivation to learn refers to the desire of the trainee to learn the content of a training program (Noe, 1986), and training motivation is defined as "the direction, intensity, and persistence of learning-directed behavior in training contexts" (Colquitt, LePine, & Noe, 2000, p.

678). Empirical studies have shown that motivation to learn indeed leads to actual learning, measured as both cognitive and skill-based outcomes (Colquitt & Simmering, 1998; Martocchio & Webster, 1992; Mathieu, Tannenbaum, & Salas, 1992; Noe & Schmitt, 1986). Several reviews have concluded that motivation to learn is a significant predictor of training outcomes (Colquitt et al., 2000; Noe, 1986; Tannenbaum & Yukl, 1992). In Noe's (1986) seminal framework of motivational influences on training effectiveness, motivation to learn was theorized to mediate the effects of personal attributes such as locus of control and self-efficacy on learning, which was confirmed in later empirical and meta-analytic studies (Colquitt et al., 2000; Noe & Schmitt, 1986). When measuring motivation to learn, researchers have frequently used the following three items adapted from the work of Noe and Schmitt (1986): "In general, I exert considerable effort to learning the material in my courses," "In general, I try to learn as much as I can from my courses," and "In general, I am motivated to learn the skills emphasized in my courses" (Colquitt & Simmering, 1998; LePine, LePine, & Jackson, 2004). It is evident from these items that the measure of motivation to learn appears to capture mostly cognitive determination and effort while neglecting emotional aspects of individuals' desire to learn.

In contrast to cognitive measures of learning ability, LGO refers to the tendency, when facing a task, for people to focus on learning and improving their abilities, as opposed to a PGO which gravitates people towards proving their competence via task performance (Dweck & Leggett, 1988). LGO originates from the

work of psychologist Carol Dweck and her colleagues (Dweck, 1986, 1999), which proposes that fundamental assumptions about personal growth divide people into two groups. Those who hold an entity theory believe that human attributes such as intelligence and personality are fixed entities and not subject to personal development. Consequently, they do not believe that hard work will pay off, and tend to seek recognition by performing well in tasks even if it means choosing only tasks they know they can do well in and avoid challenges (i.e., having a PGO). The other group, those who hold an incremental theory, believe that such attributes could be incrementally developed through personal efforts. These people tend to focus on developing their skills on the job and seek developmental feedback (i.e., having a LGO). Later empirical studies in organizations have revealed that PGO and LGO are not two ends of a spectrum but instead two independent constructs (Button et al., 1996; Ford et al., 1998). LGO has been found to be positive predictor of college GPA (Button et al., 1996), feedback seeking behavior (Anseel et al., 2015; VandeWalle & Cummings, 1997), knowledge and performance (Bell & Kozlowski, 2002). However, LGO measures focus on rational justification of motivation (e.g., "The opportunity to do challenging work is important to me," see Appendix IV) and do not reflect affective components of the motivation to learn.

In developing the concept of and measurement scale for learning identity, I argue that emotional experiences are indispensable elements in the learning process and need to be included in any form of measurement. Learning identity invokes the affective components of learning that are crucial for intentional learning and deep

comprehension (Brown, 1988; Hatano & Inagaki, 1987), but largely missing in existing related constructs. It emphasizes the joy of learning that over time is said to develop into a sense of identity in the lifelong learner (Kolb & Kolb, 2009a).

Conceptualizing Learning Identity

Learning identity characterizes people who "see themselves as learners, seek and engage life experiences with a learning attitude, and believe in their ability to learn" (Kolb & Kolb, 2009a, p. 5). It roots in the assumption that people will only learn if they want to learn, and if they believe that they can grow from their education and experience (Kolb & Kolb, 2009b). This assumption is consistent with the causal view of learning which emphasizes that learning is a process in which learners consciously and intentionally take charge of their own progress, instead of a thing that happens to them (Dewey, 1916; Kolb, 2015; Piaget, 1952). Formally, I define learning identity as an individual's disposition to learn from life experience that entwines his or her love of learning, valuing of learning and development, and core belief in him- or herself as a learner.

Because learning identity refers to unique personal attributes that may distinguish one person from another and has little to do with an individual's perception of self as member of a group (Alvesson, Lee Ashcraft, & Thomas, 2008), it is a form of personal instead of social identity. Accordingly, the identification of self as a learner is self-defined and based on subjective meanings and experience (Cerulo, 1997; Hogg, 2012). Like other types of personal identity, it is produced through value commitments (Hitlin, 2003), and entwines feelings, values, behaviors

that point individuals in particular directions (Alvesson et al., 2008). Individuals with strong learning identity are committed to lifelong learning and continuing personal development, value learning from experience, feel the joy of learning, and often seek learning opportunities.

Consistent with the notion of personal identity as "a sense of self built up over time as the person embarks on and pursues projects or goal" (Hewitt, 1997, p. 93), learning identity is acquired and developed through life experiences. Learning identity develops over time in accordance with the Experiential Learning Theory (ELT) of growth and development (Kolb, 2015). As an integrative theory which conceives learning as a dynamic and holistic process, Kolb's ELT divides the human developmental process into three stages of maturation: acquisition, specialization, and integration. Stage 1 "Acquisition"—usually extends from birth to adolescence—is when children acquire the basic learning and cognitive abilities. Stage 2 "Specialization" marks the impact of formal education and career training when people become specialized in one (or a few) particular aspects as they choose their own career paths in life. It is in this stage that people achieve a sense of individuality through their specialization, often in the form of a professional label (e.g., "I am a doctor") together with it, social security and accomplishment. Fewer people arrive at Stage 3 "Integration," because it requires a personal, existential confrontation of the conflict between social demands and personal fulfillment needs created as a by-product in Stage 2. The transformation from Stage 2 to Stage 3 carries a sense of spiritual awakening, which is parallel to other stages in other theories about adult

development, such as Maslow's (1971) unitive stage, Loevinger's (1976) transcendent stage, Cook-Greuter's (1990) integrated stage, and Wilber's (1999) ego-transcendent stage. Accordingly, an individual's learning identity is theorized to develop over time through 3 stages, in which learners gradually adopt a learning stance toward life experience (acquisition), a learning self that is specific to certain contexts (specialization), and a learning self-identity that permeates deeply into all aspects of the way one lives their life (integration) (Kolb & Kolb, 2009a).[1] This development of learning identity is also aligned with dynamic characteristics of identity as "a temporary, context sensitive and evolving set of constructions, rather than a fixed and abiding essence" (Alvesson et al., 2008, p. 6).

Despite their conceptual similarity, learning identity is distinct from LGO. An important distinction between these two constructs is their stability over time. Like other types of identity, learning identity remains relatively stable across different situations and only changes in significant life experiences (Cramer, 2004; Erikson, 1968; Marcia, 1966). LGO, however, is an adaptive response (Vandewalle, 1997) and varies across situations. Button and colleagues theorized that "dispositional goal orientations [would] predispose individuals to adopt particular

[1] Kolb and Kolb's (2009a) paper suggested a 4-stage development of learning identity, in which the second stage is "a more confident learning orientation," before leading to the third stage, "a learning self that is specific to certain contexts." I argue that a more confident learning orientation represents progress in the first stage: as a learner starts to see that (s)he can indeed learn and grow from experience, (s)he gradually becomes more assured of this learning attitude. However, this confidence is still broad and general—a typical marker of the first developmental stage. It is only when (s)he starts gravitating toward one field of specialization that the learner's development moves on to the second stage.

response patterns across situations, but situational characteristics [might] cause them to adopt a different or less acute response pattern for a particular situation" (1996, p. 28). These authors then confirmed that dispositional and situational LGO were distinguishable constructs. In a complex task experiment, Seijts et al. found that inducing a situational learning goal indeed overrode the effects of dispositional goal orientations (2004).

While both learning identity and LGO create mental frameworks which guide people in interpreting and responding to situations, the former evokes an enduring self-belief rooting in a combination of an individual's values, emotions, and self-identification. Meanwhile, the latter was conceptualized as a reactive response to external situations, such as task difficulty, failure, feedback, and effort (Dweck & Leggett, 1988; Elliott & Dweck, 1988; VandeWalle & Cummings, 1997). Put another way, learning identity is essentially a type of intrinsic motivation (e.g., "I like to learn therefore I learn"), while LGO is extrinsic motivation in the sense that an individual learns in order to achieve a specific purpose (e.g., "I want to achieve this goal therefore I learn"). Accordingly, scale items measuring LGO include rational cognitive and behavioral elements, while the affective component is missing, as shown in Table 1. The intrinsic, affective emphasis of learning identity therefore complements LGO measures to capture individuals' holistic motivation to learn.

Table 1. *Learning Goal Orientation Scale Items*

LGO scale developed and validated by Button et al. (1996)

1. The opportunity to do challenging work is important to me.
2. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
3. I prefer to work on tasks that force me to learn new things.
4. The opportunity to learn new things is important to me.
5. I do my best when I'm working on a fairly difficult task.
6. I try hard to improve on my past performance.
7. The opportunity to extend the range of my abilities is important to me.
8. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.

LGO scale developed and validated by Vandewalle (1997)

1. I often read materials related to my work to improve my ability.
2. I am willing to select a challenging work assignment that I can learn a lot from.
3. I often look for opportunities to develop new skills and knowledge.
4. I enjoy challenging and difficult tasks at work where I'll learn new skills.
5. For me, development of my work ability is important enough to take risks.
6. I prefer to work in situations that require a high level of ability and talent.

Developing and Validating the Learning Identity Scale

In three studies, I developed and validated the Learning Identity scale. I first conducted an exploratory study to generate initial items and examine underlying latent dimensions of this construct. Study 2 followed to confirm the latent structure of the scale and establish initial evidence of convergent, discriminant, and concurrent validity. In Study 3 (chapter IV), I further tested the role of learning identity within a nomological network in an organizational setting. Before moving on, it is important to note that learning identity is conceptualized as a reflective measure, meaning that each of the scale items is "an imperfect reflection of the underlying latent construct" (MacKenzie, Podsakoff, & Podsakoff, 2011, p. 295; Nunnally & Bernstein, 1994). In other words, learning identity is the latent factor

that drives all observable feelings, thoughts, and behaviors captured in each of the scale items.

Study 1: Developing the Learning Identity Scale

Methods

Item Generation

I developed initial items measuring learning identity both deductively and inductively. First, I generated a pool of items based on an extensive review of the literature on concepts or scale items that may be related to learning identity, such as openness to experience (Goldberg et al., 2006; LePine et al., 2000; McCrae, Costa, & Martin, 2005), epistemic curiosity[2] (Berlyne, 1954, 1960; Litman, 2005; Litman & Spielberger, 2003; Reio Jr., Petrosko, Wiswell, & Thongsukmag, 2006), mindfulness (Bodner, 2000), and learning focus (McKenna, Boyd, & Yost, 2007). I did not use scale items measuring learning agility, LGO, or motivation to learn due to shortcomings of these items as highlighted above. Additionally, I wrote new scale items based on learning identity's conceptual definition. This process resulted in 56 theoretically-generated items, of which 45 were taken from related scales and 11 were newly constructed (see Appendix I). Second, I reached out to a panel of experts who had at least 5 years of experience working with learners and experiential learning in various settings: education, coaching, training, and consulting. I gave them a brief

[2] Epistemic curiosity refers to one's desire to know more cognitively, triggered by one's gaps in knowledge or conceptual questions, as opposed to perceptual curiosity which leads to increased perception, often evoked by visual, auditory, or tactile stimuli (Berlyne, 1954).

definition of what learning identity was, and asked them to write short concise sentences describing people with a learning identity that they knew in their professional and personal settings. 6 out of 12 experts responded, yielding a 50% response rate. I modified their descriptive statements into appropriate survey items and ended up with 44 items generated inductively (see Appendix II). At the end of the item generation process I had a pool of 100 items altogether, which satisfied DeVellis's suggestion "to begin with a pool of items that is 3 or 4 times as large as the final scale" (2012, p. 66).

First Item Reduction

In the first phase of item reduction, one of my dissertation advisors and I each thematically categorized the 100 learning identity items, separately from each other. In this process, 23 items were eliminated from the pool due to being too vague or overlapping too much with another item. We then discussed our thoughts about the categories, resolved disagreements, and came up with a set of six preliminary categories, roughly labeled as "love of learning," "learning self-image," "learning relationships", "learning strategies," "persisting in the face of challenges," and "immersion in life experience" (see Appendix III). We reassessed these categories in terms of how much they actually reflected the conceptualization of learning identity, and concluded that only the first two categories ("love of learning" and "learning self-image") were central to the definition. The "love of learning" category captured the affective component of learning identity, while "learning self-image" pertained to its identity aspect. The other four categories included cognitive and

behavioral tendencies associated with learning identity. For example, people with a strong learning identity would be likely to have positive learning relationships, learning strategies, persist in the face of challenges, and immerse themselves in life experience. Nevertheless, we decided to retain all six categories in order to make sure that learning identity factor(s) would be indeed distinguishable from these related tendencies.

Content Validity Assessment

77 remaining items at the end of the first item reduction phase were assessed for content validity by a group of 15 judges who were doctoral students in a large private Midwestern university. Following Hinkin's (1998) guidelines, all 15 judges were sufficiently trained in behavioral sciences but had not worked on this project before. They were given the definitions of learning identity in general and each of the six preliminary categories, and were asked to sort the 77 items into one of the six categories or, if applicable, specify "None of the above." After content validity assessment, a total of 38 items were retained, with overall Fleiss's $\kappa = .66$ ($p < .001$), suggesting acceptable agreement among the 15 raters.[3]

Participants and Procedures

[3] Even though this number fell slightly below the general rule of thumb of .70, it is noteworthy that the number of judges involved in the content validity assessment (15) was much higher than what is commonly seen in the literature. Had a smaller number of judges been involved, Fleiss's κ could have been higher than .70.

A survey consisting of 38 learning identity items was administered as a human intelligence task on Amazon's Mechanical Turk (mTurk). Participants were asked to respond to statements regarding their learning identity in a scale from 1 (*Strongly disagree*) to 7 (*Strongly agree*). Three attention check questions were inserted in the middle of the 38 learning identity items: "I am currently using an electronic device," "I have been to every country in the world," and "One plus two equals five." The first two items were suggested by Meade and Craig (2012) as helpful in identifying careless responses. Only responses that passed all three attention check questions were included in the final dataset. The final sample consists of 195 mTurk workers (58.97% males) with age ranging from 20 to 67 years (M = 35.53, SD = 10.77), all of whom reported to be employed full-time in an organization. According to Hinkin's (1998) summary of previous practices, even though researchers generally suggest an item-to-response ratio to range from 1:4 to 1:10, "a sample size of 150 observations should be sufficient to obtain an accurate solution in EFA as long as item intercorrelations are reasonably strong" (1998, p. 111).

Analyses and Results

The item intercorrelation matrix was examined first. No item correlated at less than .40 with all other items (Hinkin, 1998); therefore all 38 items were retained in the analysis.

An exploratory factor analysis (EFA) was conducted using principle axis factor analysis with oblique (direct oblimin) rotation in SPSS 23. The oblique rotation was chosen over orthogonal rotation because the factors of the learning

identity scale were expected to correlate with one another (Conway & Huffcutt, 2003; DeVellis, 2012). The Kaiser-Meyer-Olkin measure of sampling adequacy was .95, suggesting excellent adequacy in the EFA. The Bartlett's test of sphericity result was significant ($p < .001$), confirming that there were correlations in the data set that were appropriate for factor analysis (Raykov & Marcoulides, 2011).

When examining the output, I deleted all items that either did not load significantly onto one factor (primary factor loading < .45) or loaded highly on more than one factor (secondary factor loading ≥ .30). Based on the Kaiser-Guttman criterion and Scree plot, a five-factor solution was obtained (see Table 2 and 3). An EFA rerun in Mplus 7 confirmed this five-factor solution as it best fitted the data compared to one-, two-, three-, four-, and six-factor solutions. Fit indices indicated acceptable fit even though TLI was slightly lower than the .90 cut-off: χ^2 (523, N = 192) = 1037.73 ($p < .001$), $\chi^2/df < 3$, CFI = .91, TLI = .88, RMSEA =.07, SRMR = .03. Cronbach's α was higher than .70 for each subscale and for the entire set of five factors (α = .96). Intercorrelations among subscales are presented in Table 4.

Table 2. *Summary of 5 Factors Resulting from EFA*

Factor	# of Items	Eigenvalue	Variance Explained	Reliability α
Love of Learning & Learning Self-Image	15	19.70	51.83%	.97
Learning Relationship	2	2.24	5.90%	.90
Learning Strategies	3	1.57	4.12%	.80
Resilience	3	1.47	3.86%	.83
Intentional Learning	5	1.22	3.20%	.82
Total Scale			68.90%	.96

Table 3. *Learning Identity Factor Loadings for the Final Item Pool Exploratory Factor Analysis in Study 1*

Item	Factor (F) loadings				
	F1	F2	F3	F4	F5
(1) LOVE OF LEARNING + LEARNING SELF-IMAGE					
Eigenvalue = 19.70, 51.83% variance explained, α = .97					
I think it's fascinating to learn new information.	.98				
I enjoy exploring new ideas.	.89				
I am a curious person.	.87				
I enjoy learning as a part of my own intellectual growth.	.80				
Learning is a pleasure.	.77				
I am someone who is willing to learn.	.74				
I enjoy learning about subjects which are unfamiliar.	.73				
The learning process is engaging.	.71				
I love to learn and grow both personally and professionally.	.69				
I see myself as a learner.	.66				
I do not find learning new things satisfying. [R]	.65				
I get excited by new ideas.	.63				
I am interested in discovering how things work.	.59				
I would describe myself as someone who actively seeks as much information as I can in a new situation.	.55				
I embrace life experiences with a learning attitude.	.46				
(2) LEARNING RELATIONSHIPS					
Eigenvalue = 2.24, 5.90% variance explained, α = .90					
I learn from the success of others.		.74			
I am inspired by the success of others.		.72			

(3) LEARNING STRATEGIES			
Eigenvalue = 1.57, 4.12% variance explained, α = .80			
I know what kind of environment would help me learn best.	.90		
I understand the way I learn.	.75		
I have tools or tricks to support my learning.	.45		
(4) PERSISTING IN THE FACE OF CHALLENGES			
Eigenvalue = 1.47, 3.86% variance explained, α = .83			
I persist in the face of obstacles.		.63	
When I encounter a problem, I believe there is something I can learn from it.		.48	
I embrace challenges in life and at work.		.45	
(5) INTENTIONAL LEARNING			
Eigenvalue = 1.22, 3.20% variance explained, α = .82			
I believe variety is the spice of life.			.66
Everywhere I go, I am out looking for new things or experiences.			.61
I seek out people who help me learn.			.55
I actively seek feedback.			.54
I consciously set aside time to reflect on the situation, strengths, weaknesses, contribution, personal development.			.42
TOTAL SCALE: Total variance explained = 68.90%, α = .96			

Table 4. *Learning Identity Subscale Intercorrelations*

Subscale	1	2	3	4
2	.42*			
3	.50*	.36*		
4	.45*	.24*	.26*	
5	.58*	.46*	.43*	.26*

*$p < .05$

Of the six preliminary conceptual categories, three factors remained statistically robust: "learning relationships," "learning strategies," and "persisting in the face of challenges." The first two factors that comprised the core of learning identity ("love of learning" and "learning self-image") merged into one statistical factor with the largest eigenvalue (19.70), the most variance explained (51.83%), and highest reliability coefficient ($\alpha = .97$). This result not only confirmed the theoretical distinction between learning identity and the other related factors, but also suggested that individuals with a strong learning identity would indeed be more likely to learn from their relationships with others, to know which learning strategies would be effective for them, and to persist in the face of challenges. Lastly, an unexpected fifth factor emerged from the data, reflecting the intentional and proactive elements of learning. Items from this factor were mainly from the "immersion in life experience" category; however, this factor was not significantly correlated with all other factors.

Second Item Reduction

After obtaining evidence from the EFA that learning identity ("love of learning" and "learning self-image") was distinctive from other related dimensions,

I examined the 15 learning identity items more closely. I reran EFA on these 15 items to see if the factor structure of learning identity is unidimensional or bidimensional and if any items can be removed to avoid redundancy. Results (Table 5) suggested that learning identity is a strong unidimensional construct with the 15 items explaining more than 70% of all variance. I used factor loadings and theoretical meaningfulness of each item as guidance to remove redundant items, and tried to retain items that covered different aspects of learning identity. The final learning identity scale at the end of EFA and second item reduction phase included six items with reliability $\alpha = .94$. An alternative choice to exclude the common root "learn" or "learning" presents a different set of equally rigorous items in Appendix V.

Discussion

In this study, I developed an initial learning identity scale to measure an individual's disposition to learn from life experience, examined its underlying structure, and tested its reliability. The analyses resulted in a unidimensional latent construct measured by 6 items which reflected one's love of learning and self-image as a learner. High factor loadings and reliability suggested that learning identity was robust and distinctively different from other tendencies that individuals with a strong learning identity may display, such as learning from others, knowing their learning strategies, and persisting in the face of challenges.

Table 5. *Learning Identity Factor Loadings for the Final Item Pool Exploratory Factor Analysis in Study 1*

Item	Item mean	Item SD	Factor loading	Alpha if item deleted
I enjoy exploring new ideas.	5.98	1.03	.90	.96
I think it's fascinating to learn new information.	6.04	1.00	.90	.96
I enjoy learning as a part of my own intellectual growth.	6.03	.92	.88	.97
I see myself as a learner.	5.97	1.02	.86	.97
I love to learn and grow both personally and professionally. [a]	*5.98*	*.98*	*.86*	.97
I enjoy learning about subjects which are unfamiliar. [a]	*5.77*	*1.02*	*.85*	.97
I get excited by new ideas. [a]	*5.80*	*1.02*	*.84*	.97
Learning is a pleasure.	5.86	1.03	.83	.97
The learning process is engaging. [a]	*5.92*	*.96*	*.83*	.97
I embrace life experiences with a learning attitude. [a]	*5.77*	*1.07*	*.81*	.97
I would describe myself as someone who actively seeks as much information as I can in a new situation. [a]	*5.80*	*1.19*	*.80*	.97
I am someone who is willing to learn.	6.10	.83	.78	.97
I am a curious person. [a]	*6.07*	*.93*	*.77*	.97
I am interested in discovering how things work. [a]	*5.94*	*1.13*	*.74*	.97
I do not find learning new things satisfying. [Ra]	*5.95*	*1.16*	*.70*	.97
	Total variance explained		15-item scale	70.02%
			6-item scale	75.29%
	Scale reliability		15-item scale	.97
			6-item scale	.94

N = 192. [R] Reverse coded item. [a] *Items removed in second item reduction phase*.

Study 2: Confirming the Structure of the Learning Identity Scale and Establishing Its Convergent and Discriminant Validities

Study 2 aimed to confirm the factor structure of the learning identity scale obtained in Study 1, as well as to establish evidence of convergent, discriminant, and predictive validities for the scale.

Convergent validity is the extent to which different measures of the same construct are in agreement, while discriminant validity reflects the degree to which measures of different constructs are distinct (Bagozzi, Yi, & Phillips, 1991; Campbell & Fiske, 1959). In other words, two or more measures of the same construct should covary highly, while two or more measures of different constructs should not correlate too highly. From a theoretical standpoint, it would be appropriate to establish learning identity's convergent validity by examining its correlation with learning agility, motivation to learn, and LGO. However, because the measures of learning agility and motivation to learn lack face and construct validity, these two measures were not used in this part of the analysis. Instead, I used measures of LGO (Button et al., 1996), openness to experience (Goldberg et al., 2006), epistemic curiosity (Litman & Spielberger, 2003), and range of interests (Berdie, 1945; Pinterest, n.d.) to show evidence of learning identity's convergent validity because these constructs are conceptually similar to learning identity. I expected learning identity to display a strong positive relationship with each of these four measures, because individuals with a strong learning identity are prone to improve their skills, open to learning, curious, and likely to have a wide range of interests. At the same

time, I expected these four measures to be distinct from learning identity, suggesting that even though they were conceptually similar, they were not the same construct as learning identity. Similar to the conceptual difference between learning identity and LGO explained above, learning identity is one step beyond being open to experience or being curious. More than simply seeking new learning, it includes an enduring commitment to lifelong learning and belief in one's ability to learn. Openness to experience and curiosity reflect desire (e.g., "I want to learn more") instead of self-identification (e.g., "I am a learner" and "I can learn"). Additionally, an individual with a strong learning identity may be interested in one or a few domains and does not necessarily have a wide range of interests.

To further provide evidence of discriminant validity, I expected learning identity to correlate at low or non-significant levels with social desirability (Hays, Hayashi, & Stewart, 1989), PGO (Button et al., 1996), and learning style (Kolb & Kolb, 2013). Because LGO and PGO are two distinct constructs, in a similar manner learning identity should also be distinctively different from PGO. Furthermore, learning identity should not be associated with learner's preferred mode of learning, as learners of all learning styles should be equally likely to adopt a learning identity.

To establish concurrent validity of learning identity, I placed the construct in a nomological network (see Figure 2). Age and sex were not expected to significantly predict learning identity. The organicism-mechanism paradigm—people's implicit worldviews either as changing, holistic patterns or as stable, isolated elements (Johnson, Howey, Reedy, Gribble, & Ortiz, 1989)—was expected to predict learning

identity such that people who held an organicism worldview would be more likely to have a stronger learning identity. According to Colquitt and associates' (2000) integrated theory of training motivation, locus of control, need for achievement, self-esteem, and self-efficacy should all be significant positive predictors of learning identity. Finally, people who held a strong learning identity would be less likely to resist change (Oreg, 2003).

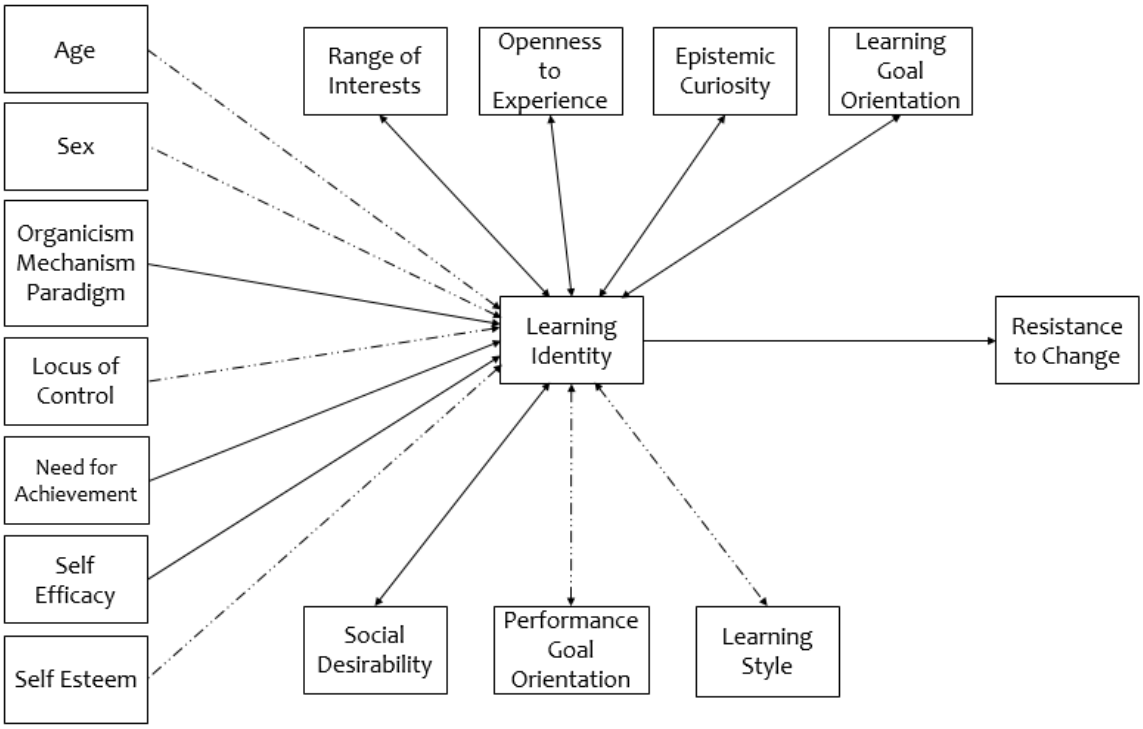

Figure 2. Learning identity's nomological network in study 2. Solid lines denote statistically significant effects while dotted lines denote non-significant effects.

Methods

Participants and Procedures

I collected data from 193 different mTurk workers (52.8% females) with age ranging from 22 to 68 (M = 37.81, SD = 11.41), all of whom reported to be full-time

employees in an organization. Participants completed a survey which consisted of demographic questions, the learning identity scale, and other study measures as described below.[4] The scale items are presented in Appendix IV.[5]

Measures

Learning identity was measured using the six-item scale established in Study 1 and a 7-point Likert response format (α = .92). *Range of interests* was measured as a count of how many categories taken from the Pinterest general board participants marked as being interested in. *Openness to experience* (α = .84) and *need for achievement* (α = .84) were measured using their respective subscale in Goldberg's (2006) International Personality Item Pool. *Epistemic curiosity* (α = .89) was measured by eight items in the scale developed by Litman and Spielberger (2003). Two items ("I find it fascinating to learn new information" and "I enjoy exploring new ideas") were excluded because of content overlap with the learning identity scale. *LGO* (α = .88) and *PGO* (α = .83) were each measured by the eight items developed and validated by Button and colleagues (1996).

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[4] Similar to Study 1, five attention check questions were randomly inserted in the middle of the survey: "I sleep less than one hour per night," "I do not understand a word of English," "All my friends are aliens from other planets," "I have never spoken to anyone in my entire life," and "I am paid biweekly by leprechauns." All five questions were modified after Meade and Craig's (2012) list of bogus items to identify careless responses. Only responses that passed all five attention check questions were included in the final dataset.

[5] The 12 items from the Learning Style Inventory were not included in the Appendix because this instrument is copyrighted.

Self-esteem (α = .90) was measured using ten items in the Rosenberg Self Esteem Scale (Rosenberg, 1965). *Self-efficacy* (α = .92) was measured by eight items in the new general self-efficacy scale (Chen, Gully, & Eden, 2001). *Social desirability* (α = .80) was measured using the five-item social desirability scale (Hays et al., 1989). *Resistance to change* (α = .86) was measured by eleven items in the routine-seeking and cognitive rigidity subscales developed by Oreg (2003).

Organicism-mechanism paradigm (OMPI) was measured using the inventory validated by Johnson and associates (1989). Participants were presented with 26 pairs of statement, with one statement measuring preference towards organicism (e.g., "All things change from one moment to the next.") and the other measuring preference towards mechanism (e.g., "All things stay basically the same over time."). They were asked to select the statement that better represented their worldview. Each organicism statement scored as "1"; each mechanism statement scored as "0." The final OMPI score was the sum of participants' selection in 26 pairs, ranging from 0 to 26, with higher score represented more organicist worldview. The Kuder-Richardson's formula 20 reliability estimate for the OMPI scale was .69. Similarly, *locus of control* was measured using the same format, in which participants selected one statement out of a pair that better represented their view. I used eight items from dimensions 2 and 3 of the Rotter's (1990) locus of control scale (Smith, Trompenaars, & Dugan, 1995). I excluded dimension 1 because it captured personal interest in political events (e.g., "There will always be wars, no matter how hard people try to prevent them.") which had little to do with learning and daily life.

Dimensions 2 and 3 consisted of individual –social preference as well as whether luck played a role in people's success, which pertained more to the research at hand. In the end, the locus of control score ranged from 0 to 8, with higher scores indicating more internal locus of control and lower scores indicating more external locus of control. The Kuder-Richardson's formula 20 reliability estimate for the locus of control scale was .64.

Learning style was measured using twelve statements in version 4.0 of the Learning Style Inventory (Kolb & Kolb, 2013). Participants were presented with a situation (e.g., "When I learn…") and were asked to rank four items describing four different ways of learning in the order from most to least representative of the way they learned to complete the statement. The most representative item was assigned a score of 4, the second most a 3, the third most a 2, and the least representative a 1. Each of these four items corresponded with one of the four learning modes: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). The final score for each learning mode was the sum of scores assigned to their corresponding items in all twelve statements. Learning style was calculated as participants' preference of abstract over concrete (AC-CE) and action over reflection (AE-RO).

Analyses and Results

Table 6 shows descriptive statistics and zero-order correlations among study variables in study 2.

Table 6. *Descriptive Statistics and Zero-Order Correlations among Variables in Study 2*

Variable	*M*	*SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1. Age	37.81	11.41	---															
2. Sex [a]	.53	.50	.05	---														
3. Learning identity	5.98	.82	.03	.11	.92													
4. Range of interest	11.00	5.74	-.01	.22**	.40***	---												
5. Openness to experience	3.85	.69	-.09	.14*	.63***	.37***	.84											
6. Epistemic curiosity	3.94	.63	-.12	-.09	.76***	.27***	.58***	.89										
7. LGO	4.08	.56	-.06	.00	.75***	.23**	.49***	.77***	.88									
8. PGO	3.88	.57	-.20**	.03	.00	-.02	-.02	-.04	.02	.83								
9. Social desirability	3.30	.89	.10	.23**	.27***	.14*	.07	.21**	.26***	.06	.80							
10. Need for achievement	3.96	.62	.07	.06	.35***	.09	.10	.32***	.55***	.10	.30***	.84						
11. Abstract over concrete	-9.82	11.02	-.11	.14*	-.03	.08	.07	-.10	-.04	.09	.13	-.04	---					
12. Action over reflection	-.56	11.70	.06	.01	-.03	.02	.01	-.03	-.12	.11	.16*	-.18*	.03	---				
13. Resistance to change	2.95	.65	.01	-.05	-.39***	-.25**	-.43***	-.38***	-.33***	.31***	-.12	-.03	-.14	.15*	.86			
14. Self-esteem	22.93	5.11	-.07	.05	.24**	.04	.11	.26***	.38***	.05	.29***	.54***	.01	-.15*	-.20**	.90		
15. Self-efficacy	4.09	.56	-.16*	-.03	.36***	.08	.13	.35***	.53***	.21**	.26***	.62***	.10	-.11	-.12	.64***	.92	
16. Locus of control [b]	3.51	2.02	-.10	.15*	-.10	.08	.05	-.07	-.09	.06	-.11	-.22**	.25**	.08	-.06	-.22**	-.23**	---
17. Organicism-mechanism [c]	14.32	4.07	.15*	.25***	.28***	.18*	.33**	.20**	.20**	-.26***	.04	-.01	.21**	-.06	-.41***	.01	.01	.07

N = 193 * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed)

[a] Sex was coded as 0 = Male, 1 = Female. Scale reliability α is presented in the diagonal of the matrix. [b, c] The Kuder-Richardson formula 20 to estimate scale reliability for the dichotomous instruments locus of control and organicism-mechanism paradigm were .64 and .69, respectively.

Confirmatory Factor Analysis

I performed a confirmatory factor analysis (CFA) in Mplus 7 to revalidate the learning identity scale's structure. The data met all assumptions of Structural Equation Modeling, including univariate and multivariate normality (Kline, 2011). All 6 indicators loaded significantly on the learning identity latent factor. The CFA model exhibited excellent fit: χ^2 (7, N = 193) = 17.71, p < .05, ratio of χ^2 to degree of freedom = 2.53 < 3 (Carmines & McIver, 1981; Tabachnick & Fidell, 2013), CFI = .99, TLI = .97, RMSEA = .09 (slightly higher than the cut-off point of .08), SRMR = .02 (Bagozzi & Yi, 1988; Hu & Bentler, 1999). Scale reliability α was .92. These results confirmed the structure of the learning identity scale as a unidimensional reflective latent construct with six indicators.

Convergent Validity

Convergent validity is achieved when the correlations between measures of similar constructs are "significantly different from zero and sufficiently large" (Campbell & Fiske, 1959, p. 82). As shown in Table 6, learning identity correlated positively and significantly with range of interest (r = .40, p < .001), openness to experience (r = .63, p < .001), epistemic curiosity (r = .76, p < .001), and LGO (r = .75, p < .001). These medium to strong correlations are sufficiently large to meet the requirements of convergent validity.

Discriminant Validity

Learning identity was found to be uncorrelated with PGO and learning styles (see Table 6). Learning identity had a small positive correlation with social

desirability, as was the case for most other constructs. These small and non-significant correlations provided initial evidence of learning identity's discriminant validity.

To provide further evidence of learning identity's discriminant validity, I conducted two additional sets of analyses to show that learning identity was, though conceptually similar to and highly correlated with, distinctively different from openness to experience, epistemic curiosity, and LGO. First, I followed the approach of Owens and colleagues (2013) and entered the six items from the learning identity scale into a factor analysis along with the items measuring the other three constructs. Factor analysis results, shown in Table 7, revealed that the learning identity items best held together compared to items from the other scales, with only two items from the epistemic curiosity scale cross-loaded onto the learning identity construct. This is a strong piece of evidence of discriminant validity for the learning identity construct.

Table 7. *Factor Analysis Showing Discriminant Validity for Learning Identity in Study 2*

Item	Factor (F) loadings				
	F1	F2	F3	F4	F5
Learning Identity					
I am someone who is willing to learn.	.46				
I think it's fascinating to learn new information.	.72				
I enjoy exploring new ideas.	.65				
I see myself as a learner.	.77				
Learning is a pleasure.	.69				

I enjoy learning as a part of my own intellectual growth.	.83				
Epistemic Curiosity					
I enjoy learning about subjects which are unfamiliar.	.81				
When I learn something new, I like to find out more.	.66				
When I see a complicated piece of machinery, I ask someone how it works.				.70	
When I see a new kind of arithmetic problem, I enjoy imagining solutions.				.53	
When I see an incomplete puzzle, I try and imagine the final solution.				.68	
When I see a riddle, I am interested in trying to solve it.				.56	
Learning Goal Orientation					
When I fail to complete a difficult task, I plan to try harder the next time I work on it.					.61
I try hard to improve on my past performance.					.55
Openness to Experience					
I believe in the importance of art.		.74			
I tend to vote for liberal political candidates.			.91		
I am not interested in abstract ideas. [R]		.52			
I do not like art. [R]		.81			
I avoid philosophical discussions. [R]		.58			
I do not enjoy going to art museums. [R]		.82			
I tend to vote for conservative political candidates. [R]			.94		

N = 193. [R] Reverse-coded items.

It is noteworthy that when the two epistemic curiosity items were taken out of the epistemic curiosity latent factor, curiosity and learning identity still correlated at $r = .63$ ($p < .001$). This meant that curiosity's strong correlation with learning identity was indeed due to a conceptual similarity and not due to item overlap.

Second, I followed MacKenzie et al.'s guideline to assess discriminant validity for reflective measures: "After setting the scale of measurement for each construct by fixing its variance at 1.0, discriminant validity can be assessed for any pair of constructs by constraining the estimated correlation between the constructs to 1.0 and then performing a chi-square difference test on the values obtained for the constrained and unconstrained models" (2011, p. 324). For each of the three pairs, the unconstrained model proved to have significant better fit than the constrained model, suggesting that learning identity is significantly different from openness to experience ($\Delta\chi^2$ (1, 193) = 151.27, $p < .001$), epistemic curiosity ($\Delta\chi^2$ (1, 193) = 42.31, $p < .001$), and LGO ($\Delta\chi^2$ (1, 193) = 99.85, $p < .001$).

Concurrent Validity

To test concurrent validity of learning identity, I ran a path analysis in Mplus 7 testing a model in which age, sex, organicism-mechanism paradigm, locus of control, need for achievement, self-efficacy, and self-esteem were hypothesized to predict learning identity, which in turn would predict resistance to change. The path model was a saturated model. Path analysis results are shown in Table 8. As expected, age and sex were not significant predictors of learning identity. Organicism-mechanism paradigm, need for achievement, and self-efficacy were found to be significant positive predictors of learning identity: individuals with an organicist worldview, high need for achievement, and high self-efficacy would be more likely to develop a strong learning identity. On the contrary, locus of control and self-esteem did not significantly predict learning identity. In the second part of

the path model, learning identity proved to be a significant negative predictor of resistance to change (β = -.39, p < .001), suggesting that individuals with strong learning identity would be less resistant to changes in the workplace. In addition, individuals who view the world as dynamic and changing, who have a weak need for achievement, and who have strong self-esteem would also be less likely to resist changes.

Table 8. *Path Analysis Results Establishing Concurrent Validity of Learning Identity in Study 2*

Variable	*DV:* Learning Identity		*DV:* Resistance to Change	
	β	*S.E.*	β	*S.E.*
Age	.01	.07	.04	.06
Sex	.04	.07	.09	.06
Organicism-mechanism paradigm	.27***	.06	-.34***	.06
Locus of control	-.02	.07	-.08	.06
Need for Achievement	.22**	.08	.17*	.08
Self-efficacy	.24**	.09	.05	.09
Self-esteem	-.05	.08	-.26**	.08
Learning identity			-.33***	.06
R^2	23.80% (p < .001)		15.00% (p < .01)	

N = 193. β is the standardized regression coefficient. ** p < .01; *** p < .001 (one-tailed)

Discussion

This study provided additional evidence of scale structure and construct validity for the learning identity scale. Learning identity with six indicators was shown to be a strong unidimensional reflective latent construct that captured one's love for learning and self-identification as a learner. Learning identity was closely

related to, but distinctively different from, openness to experience, curiosity, and LGO. Furthermore, learning identity was highly correlated with range of interests, had a small positive correlation with social desirability, and had no relationship with PGO and learning style. Placed in a nomological network, learning identity was significantly predicted by worldview, need for achievement, and self-efficacy, while age, sex, locus of control, and self-esteem had no effects on learning identity. As a predictor, learning identity significantly predicted one's resistance to change.

General Discussion of Studies 1 and 2

The purpose of this chapter was to develop and validate a scale measuring learning identity, the degree to which individuals were disposed to learn from life experience. While capturing the core ideas of why people learn from experience, learning identity emphasizes the affective components of learning which had been missing in related constructs in the literature. Studies 1 and 2 established that learning identity, measured by six items, was a unidimensional reflective construct with strong evidence of reliability and construct validity.

The development of learning identity as a construct was meant to be helpful in training and education not as a way to label people and classify them into categories, but instead as a tool to start a conversation about how people learn. Questions that are often taken for granted by both educators and learners include whether learners have any intention of learning materials at all, and what their motivation(s) for learning or not learning might be. Just like how emotions are often suppressed in the workplace (Ashforth & Humphrey, 1995; Schaubroeck & Jones,

2000), they are also neglected in the learning process. Being under so much pressure to be productive and to be rational beings, people tend to forget that they work best when they are doing something that they like (Hatano & Inagaki, 1987); they forget the simple joy associated with discovery. Without positive emotional experiences, deep comprehension such as double-loop learning will likely become rare occurrences (Argyris, 2002; Brown, 1988; Meyer & Turner, 2006). The learning identity scale and discussion about learning identity with learners can make explicit the assumptions held by learners and the benefits of holistic engagement in the learning process. The tool can also be used to predict learning behaviors in the workplace and help managers motivate workers during change and innovation initiatives.

CHAPTER IV: MODERATING EFFECTS OF HUMILITY, LEARNING GOAL ORIENTATION, AND LEARNING IDENTITY

In this chapter, I empirically test the four hypotheses presented in chapter II. I first test the mediating effect of PGO to see if experts adopt a strong PGO, which in turn makes them inflexible. I then test how this indirect effect may be conditional on each of the three moderators (LGO, learning identity, humility) and explore whether these moderators can help explain why some experts may be more flexible than others.

Methods

Participants and Procedures

Participants in this study were employees of a large U. S. Midwestern health services organization. Participants were invited through email to complete a voluntary survey about adaptive performance at work. Participants responded to questions about their domain expertise, PGO, LGO, learning identity, learning flexibility, humility, and adaptive performance. After they completed their self-report survey, they were asked to refer three to five colleagues who would be asked to fill out a rating form for them. The rating form for raters included measures of perceived expertise, expressed humility, and perceived adaptability. The current sample includes 83 participants (13 nurses, 4 physicians, 38 administrative staff, and 28 unreported), 74% of whom were females. Average age was 47.74 years and average working experience was 18.82 years. Participants each received 0-5 colleague ratings, totaling 129 raters, and averaging 1.55 raters per participant.

Measures

Control variables

I controlled for participant's sex because previous research has suggested that females tend to be more humble than males (Furnham, Hosoe, & Tang, 2002; Owens et al., 2013). Furthermore, women receive less recognition for their achievements than men do and often deflect attention off of themselves (Fels, 2004). Therefore, if both a man and a woman have the same level of expertise, it is likely that the man will report higher expertise than the woman will, and he is also more likely to be perceived to have higher expertise than her. Controlling for gender effect will help keep these biases out of the results.

Domain expertise

Measures of domain expertise included level of education, years of work experience, related work experience, and a five-item expertise scale taken from Johanna and Van der Heijden's (2000) professional expertise scale. The expertise scale was measured on a seven-point Likert scale (1 = *Strongly disagree;* 7 = *Strongly agree*) and administered to both study participants and their raters, with Cronbach's alpha being .85 and .93, respectively. Items for the self-report survey included "I have expert knowledge in my job domain," "I consider myself competent to engage in in-depth discussions in the domain of my work," "I consider myself competent to be of practical assistance to colleagues with questions in my areas of expertise," "I am competent to handle the methods and materials in use in the domain of my work," and "I am able to solve problems that occur at work at ease." In the rater's survey,

raters were asked to rate their colleagues using the same statements, with the subject changed from "I" to "He/she."

Following the approach of Haerem and Rau (2007), I performed an EFA followed by a CFA to examine if these different measures could form a composite measure of expertise.[6] Even though EFA results indicated that level of education, work experience, and perceived expertise all loaded onto one factor, the CFA model of the latent expertise construct composed of these three measures exhibited poor fit and poor reliability. This suggested that the four measures could not be considered observed indicators of the same latent variable. In subsequent analyses, I used self-report and other-report (perceived) expertise as two different measures of expertise and excluded education and work experience because parts of variance in the latter two were already captured in the first two measures (see Table 9).

PGO and LGO

PGO (α = .85) and LGO (α = .84) were each measured by the same eight items developed and validated by Button and colleagues (1996) used in Study 2. The items were anchored to a seven-point Likert scale (1 = *Strongly disagree;* 7 = *Strongly agree*).

Learning identity

[6] Using Haerem and Rau's approach, related work experience (qualitative responses from participants) should have been sorted qualitatively, coded based on its relevance to participant's domain of expertise, and included in the EFA. However, due to sampling issues participants came from various domains, rendering this estimate less meaningful than it otherwise could be. It was thus excluded from the analysis.

Using a seven-point Likert scale (1 = *Strongly disagree;* 7 = *Strongly agree*), learning identity was measured by the six-item scale developed and validated in Studies 1 and 2. Reliability α for the current study was .93.

Humility

In the self-report survey, humility was measured with seven semantic differential items on a scale from 0 to 100 with the following end-labels: humble/ arrogant, modest/ immodest, respectful/ disrespectful, egotistical/ not self-centered, conceited/ not conceited, intolerant/ tolerant, closed-minded/ open-minded (Rowatt et al., 2006). The semantic differential measure was chosen because it was the best proxy for the arguably best available measure of self-report humility—the implicit association test (IAT) (Davis, Worthington, & Hook, 2010; Rowatt et al., 2006).[7] Self-report humility measure was calculated as the average of participants' response to these seven items.

In the rater survey, expressed humility was measured using nineteen items developed and validated by Ou and colleagues (2014) on a seven-point Likert scale (1 = *Strongly disagree;* 7 = *Strongly agree*). These nineteen items were intended to measure six dimensions of humility: self-awareness (e.g., "My colleague actively seeks feedback, even if it is critical."), appreciation of others (e.g., "My colleague takes notice of others' strengths."), self-improvement (e.g., "My colleague is willing

[7] The IAT could not be used because it required participants to be in a computer lab and go through 240 trials while maintaining focus and attention. This was logistically impossible for the current study.

to learn from others."), low self-focus (e.g., "My colleague does not like to draw attention to himself/herself."), self-transcendent pursuit (e.g., "My colleague devotes his/her time to the betterment of the society."), and transcendent self-concept (e.g., "My colleague believes that no one in the world is perfect, and he/she is no better or worse than others."). The composite reliability for the entire scale in this study was .93.

Learning flexibility

Learning flexibility was measured by the Learning Flexibility Index (LFI) (Sharma & Kolb, 2011). Participants were presented with eight different learning contexts (e.g., "When I start something new") and were asked to think of a specific example of each context in their life. They were then asked to rank four responses in terms of likelihood that they would use to respond to the situation. The four responses corresponded to four learning modes in Experiential Learning Theory (Kolb, 2015), namely concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). For example, for the item "When I start something new," the four responses are "I rely on my feelings to guide me" (CE), "I imagine different possibilities" (RO), "I analyze the situation" (AC), and "I try to be practical and realistic" (AE). If a participant ranked the four responses in this order (4-3-2-1), it meant that (s)he would most prefer relying on feelings or concrete experience, followed by observations, followed by analysis, and least likely to be using experimentation. The LFI was defined as the degree to which respondents varied their preferred mode of response across the eight different

situations and calculated as 1 – *W*, in which *W* was the Kendall's coefficient of concordance. According to Sharma and Kolb (2011), with 8 learning situations and 4 learning modes, the mathematical formula for *W* is:

$$W = \frac{12\left(Sum_{CE}{}^2 + Sum_{RO}{}^2 + Sum_{AC}{}^2 + Sum_{AE}{}^2\right) - 3 \times 8^2 \times 4 \times (4+1)^2}{8^2(4^3 - 4)}$$

Adaptive performance index

Adaptive performance index was measured on a seven-point Likert scale (1 = *Strongly disagree;* 7 = *Strongly agree*) by 21 items adapted from Pulakos and associates' (2000) taxonomy of adaptive performance. I presented a total of 54 items from the taxonomy to a panel of upper-level managers at the healthcare organization and asked them to select those which were desirable in their organization. The 21 items selected by this panel were included in both the self-report survey (α = .92) and the rater survey (α = .97). Sample items included "I think outside the given parameters to see if there is a more effective approach, "I effectively adjust plans to deal with changing situations," and "I adjust to new work processes and procedures."

Analyses

Data screening & cleaning

Data was entered and screened in SPSS. The Little's MCAR test was not significant ($\chi^2 = 187.50$, $df = 163$, $p > .05$), suggesting that data was missing completely at random. Missing data was then replaced using expectation maximization procedure (Tabachnick & Fidell, 2013).

Table 9. *Descriptive Statistics and Zero-Order Correlations among Variables in Study 3*

	Variable	*M*	*SD*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1.	Sex [a]	.74	.44	---												
2.	Age	47.47	11.63	-.06	---											
3.	Education [b]	3.71	.88	-.18	.08	---										
4.	Work Experience	18.82	12.54	.05	.74***	.07	---									
5.	Self-report expertise	6.38	.56	-.11	.35**	.10	.32*	(.85)								
6.	Perceived expertise	6.57	.50	.03	.30*	.34*	.30*	.10	(.93)							
7.	PGO	5.26	.84	.07	.24†	.18	.19	.30*	.27*	(.85)						
8.	LGO	6.26	.52	.23†	-.17	.04†	-.24†	.26†	-.19	-.02	(.84)					
9.	Learning identity	6.51	.55	.12	-.13	.21*	-.27*	.17	-.01	-.14	.63***	(.93)				
10.	Self-report humility	75.78	11.11	-.03	-.23	-.03	-.18	.10	-.14	.05	.08	.13	---			
11.	Perceived humility	6.03	.58	.22	.31*	.14	.17	-.06	.70***	.34*	-.03	.15	.00	(.93)		
12.	Self-report adaptability	5.97	.53	.16	-.08†	-.05	-.11	.36**	-.11	-.14	.55***	.53***	.41**	-.06	(.92)	
13.	Perceived adaptability	6.20	.57	.26*	.23	.23	.09	-.11	.71***	.28*	.04	.21	.01	.91***	.06	(.97)
14.	Learning flexibility	.68	.16	.20	.13	.02	-.05	-.28*	.11	.00	-.12	.08	-.24†	.17	-.4	.11

$N = 57$ † $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed). Scale reliability α is presented in the diagonal of the matrix.

[a] Sex was coded as 0 = Male, 1 = Female. [b] Education was coded as 1 = High school diploma, 2 = Associate degree, 3= Bachelor's degree, 4 = Master's degree, 5 = Doctorate degree.

In order to calculate other-report scores of expertise, humility, and adaptability, I first calculated the interrater agreement r_{wg} for each participant's rater scores in each of the three measures. I retained only responses with moderate agreement ($r_{wg} > .50$) (LeBreton & Senter, 2008) in the dataset, which meant different raters agreed with one another regarding a particular participant's characteristic at moderate level. Each participant's score was calculated as the average rating of all raters. Participants with only one rater were excluded from the analysis because the single rating could not be triangulated with any other rating and could be potentially biased. The final dataset yielded 57 complete individual responses with ratings from 118 raters (2.07 raters per participant). Descriptive statistics and zero-order correlations are presented in Table 9. All variables are normally distributed and have sufficient variability (see Appendix VI).

Hypothesis testing

The four hypotheses were tested using the PROCESS Macro (Hayes, 2013) in SPSS 23. I first tested Hypothesis 1 using Model 4 (simple mediation—see Figure 3) to confirm the mediating effect of PGO on the relationship between expertise and flexibility.

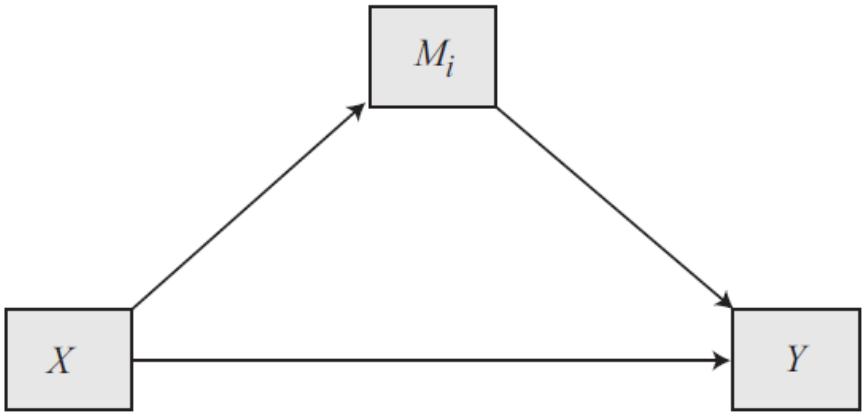

Figure 3. PROCESS Model 4

I then used Model 14 to test 24 separate conditional process models with two measures of expertise (self-report and perceived) as the independent variable (X), three measures of flexibility (learning flexibility index, self-report adaptability, and perceived adaptability) as dependent variables (Y), and four moderators (LGO, learning identity, self-report humility, and perceived humility) (V). PGO was the mediator (M) in all of these 24 models. Conditional process analyses were performed according to Hayes's (2013) guidelines. Figure 4 shows the conceptual diagram for Model 14, while Figure 5 shows its statistical diagram.

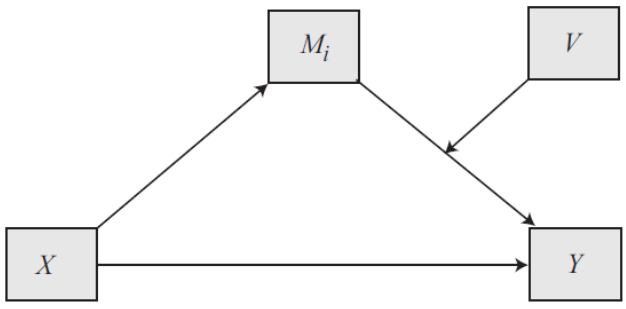

Figure 4. Conceptual diagram of PROCESS Model 14

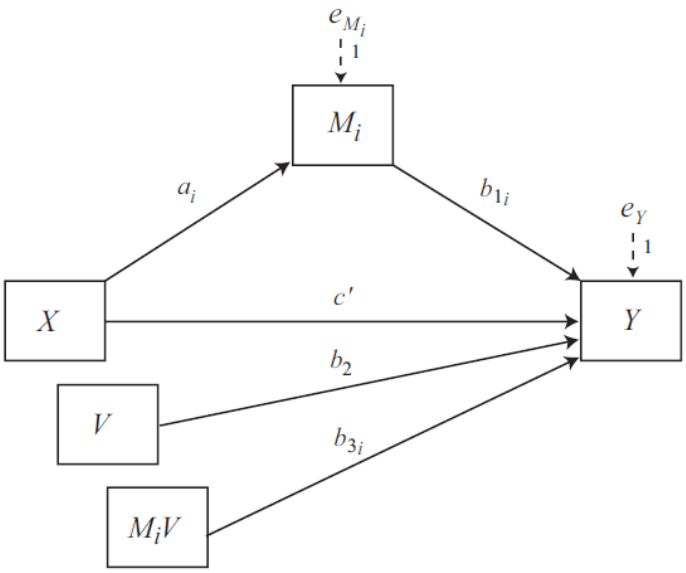

Figure 5. Statistical diagram of PROCESS Model 14

PGO and the four moderators were mean-centered prior to analyses. Due to small sample size, I used 90% bootstrap confidence intervals for all mediation and conditional process analyses.

Results

Total effects

Controlling for gender, self-report expertise had medium negative effect on learning flexibility, while having medium positive effect on self-report adaptability (see Table 10). This suggested that people who reported themselves to be high on expertise tended to report higher adaptability. However, when presented with different learning situations in the LFI, people with higher self-report expertise demonstrated less flexibility in responding to the eight different situations.

Self-report expertise did not have any effect on perceived adaptability, and neither did perceived expertise have any effect on LFI and self-report adaptability.

However, perceived expertise were strongly related to perceived adaptability, suggesting that raters tended to associate expertise with adaptability when filling out the survey. Altogether, these results suggested that there seemed to be common variance between measures of expertise and adaptability within same-source ratings. The LFI, being a force-ranking instrument instead of a Likert scale, helped control for this common method variance and may have been the most accurate indicator of flexibility. People who saw themselves as experts also thought of themselves as more adaptable, even though they demonstrated less flexibility when responding to different situations.

Table 10. *Regression Results Showing Total Effects of Expertise on Flexibility*

Independent Variable (IV)	Dependent Variable (DV)	Total Effects
Self-report expertise	LFI	-.26*
Perceived expertise	LFI	.10
Self-report expertise	Self-report adaptability	.38**
Perceived expertise	Self-report adaptability	-.11
Self-report expertise	Perceived adaptability	-.08
Perceived expertise	Perceived adaptability	.70***

N = 57. * $p < .05$. ** $p < .01$. *** $p < .001$. Effects are standardized regression coefficients.

Indirect effects

Table 11 shows regression results testing the mediating effect of PGO on the relationship between expertise and flexibility. Significant indirect effects were observed in Analyses #03 and #05, suggesting that when expertise was measured as self-report, PGO mediates the relationship between expertise and adaptability, both as self-report and as perceived measures. This finding partially supports Hypothesis

1. Controlling for gender, experts who reported to have a high level of expertise were likely to adopt a strong PGO, which in turn led to less self-report adaptability. This indirect effect (β = -.09, p < .10) was small compare to the total effect. However, the strong PGO displayed by these same experts with high self-report expertise led to higher adaptability perceived by their colleagues, making the indirect effect of self-report expertise on perceived adaptability through PGO a positive one (β = .10, p < .10). PGO did not mediate the effect of expertise on learning flexibility.

Table 11. *Regression Results Showing Mediating Effects of Performance Goal Orientation*

#	IV	DV	Indirect Effects	90% Bootstrap Confidence Intervals	
				LLCI	ULCI
01	Self-report expertise	LFI	.02	-.05	.12
02	Perceived expertise	LFI	-.01	-.08	.05
03	Self-report expertise	Self-report adaptability	-.09†	-.22	-.02
04	Perceived expertise	Self-report adaptability	-.04	-.10	.01
05	Self-report expertise	Perceived adaptability	.10†	.03	.22
06	Perceived expertise	Perceived adaptability	.02	-.01	.09

N = 57. † p < .10. * p < .05. ** p < .01. *** p < .001. Effects are completely standardized indirect effects.

Conditional indirect effects

Table 12 displays results of 24 conditional process analyses. In the following section, I examine how these results support or do not support each hypothesis and explain the conditional indirect effects of each moderator using the accompanied graph.

Table 12. *Results of 24 Conditional Process Analyses*

#	IV (X)	Moderator (V)	DV (Y)	Direct effects	Conditional indirect effects
07	Self-report expertise	LGO	LFI	-.07†	*ns*
08	Perceived expertise	LGO	LFI	.02	*ns*
09	Self-report expertise	LGO	Self-reported adaptability	.33**	Negative & significant at low and medium values of LGO
10	Perceived expertise	LGO	Self-reported adaptability	.01	*ns*
11	Self-report expertise	LGO	Perceived adaptability	-.19	*ns*
12	Perceived expertise	LGO	Perceived adaptability	.80***	*ns*
13	Self-report expertise	LID	LFI	-.08*	*ns*
14	Perceived expertise	LID	LFI	.03	*ns*
15	Self-report expertise	LID	Self-reported adaptability	.35**	*ns*
16	Perceived expertise	LID	Self-reported adaptability	-.10	*ns*
17	Self-report expertise	LID	Perceived adaptability	-.25†	*ns*
18	Perceived expertise	LID	Perceived adaptability	.77***	*ns*
19	Self-report expertise	Self-report humility	LFI	-.06	*ns*
20	Perceived expertise	Self-report humility	LFI	.01	*ns*
21	Self-report expertise	Self-report humility	Self-reported adaptability	.52***	Negative & significant at low and medium values of humility
22	Perceived expertise	Self-report humility	Self-reported adaptability	-.03	*ns*

23	Self-report expertise	Self-report humility	Perceived adaptability	-.10	Positive & significant medium and high values of humility
24	Perceived expertise	Self-report humility	Perceived adaptability	.77***	Positive & significant at high values of humility
25	Self-report expertise	Perceived humility	LFI	-.07†	*ns*
26	Perceived expertise	Perceived humility	LFI	.01	*ns*
27	Self-report expertise	Perceived humility	Self-reported adaptability	.46***	*ns*
28	Perceived expertise	Perceived humility	Self-reported adaptability	-.08	*ns*
29	Self-report expertise	Perceived humility	Perceived adaptability	-.05	Negative & significant at low values of humility
30	Perceived expertise	Perceived humility	Perceived adaptability	.17†	Negative & significant at low values of humility

N = 57. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. *ns* = non-significant. Effects are unstandardized regression coefficients.

Analysis #09 examined the indirect effect of self-report expertise on self-report adaptability through the mediator PGO, conditional on the moderator LGO. The conceptual and statistical diagrams are presented in Figure 6 and 7, respectively.

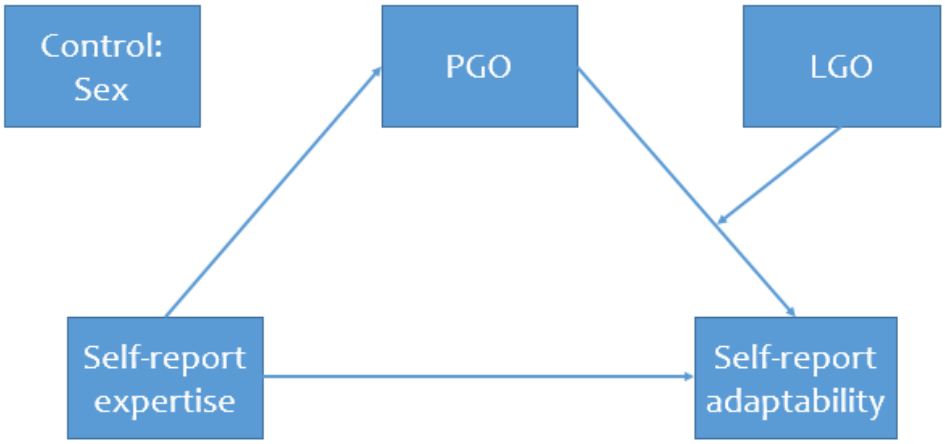

Figure 6. Conceptual diagram of Analysis #09

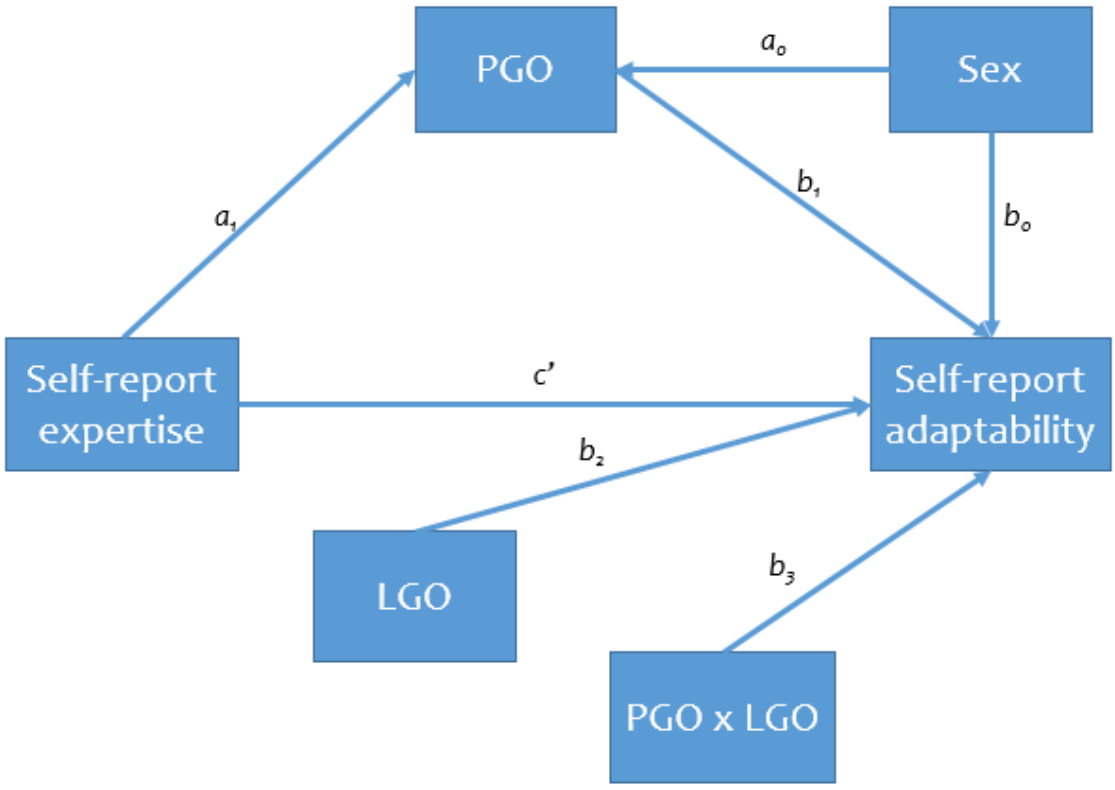

Figure 7. Statistical diagram of Analysis #09

As illustrated in Figure 7, the statistical formulas for PGO and Self-report adaptability are:

$$PGO = intercept + a_0 \times Sex + a_1 \times Expertise + error \quad (1)$$

$$Adaptability = intercept + b_0 \times Sex + c' \times Expertise + b_1 \times PGO + b_2 \times LGO + b_3 \times PGO \times LGO + error \quad (2)$$

The conditional effect of PGO on Adaptability in Formula (2) is $b_1 + b_3 \times LGO$. The value of this effect depends on the value of the moderator LGO.

The indirect effect of Expertise on Adaptability through PGO conditional on LGO is therefore the product of the effect of Expertise on PGO (a_1 in Formula (1)) and the conditional effect of PGO on Adaptability in Formula (2), making it $a_1(b_1 + b_3 \times LGO)$. (3)

Table 13 presents the results of two regression analyses depicted in the two formulas above. First, the mediator PGO was regressed on the control variable Sex and the IV Self-report expertise. Then the DV Self-report adaptability was regressed on the control variable Sex, the IV Self-report expertise, the mediator PGO, the moderator LGO, and the interaction term of the mediator and moderator PGO×LGO. As shown in Table 13, the interaction effect between PGO and LGO was marginally significant, indicating that the indirect effect of self-report expertise on self-report adaptability through PGO is indeed conditional on LGO, supporting Hypothesis 2.

To further examine this conditional indirect effect, I ran 10,000 times of bias-corrected bootstrap in SPSS. The conditional indirect effect was calculated at high,

medium, and low values of LGO using Formula (3), with these values being one standard deviation above the mean, mean, and one standard deviation below the mean, respectively. Figure 8 illustrates the conditional indirect effect of self-report expertise on self-report adaptability through PGO at high, medium, and low values of LGO at high (7) and low (5) values of self-report expertise. The 90% bootstrap confidence intervals for the conditional indirect effects at medium and low values of LGO did not contain 0, indicating that these effects were statistically significant. These negative effects suggested that while all participants reported to be more adaptable as their expertise increased (direct effect = .33, $p < .05$), only among experts who reported average or below average levels of LGO, higher self-report expertise led to stronger PGO ($b = .47$, $p < .05$), which then led to lower self-report adaptability ($b = -.13$, $p < .10$). This conditional indirect effect was not significant among experts who reported high levels of LGO, denoted by the dotted line in Figure 8. LGO did not moderate any other set of relationship when expertise and flexibility were measured differently (Analyses #07-08, 10-12), thus Hypothesis 2 was only partially supported.

Table 13. *Results of Conditional Process Analysis #09 Testing the Indirect Effect of Self-report Expertise on Self-report Adaptability through PGO, Conditional on LGO*

Variable	*DV:* PGO		*DV:* Self-report adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.19	.25	.11	.13
Self-report expertise	.47*	.20	.33**	.11
PGO			-.13†	.07

LGO			.43***	.12
PGO × LGO			.26†	.13
	R^2	.10†	.45***	

N = 193. *b* is the unstandardized regression coefficient. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)

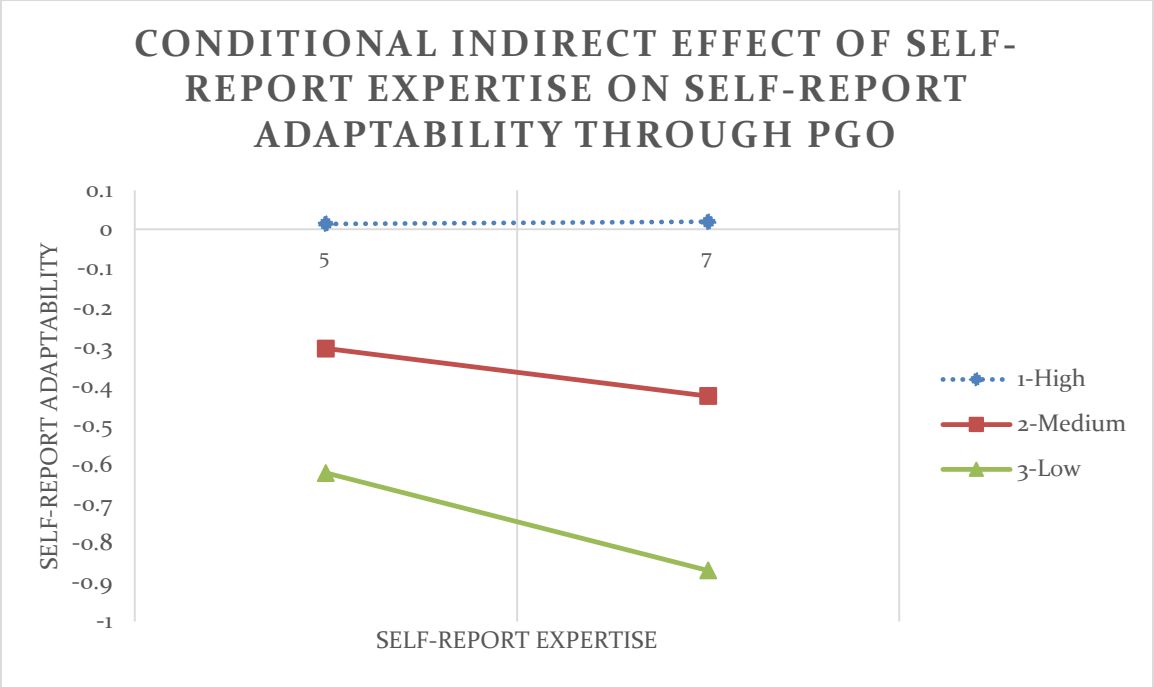

Figure 8. Conditional indirect effect of self-report expertise on self-report adaptability through PGO is significant at low and medium values of the moderator LGO with 90% confidence (Analysis #09).

Following the same procedure, Analyses #13-18 revealed that learning identity did not significantly moderate the relationship between PGO and flexibility regardless of which measures were used for the IV and DV, thus Hypothesis 3 was not supported.

Meanwhile, self-report and perceived humility moderated the relationship between PGO and flexibility in five out of twelve occasions, partially supporting Hypothesis 4. As shown in Table 14 and Figure 9, the indirect effect of self-report expertise on self-report adaptability through PGO was negative and significant at low and medium values of the moderator self-report humility (Analysis #21). In other words, despite a strong positive direct effect of self-report expertise on self-report adaptability (b = .52, p < .001), only among people who reported to have an average or below average level of humility, higher expertise could lead to stronger PGO (b = .47, p < .05), but stronger PGO in turn led to lower adaptability (b = -.22, p < .01).

Table 14. *Results of Conditional Process Analysis #21 Testing the Indirect Effect of Self-report Expertise on Self-report Adaptability through PGO, Conditional on Self-report Humility*

Variable	*DV:* PGO		*DV:* Self-report adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.19	.25	.29*	.12
Self-report expertise	.47*	.20	.52***	.11
PGO			-.22**	.07
Self-report humility			.02***	.01
PGO × Humility			.02**	.01
R^2	.10†		.50***	

N = 193. b is the unstandardized regression coefficient. † p < .10. * p < .05. ** p < .01. *** p < .001 (one-tailed)

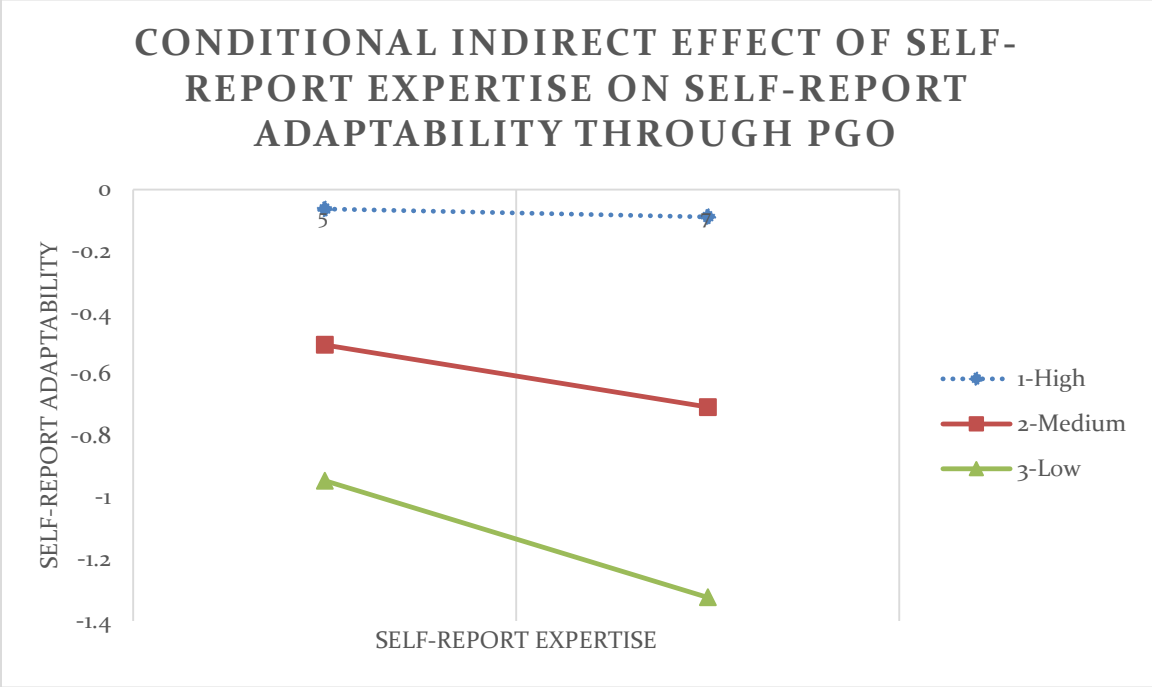

Figure 9. Conditional indirect effect of self-report expertise on self-report adaptability through PGO is significant at low and medium values of the moderator self-report humility with 90% confidence (Analysis #21).

Analysis #23 (Table 15, Figure 10) revealed that the indirect effect of self-report expertise on perceived adaptability through PGO was positive and significant at high and medium values of self-report humility. In other words, so long as they did not show too low level of humility, participants who reported to have high expertise also reported to have strong PGO (b = .47, p < .05) and subsequently were perceived to be more adaptable (b = .20, p < .05). Similarly, Analysis #24 (Table 16, Figure 11) showed that although all participants tended to show more adaptability as their expertise increased (b = .77, p < .001), only among people who reported to

have high level of humility was the indirect effect of perceived expertise on perceived adaptability through PGO also positive and significant.

Table 15. *Results of Conditional Process Analysis #23 Testing the Indirect Effect of Self-report Expertise on Perceived Adaptability through PGO, Conditional on Self-report Humility*

Variable	*DV:* PGO		*DV:* Perceived adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.19	.25	.29*	.16
Self-report expertise	.47*	.20	-.10	.14
PGO			.20*	.09
Self-report humility			.00	.01
PGO × Humility			.01†	.01
R^2	.10†		.22*	

N = 193. *b* is the unstandardized regression coefficient. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)

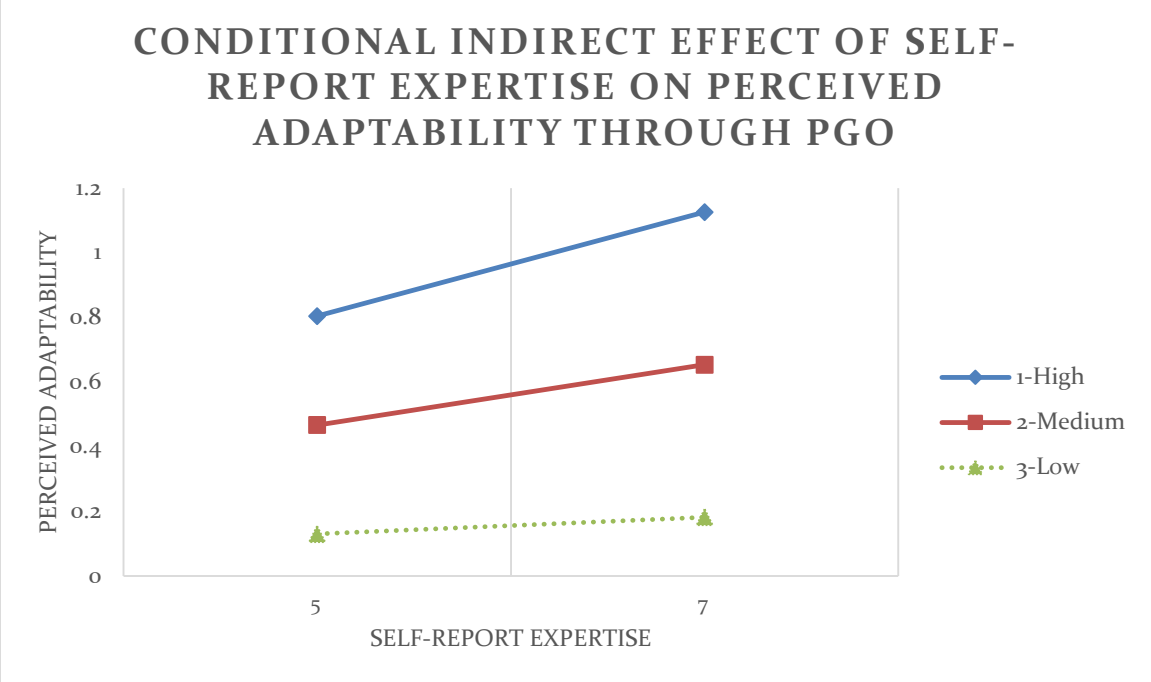

Figure 10. Conditional indirect effect of self-report expertise on perceived adaptability through PGO is significant at medium and high values of the moderator self-report humility with 90% confidence (Analysis #23).

Table 16. *Results of Conditional Process Analysis #24 Testing the Indirect Effect of Perceived Expertise on Perceived Adaptability through PGO, Conditional on Self-report Humility*

Variable	*DV:* PGO		*DV:* Perceived adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.11	.25	.31*	.11
Perceived expertise	.44†	.22	.77***	.11
PGO			.06	.06
Self-report humility			.01	.01
PGO × Humility			.01†	.01
R^2	.07		.61***	

N = 193. *b* is the unstandardized regression coefficient. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)

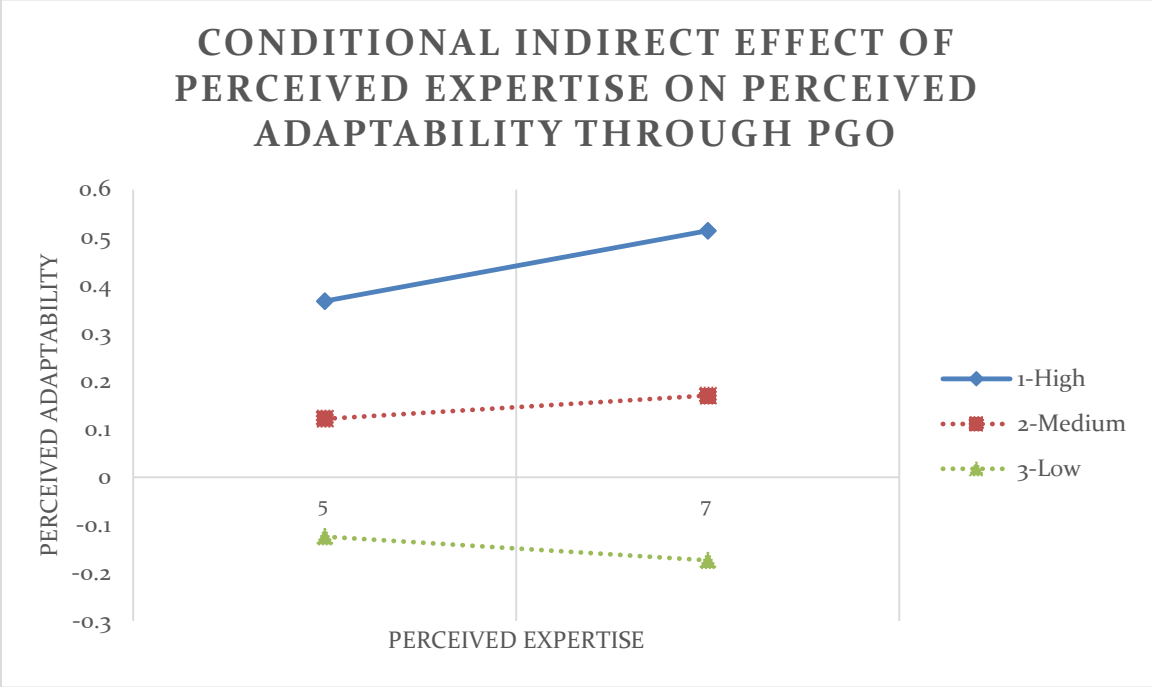

Figure 11. Conditional indirect effect of perceived expertise on perceived adaptability through PGO is significant at high values of the moderator self-report humility with 90% confidence (Analysis #24).

Consistent with previous results, Analysis #29 (see Table 17 and Figure 12) and Analysis #30 (see Table 18 and Figure 13) also showed that perceived humility moderated the indirect effect of expertise, whether self-report or other-report, on perceived adaptability through PGO. Among people who were perceived to have low level of humility, higher expertise led to stronger PGO but stronger PGO led to lower perceived adaptability.

Table 17. *Results of Conditional Process Analysis #29 Testing the Indirect Effect of Self-report Expertise on Perceived Adaptability through PGO, Conditional on Perceived Humility*

Variable	*DV:* PGO		*DV:* Perceived adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.19	.25	.10	.08
Self-report expertise	.47*	.20	-.05	.06
PGO			-.00	.04
Perceived humility			.91***	.06
PGO × Humility			.17*	.08
R^2	.10†		.84***	

N = 193. *b* is the unstandardized regression coefficient. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)

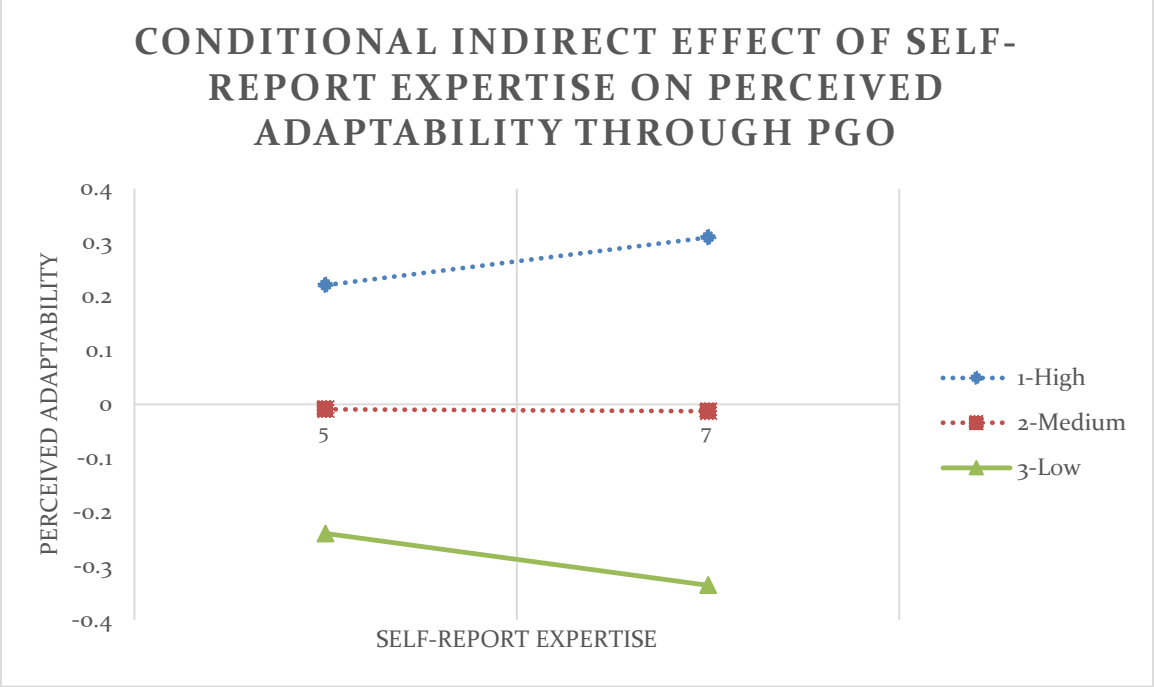

Figure 12. Conditional indirect effect of self-report expertise on perceived adaptability through PGO is significant at low values of the moderator perceived humility with 90% confidence (Analysis #29).

Table 18. *Results of Conditional Process Analysis #30 Testing the Indirect Effect of Perceived Expertise on Perceived Adaptability through PGO, Conditional on Perceived Humility*

Variable	*DV:* PGO		*DV:* Perceived adaptability	
	b	*S.E.*	*b*	*S.E.*
Sex	.11	.25	.13†	.07
Perceived expertise	.44†	.22	.17†	.09
PGO			-.02	.04
Perceived humility			.80***	.08
PGO × Humility			.15†	.08
R^2	.07		.85***	

N = 193. *b* is the unstandardized regression coefficient. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$ (one-tailed)

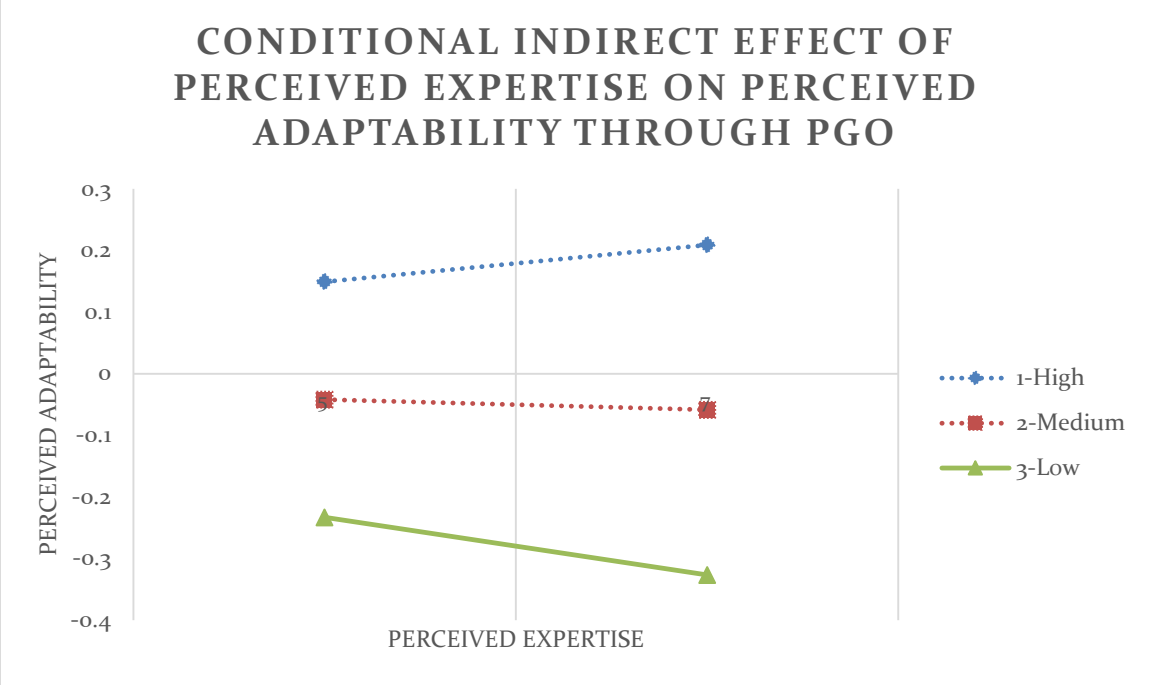

Figure 13. Conditional indirect effect of perceived expertise on perceived adaptability through PGO is significant at low values of the moderator perceived humility with 90% confidence (Analysis #24).

Discussion

In this chapter, I used data collected from a small sample of healthcare professionals to test four hypotheses, that PGO would mediate the relationship between expertise and flexibility (*H1*), and that LGO (*H2*), learning identity (*H3*), and humility (*H4*) would moderate this indirect effect. Hypotheses 1, 2, and 4 were partially supported while Hypothesis 3 was not supported.

Overall, results indicated that PGO partially explained the mechanism of why experts may become inflexible, though the mechanism depended on whether the outcome was measured by self-report or other-report. When outcome was measured as self-report, results were in the hypothesized direction, meaning higher self-report expertise led to stronger PGO, which then led to less flexibility. On the other hand, when outcome was measured as other-report, stronger PGO was associated with higher perceived adaptability, making the indirect effect positive instead of negative. This may be logical because external raters may have perceived signs of strong PGO (striving to do the work well and avoiding showing weaknesses or failures) as equivalent to adapting in order to achieve success.

Of the three moderators, humility, both as self-report and other-report measure, was the most consistent moderator of the indirect effect of expertise on flexibility through PGO. For those with average or below average levels of self-report humility, higher self-report expertise was associated with lower self-report adaptability. On the other hand, for those with humility above the "very low" level, higher self-report expertise was associated with higher perceived adaptability.

Similarly, for those who reported high or very high level of humility, higher perceived expertise was associated with higher perceived adaptability. When experts were perceived to have low or very low levels of humility, higher expertise, whether self-report or other-report, lead to higher perceived adaptability. Taken all together, these results suggested that having low levels of humility added to the pressure to perform to make experts inflexible, while having above average level of humility actually made experts more flexible. This meant that experts who were humbler were less susceptible to the negative effect of PGO and were more skillful in avoiding the inflexibility trap, while their less humble counterparts might have fallen right into it.

LGO only moderated the indirect effect of expertise on flexibility through PGO when both expertise and flexibility were self-report; however, the direction of effect was as hypothesized. Among experts who reported average or below average levels of LGO, higher expertise led to higher PGO, which then led to lower adaptability. This implied that if experts only focused on performance and did not spend time to learn and improve their skills, they would have been more likely to suffer from inflexibility, even though putting stronger emphasis on learning might not have brought apparent advantages.

Learning identity was not found to moderate the indirect effect of expertise on flexibility through PGO, which came as a surprise. This may be due to learning identity being deeply held values and beliefs, which might have been suppressed by pressure to perform in the specific context. It is noteworthy that in this sample, the

total effect of expertise on flexibility was medium among self-reports ($b = .36$, $p < .01$) and strong among other-reports ($b = .80$, $p < .001$), thus the indirect effect mediated by PGO was small in comparison. These positive effects suggested that common method bias and/or selection bias might be present in the data. Because participants self-selected to participate in the study, and were allowed to invite colleagues of their choice to be their external raters, responses might have been biased upward.

Overall, the biggest takeaway from Study 3 is that humility may be a key factor distinguishing inflexible experts from flexible ones. Even though the benefits of humility may not always be apparent, having low (below average) levels of humility can bring serious disadvantages to experts, rendering them incapable of escaping the shadow of their own expertise. Knowing this, managers should consider incorporating humility as a core value of organizations to start building an organizational culture that encourages seeing things in perspectives, seeking feedback and new insights, and continually improving one's skills.

CHAPTER V: IMPLICATIONS AND FUTURE RESEARCH DIRECTIONS

Theoretical Implications

In this dissertation, I introduced a motivational framework to explain why some experts might be more flexible than others and what would help inflexible experts become more flexible. I proposed that due to pressures to perform, experts had to adopt strong PGO which in turned make them inflexible. However, concurrently adopting a LGO, developing a learning identity, and humility would help experts overcome this mental obstacle and hence become more flexible. In the process, I also advanced the newly formed learning identity construct, developed and validated a scale measuring learning identity, establishing strong evidence of content and construct validity.

Data collected from a small sample of healthcare professionals in Northeast Ohio partially supported these hypotheses. Results suggested that performance goal orientation partially explained the mechanism of why experts may be inflexible. Humility, both as self-report and other-report measure, was found to be the most consistent moderator of this indirect effect. Experts with very low or low levels of humility suffered from the negative effects of performance goal orientation, leading them to be less flexible compared to their counterparts with higher levels of humility. Experts who reported high or very high levels of humility, on the other hand, were perceived to be more flexible as their expertise increased. Meanwhile, learning goal orientation partially moderated the indirect effect of expertise on flexibility through performance goal orientation, and learning identity did not moderate this effect.

A major limitation of this dissertation is the sample and sample size in Study 3. Due to difficulty in recruitment, I could not recruit experts all from the same domain within the healthcare organization and had to expand to different domains, resulting in expert participants having different types of expertise. Ideally, if all participants had come from the same domain, then controlling for and measuring expertise (such as the use of the expertise index) would have been easier and more rigorous. Furthermore, even as I had expanded the targeted population, the sample size remained very low, admittedly lower than the N = 114 minimum threshold required to perform this kind of regression analysis (Tabachnick & Fidell, 2013). The low sample size left me with very limited options in analyzing the data; for example, I had to use 90% confidence intervals in the 24 analyses presented in chapter IV.

In all three studies in this dissertation, I have not controlled for common method variance for a few reasons. Researchers are concerned about method bias and method variance because they believe that "relationships between self-reported variables are necessarily and routinely upwardly biased" (Conway & Lance, 2010, p. 325). In Studies 1 and 2 that developed and validated the learning identity scale, self-reports were clearly appropriate measures because both learning identity and other variables included in Study 2 pertained to each individual's personal beliefs, values, and cognitive tendencies. Strong evidence of construct validity including reliability, factor structure, convergent and discriminant validity, concurrent validity also helped to rule out substantial method effects (Conway & Lance, 2010; Raykov & Marcoulides, 2011). In Study 3, I employed a couple of *a priori* procedural remedies

to control for method biases, including obtaining measures of predictor and criterion variables from different sources and eliminating common scale properties by using different types of measurement scales (Podsakoff, MacKenzie, & Podsakoff, 2012). I did not use any *posthoc* statistical remedies because the low sample size in Study 3 prevented the use of SEM and because the most rigorous technique of this kind—Lindell and Whitney's (2001) use of marker variable—usually demonstrated that method bias was not a problem in the first place (Richardson, Simmering, & Sturman, 2009).

This dissertation contributes to the literature in a number of areas. First, I join the conversation about experts' inflexibility and propose a motivational framework to explain the same phenomena in a different way. This framework offers testable hypotheses and more accessible solutions to the problems of expert performance pitfalls beyond what has been proposed cognitively and behaviorally. Second, I extend the conversation about the importance of humility in today's organizations and apply it outside of the leader-follower context. I join others in promoting that humility is a virtue that should be valued instead of suppressed. Even though having humility may not bring readily visible benefits, not having it or having below average levels of humility further enforced the inflexibility trap of expertise. Last but not least, my development and validation of the learning identity scale contributes to experiential learning theory and management learning & education literature in helping to address a fundamental question of why individuals learn or do not learn.

In the near future, I plan to conduct one more study to examine the effects of learning identity on learning outcomes in organizational and use relative importance analysis (Johnson & Lebreton, 2004; Tonidandel & LeBreton, 2011) to show that learning identity may contribute more predictive power than other predictors. Ideally I would collect data from an educational or training setting and a separate organizational setting to determine if learning identity indeed predicts learning outcomes. For instance, I would like to show that students with stronger learning identities spend more time doing extra readings for class, persist longer when they face a challenging assignment, and retain more learning after the course is over compared to those with weaker learning identities.

Additionally, I plan to improve Study 3 in a number of ways: improving measures of expertise, adaptability, and humility to avoid redundancy, and collecting more data from other sites to enhance statistical power. First, if I could get a sample of experts from the same domain, I could calculate the expertise index mentioned in chapter IV and improve how expertise is measured. In Study 3, there appeared to be a floor effect with the measure of expertise, with most respondents (both participants and raters) responded in the positive half of the scale. While this response pattern confirmed that selected participants were indeed experts in their fields, it limited the range of the variable. A better question to ask would be "Compared to other experts in your field, how would you rate yourself?". Second, the measures of perceived humility and adaptability overlapped a great deal in Study 3 (see Appendix VII). The items not only did not load cleanly on their conceptual

factors, but also cross-loaded onto each other. This explained for the strong correlation between perceived humility and adaptability in Table 9. In the future study, I would try to find a more situation-specific measure of flexibility, such as how well experts adapt during a particular training exercise or during a change process. Third, with more data I will be able to perform Structural Equation Modeling with Multi-Trait Multi-Method matrices, which would account for not only measurement error but also common method variance and the method discrepancy between self- and other-ratings.

There are a few future directions for my dissertation. First, I plan to take this project to the team level and examine how humility and LGO alter the processes among people in teams of experts. More ambitiously, I want to study how humility can contribute to a positive team culture and eventually organizational climate. Second, I want to extend the analysis to include the environment of the industry, hypothesizing that the roles of humility and LGO would be very different in fast-paced, constantly changing industries (e.g., IT) vs. slow-paced, relatively stable ones (e.g., law). Finally, I would like to examine the role of a formal support system for advice and feedback within the organization in shaping domain experts' professional identity. I propose that in organizations with a formal support system for experts to ask for advice and feedback, experts are less obligated to having the "right" answers to every question and are allowed to venture more into unknown territories for more learning and creativity.

Practical Implications

This study hopes to generate awareness for leadership and management teams as well as experts in organizations by showing the importance of humility and learning. The first direct practical implication is for experts who want to be more flexible to start developing a sense of humility and LGO. This process takes time, but it can be done one step at a time with clear intention just like any other competency development (Boyatzis, 2006). The effects at the individual level can be extended to the group and organizational level. Imagine a number of experts who are humble, flexible, open to other's opinion and suggestions in a task force, in a department, or in the boardroom: they will engage in more double-loop learning (Argyris, 1994) and will not avoid learning-provoking conversations (Argyris, 1986). Consequently, through their humble modeling behavior (Owens & Hekman, 2012), they will create a climate that is psychologically safe for others to do the same (Edmondson, 1999), and eventually help preventing organizational defensive routines (Argyris, 1985). Humility and LGO will potentially contribute to perspective taking and perspective making, which in turn help to build communities of knowing and enhance creativity and innovation (Boland & Tenkasi, 1995). On a strategic level, if flexibility and openness to advice are valuable characteristics in the organization, managers can initiate policies that are supportive of experts' learning behaviors. Examples include demoting the image of experts as all-knowing and always correct, building time for feedback and learning into project tasks, and encouraging interdepartmental collaborations.

The learning identity scale is also a tool to help generate discussion about

why individuals learn or do not learn, and how educators can design curriculum to focus on learning attitudes and motivation instead of on assessment of abilities. It is my intention that by using the learning identity scale, students are encouraged to explore new possibilities, broaden their experience, and remain open to learn, I would like to help them understand that their learning process does not end when they get their degrees, that it is okay to try and fail or even admit mistakes, that experts are not always right, that some better solutions exist somewhere out there. All of these are not easy given that today's higher and professional education is very competitive and performance-driven. Education for learning identity and humility could be conducted as post-hoc training or intervention workshops, or instilled early into the K-12 educational system. Having a learning identity and practicing humility are the basic essential steps to a lifelong learning process.

Conclusion

Acquiring and training experts to be able to quickly respond to the changing environments has been and will always be a big challenge for all organizations in this day and age. The solution sometimes may be counterintuitive: that one has to unlearn what one has learned, refrain from doing what has been successful, and keep in perspective what one has achieved. I hope that the motivational framework presented in this dissertation will offer a fresh start in the conversation on how to get experts unstuck and of my research career on humility and lifelong learning.

APPENDIX I. DEDUCTIVELY GENERATED LEARNING IDENTITY ITEMS[8]

Source	Item
Langer's Mindfulness Scale (Bodner, 2000)	1. I seldom wonder why. [R] 2. I like being challenged intellectually. 3. I am always open to new ways of doing things. 4. I like to investigate things. 5. I am rarely alert to new developments. [R] 6. I have an open-mind about everything, even things that challenge my core beliefs. 7. I rarely seek to learn about things in depth. [R] 8. I try to think of new ways of doing things. 9. I am very curious. 10. I avoid thought-provoking conversations. [R] 11. It is very important for me to understand things. 12. I do not actively seek to learn new things. [R] 13. I like to figure out how things work. 14. I stay with the old tried and true ways of doing things. [R] 15. I do not find learning new things satisfying. [R]

[8] [R] Reversed coded items

Learning focus (McKenna et al., 2007)	16. I am willing to learn. 17. I consciously decide to learn from or pattern behaviors after a role model. 18. I enjoy seeking challenges and being 'on-the-edge' of abilities. 19. I can apply past experiences to the current event. 20. I consciously set aside time to reflect on the situation, strengths, weaknesses, contribution, personal development. 21. I actively seek feedback.
Ability to learn from experience (Spreitzer et al., 1997)	22. I take advantages of opportunities to do new things. 23. I pursue feedback even when others are reluctant to give it.
Openness to experience (McCrae et al., 2005)	24. I like the old-fashioned methods I'm used to. [R] 25. I believe variety is the spice of life. 26. I believe that it's better to stick to your own principles than to be open-minded. [R]
Epistemic curiosity	27. I enjoy learning about subjects which are unfamiliar. 28. I think it's fascinating to learn new information.

(Litman & Spielberger, 2003)	29. I enjoy exploring new ideas. 30. When I learn something new, I like to find out more. 31. When I see a complicated piece of machinery, I want to ask someone how it works. 32. When I see new kinds of arithmetic problem, I enjoy imagining solutions. 33. When I see incomplete puzzle, I try and imagine the final solution. 34. I am interested in discovering how things work.
Openness to experience (Goldberg et al., 2006)	35. I have a vivid imagination. 36. I enjoy hearing new ideas. 37. I enjoy thinking about things. 38. I can say things beautifully. 39. I enjoy wild flights of fantasy. 40. I get excited by new ideas. 41. I rarely look for a deeper meaning in things. [R]
Curiosity & Exploration Inventory (Kashdan,	42. I would describe myself as someone who actively seeks as much information as I can in a new situation. 43. I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, and resources).

Rose, & Fincham, 2004)	44. I am not the type of person who probes deeply into new situations or things. [R] 45. Everywhere I go, I am out looking for new things or experiences.
Developed from learning identity's definition	46. I see myself as a learner. 47. I seek and engage life experiences with a learning attitude. 48. I believe in my ability to learn. 49. I embrace challenges in life and at work. 50. I persist in the face of obstacles. 51. I learn from criticism. 52. I am inspired by the success of others. 53. I learn from the success of others. 54. Always learning new things is important to me. 55. To me learning is a life-long process. 56. Once I set my mind to it, I can learn anything.

APPENDIX II. INDUCTIVELY GENERATED LEARNING IDENTITY ITEMS

1. I learn something new every day.
2. I like to explore and go beyond the obvious.
3. Discovering new possibilities is exciting to me.
4. I often ask lots of questions about how things work.
5. The learning process is engaging.
6. Learning is a pleasure.
7. My facial and non-verbal expressions show active interest in new things.
8. I often discover new things that interest me.
9. I like to learn how to learn.
10. I like to try new ideas.
11. I look at things from different directions.
12. I'm willing to allow ideas to unfold.
13. To me, the learning process never ends.
14. I learn a lot from the unexpected.
15. Learning is generative of further learning.
16. The more I know, the more there is to know.
17. I learn from making mistakes.
18. I don't like being ignorant.
19. I learn from challenging my existing beliefs.
20. I know my strengths and weaknesses.
21. I know what kind of environment would help me learn best.

22. I'm comfortable with not knowing something.
23. I understand the way I learn.
24. I trust my intuition.
25. I enjoy learning as a part of my own intellectual growth.
26. I believe that continual learning and development are one of the main purposes of life.
27. I love to learn and grow both personally and professionally.
28. My learning interests are both deep and broad.
29. You can't teach an old dog new tricks. [R]
30. When I realize I'm wrong, I try to find out why, and what the right answer is.
31. I have lists of things to read or learn when I have the time.
32. I write down ah-ha moments.
33. I have tools or tricks to support my learning.
34. When I encounter something I don't know, I believe I can figure it out.
35. When I encounter something I don't know, I know where to look for help.
36. When I encounter a problem, I believe there is something I can learn from it.
37. I am not afraid of making mistakes.
38. I am comfortable stepping out of my comfort zone to learn something new.
39. When someone explains something new, I listen intently.
40. I like to teach others what I've learned.
41. I'm curious to know how something is seen or experienced by another person.

42. I enjoy discussing information about something I have learned with others who are knowledgeable in the topic.
43. I learn from meaningful conversations with others.
44. I seek out people who help me learn.

APPENDIX III. PRELIMINARY LEARNING IDENTITY ITEM POOL AND CATEGORIES

I. LOVE OF LEARNING

04. I like to investigate things.

05. I am rarely alert to new developments. R

13. I like to figure out how things work.

15. I do not find learning new things satisfying. R

27. I enjoy learning about subjects which are unfamiliar.

28. I think it's fascinating to learn new information.

29. I enjoy exploring new ideas.

32. When I see new kinds of arithmetic problem, I enjoy imagining solutions.

34. I am interested in discovering how things work.

36. I enjoy hearing new ideas.

40. I get excited by new ideas.

58. I often discover new things that interest me.

59. I like to learn how to learn.

61. I like to try new ideas.

72. Learning is a pleasure.

73. The learning process is engaging.

95. I enjoy learning as a part of my own intellectual growth.

97. I love to learn and grow both personally and professionally.

II. LEARNING SELF-IMAGE

01. I seldom wonder why. R

07. I rarely seek to learn about things in depth. R

11. It is very important for me to understand things.

14. I stay with the old tried and true ways of doing things. R

16. I am someone who is willing to learn.

24. I like the old-fashioned methods I'm used to. R

41. I rarely look for a deeper meaning in things. R

42. I would describe myself as someone who actively seeks as much information as I can in a new situation.

44. I am not the type of person who probes deeply into new situations or things. R

46. I see myself as a learner.

48. I believe in my ability to learn.

54. Learning new things is important to me.

55. To me learning is a life-long process.

56. Once I set my mind to it, I can learn anything.

77. To me, the learning process never ends.

96. I believe that continual learning and development are one of the main purposes of life.

98. My learning interests are both deep and broad.

III. LEARNING RELATIONSHIPS

17. I consciously decide to learn from or pattern behaviors after a role model.

52. I am inspired by the success of others.

53. I learn from the success of others.

65. I like to teach others what I've learned.

66. I'm curious to know how something is seen or experienced by another person.

83. I learn from meaningful conversations with others.

88. I seek out people who help me learn.

94. I enjoy discussing information about something I have learned with others who are knowledgeable in the topic.

IV. LEARNING STRATEGIES

20. I consciously set aside time to reflect on the situation, strengths, weaknesses, contribution, personal development.

21. I actively seek feedback.

43. I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, and resources).

69. When I encounter something I don't know, I know where to look for help.

86. I know my strengths and weaknesses.

87. I know what kind of environment would help me learn best.

89. I have tools or tricks to support my learning.

91. I understand the way I learn.

92. I trust my intuition.

V. PERSISTING IN THE FACE OF CHALLENGES

02. I like being challenged intellectually.

06. I have an open-mind about everything, even things that challenge my core beliefs.

18. I enjoy seeking challenges and being 'on-the-edge' of abilities.

49. I embrace challenges in life and at work.

50. I persist in the face of obstacles.

51. I learn from criticism.

68. When I encounter something I don't know, I believe I can figure it out.

74. When I realize I'm wrong, I try to find out why, and what the right answer is.

81. I learn from making mistakes.

84. I learn from challenging my existing beliefs.

85. I am not afraid of making mistakes.

93. I am comfortable stepping out of my comfort zone to learn something new.

99. When I encounter a problem, I believe there is something I can learn from it.

VI. IMMERSION IN LIFE EXPERIENCE

03. I am open to new ways of doing things.

09. I am very curious.

25. I believe variety is the spice of life.

35. I have a vivid imagination.

39. I enjoy flights of fantasy.

45. Everywhere I go; I am out looking for new things or experiences.

47. I embrace life experiences with a learning attitude.

57. I learn something new every day.

67. I like to explore and go beyond the obvious.

70. Discovering new possibilities is exciting to me.

75. I'm willing to allow ideas to unfold.

78. I learn a lot from the unexpected.

APPENDIX IV. MEASUREMENTS USED IN STUDIES 1-3

Range of Interests

Which of the following areas are you interested in? Please select all that apply.

- ☐ Film, Music, & Books
- ☐ Health & Fitness
- ☐ Architecture
- ☐ Home Decor
- ☐ Design
- ☐ Hair & Beauty
- ☐ Quotes
- ☐ Wedding
- ☐ DIY & Crafts
- ☐ Gardening
- ☐ Photography
- ☐ Products
- ☐ Education
- ☐ Art
- ☐ Outdoors
- ☐ Women's Fashion
- ☐ Animals
- ☐ Tattoos
- ☐ Technology
- ☐ Men's Fashion
- ☐ Holidays & Events
- ☐ Science & Nature
- ☐ Food & Drinks
- ☐ History
- ☐ Illustrations & Posters
- ☐ Cars & Motorcycles
- ☐ Celebrities
- ☐ Travel
- ☐ Kids
- ☐ Humor
- ☐ Geek
- ☐ Sports

Openness to Experience (10 items) (Goldberg et al., 2006)

1. Believe in the importance of art.
2. Have a vivid imagination.
3. Tend to vote for liberal political candidates.
4. Carry the conversation to a higher level.
5. Enjoy hearing new ideas.
6. Am not interested in abstract ideas. [R]
7. Do not like art. [R]
8. Avoid philosophical discussions. [R]
9. Do not enjoy going to art museums. [R]
10. Tend to vote for conservative political candidates. [R]

Epistemic Curiosity (8 items) (Litman & Spielberger, 2003)

1. Enjoy learning about subjects which are unfamiliar
2. Learn something new/like to find out more
3. Enjoy discussing abstract concepts
4. See a complicated piece of machinery/ask someone how it works
5. New kind of arithmetic problem/enjoy imagining solutions
6. Incomplete puzzle/try and imagine the final solution
7. Interested in discovering how things work
8. Riddle/interested in trying to solve it

Learning Goal Orientation (8 items) (Button et al., 1996)

7. The opportunity to do challenging work is important to me.

8. When I fail to complete a difficult task, I plan to try harder the next time I work on it.
9. I prefer to work on tasks that force me to learn new things.
10. The opportunity to learn new things is important to me.
11. I do my best when I'm working on a fairly difficult task.
12. I try hard to improve on my past performance.
13. The opportunity to extend the range of my abilities is important to me.
14. When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work.

Performance Goal Orientation (8 items) (Button et al., 1996)

1. I prefer to do things that I can do well rather than things that I do poorly.
2. I'm happiest at work when I perform tasks on which I know that I won't make any errors.
3. The things I enjoy the most are the things I do the best.
4. The opinions others have about how well I can do certain things are important to me.
5. I feel smart when I do something without making any mistakes.
6. I like to be fairly confident that I can successfully perform a task before I attempt it.
7. I like to work on tasks that I have done well on in the past.
8. I feel smart when I can do something better than most other people.

Social Desirability Scale (5 items) (Hays et al., 1989)

1. I am always courteous even to people who are disagreeable.
2. There have been occasions when I took advantage of someone.
3. I sometimes try to get even rather than forgive and forget.
4. I sometimes feel resentful when I don't get my way.
5. No matter who I'm talking to, I'm always a good listener.

Internal-External Locus of Control Scale (23 items) (Rotter, 1966)

1. a. The idea that teachers are unfair to students is nonsense.

   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
2. a. When I make plans, I am almost certain that I can make them work.

   b. It is not always wise to plan too far ahead because many things turn out to- be a matter of good or bad fortune anyhow.
3. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

   b. There really is no such thing as "luck."
4. a. In the long run the bad things that happen to us are balanced by the good ones.

   b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
5. a. With enough effort we can wipe out political corruption.

   b. It is difficult for people to have much control over the things politicians do in office.
6. a. Many times I feel that I have little influence over the things that happen to me.

b. It is impossible for me to believe that chance or luck plays an important role in my life.

7. a. People are lonely because they don't try to be friendly.

   b. There's not much use in trying too hard to please people, if they like you, they like you.

8. a. What happens to me is my own doing.

   b. Sometimes I feel that I don't have enough control over the direction my life is taking.

Need for Achievement (7 items) (Goldberg et al., 2006)

1. I do more than what's expected of me.
2. I accomplish a lot of work.
3. I excel in what I do.
4. I plunge into tasks with all my heart.
5. I do just enough work to get by. [R]
6. I find it difficult to get down to work. [R]
7. I need a push to get started. [R]

Self-Efficacy (8 items) (Chen et al., 2001)

1. I will be able to achieve most of the goals that I have set for myself.
2. When facing difficult tasks, I am certain that I will accomplish them.
3. In general, I think that I can obtain outcomes that are important to me.
4. I believe I can succeed at most any endeavor to which I set my mind.
5. I will be able to successfully overcome many challenges.

6. I am confident that I can perform effectively on many different tasks.
7. Compared to other people, I can do most tasks very well.
8. Even when things are tough, I can perform quite well.

Self-Esteem (10 items) (Rosenberg, 1965)

1. I feel that I am a person of worth, at least on an equal plane with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure. [R]
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of. [R]
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself. [R]
9. I certainly feel useless at times. [R]
10. At times I think I am no good at all. [R]

Organicism-Mechanism Paradigm Inventory (26 items) (Johnson et al., 1989)

1. a. Schools should be where a child learns to think for him/herself.

   b. Schools should be where a child learns basic information.

2. a. Things really look different if we change how we see them.

   b. Things really look different only if they are changed.

3. a. Organisms change by forces from outside themselves.

   b. Organisms can change themselves.

4. a. A good judge is purely objective.

   b. A good judge is not objective and knows it.

5. a. Great discoveries come from scientific imagination.

   b. Great discoveries come from scientific experimentation.

6. a. All things stay basically the same over time.

   b. All things change from one moment to the next.

7. a. A business executive needs time to analyze the facts.

   b. A business executive needs time for creative thinking.

8. a. Before making a big decision, I like to sleep on it.

   b. Before making a big decision, I like to get all the information.

9. a. Progress in science occurs when there is a new-way of looking at events.

   b. Progress in science occurs when an important observation is made.

10. a. A criminal just a burden to society.

    b. A criminal has a function in society.

11. a. Our knowledge is limited by our observations.

    b. Our knowledge is limited by our imagination.

12. a. Living is a process of using up the available supplies.

    b. Living is a process of exchanging supplies back and forth.

13. a. Events are sometimes just the same as before.

    b. Events are always new and different in some way.

14. a. Divorce is often a phase in each partner's growth.

    b. Divorce is usually the result of incompatible personalities.

15. a. Facts are more useful than a good idea.

    b. Facts are less useful than a good idea.

16. a. Each relationship I have is different.

    b. Each relationship I have is much like the previous one.

17. a. Things are changed only when they are directly affected.

    b. Things are changed by everything else.

18. a. We learn by carefully examining individual facts.

    b. We learn by finding order in an array of facts.

19. a. To live independently of other people is not a realistic goal.

    b. To live independently of other people is a realistic goal.

20. a. War can be understood by examining what purpose it served.

    b. War can be understood by examining its causes.

21. a. The world is like a large, living organism.

    b. The world is like a large, complex machine.

22. a. A child discovers the world by being praised and punished.

    b. A child discovers the world by testing his/her dreams and fears.

23. a. I can change things in my family only by planned action.

    b. I can change things in my family just by being who I am.

24. a. A child's world is different from mine.

    b. A child's world is like mine, but he/she knows less.

25. a. Persons are made by their environments.

    b. Persons and their environments affect each other.

26. a. To resolve a family dispute, it is important how we look at the facts.

    b. To resolve a family dispute, it is important to discover all the facts.

Resistance to Change (11 items) (Oreg, 2003)

Routine-seeking subscale

1. I'd rather be bored than surprised.
2. Generally, change is good.
3. I'll take a routine day over a day full of unexpected events any time.
4. Whenever my life forms a stable routine, I look for ways to change it.
5. I prefer having a stable routine to experiencing changes in my life.
6. I generally consider changes to be a negative thing.
7. I like to do the same old things rather than try new and different ones.
8. I like to experience novelty and change in my daily routine.

Cognitive rigidity subscale

9. I don't change my mind easily.
10. I often change my mind.
11. My views are very consistent over time.

Expertise (5 items) (Johanna & Van der Heijden, 2000)

1. I have expert knowledge in my job domain.
2. I consider myself competent to engage in in-depth discussions in the domain of my work.
3. I consider myself competent to be of practical assistance to colleagues with questions in my area of expertise.

4. I am competent to handle the methods and materials in use in the domain of my work.
5. I am able to solve problems that occur at work with ease.

Humility Semantic Differential (7 items) (Rowatt et al., 2006)

1. humble/ arrogant
2. modest/ immodest
3. respectful/ disrespectful
4. egotistical/ not self-centered
5. conceited/ not conceited
6. intolerant/ tolerant
7. closed-minded/ open-minded

Perceived Humility (19 items) (Ou et al., 2014)

1. My colleague actively seeks feedback, even if it is critical.
2. My colleague acknowledges when others have more knowledge and skills than himself/herself.
3. My colleague admits when he/she doesn't know how to do something.
4. My colleague shows appreciation for the contributions of others.
5. My colleague takes notice of the strengths of others.
6. My colleague often compliments others on their strengths.
7. My colleague is willing to learn from others.
8. My colleague is open to the ideas of others.
9. My colleague is open to the advice of others.

10. My colleague does not like to draw attention to himself/herself.
11. My colleague keeps a low profile.
12. My colleague is not interested in obtaining fame for himself/herself.
13. My colleague has a sense of personal mission in life.
14. My colleague devotes his/her time to the betterment of the society.
15. My colleague his/her work makes the world a better place.
16. My colleague believes that all people are a small part of the universe.
17. My colleague believes that no one in the world is perfect, and he/she is no better or worse than others.
18. My colleague believes that something in the world is greater than he/she.
19. My colleague believes that not everything is under his/her control.

Perceived Adaptability (21 items) (Pulakos et al., 2000)

1. I remain composed when faced with difficult circumstances.
2. I direct effort to constructive solutions rather than blaming others.
3. I demonstrate professionalism in stressful circumstances.
4. I act as a calming influence to whom others look for guidance.
5. I generate new, innovative ideas in complex areas.
6. I think outside the given parameters to see if there is a more effective approach.
7. I effectively adjust plans to deal with changing situations.
8. I do what is necessary to keep my knowledge and skills current.
9. I adjust to new work processes and procedures.
10. I anticipate changes in the work demands.

11. I take action to improve work performance deficiencies.
12. I am open-minded when dealing with others.
13. I listen to others' viewpoints.
14. I alter my own opinion when it is appropriate to do so.
15. I am open and accepting of negative or developmental feedback regarding work.
16. I develop effective relationships with highly diverse personalities.
17. I tailor my own behavior to work more effectively with others.
18. I take action to understand the needs and values of other groups.
19. I am comfortable with different value and cultures.
20. I willingly adjust my behavior as necessary to show respect for others' cultures.
21. I adjust my approach to maintain positive relationships with different groups of people.

APPENDIX V. ALTERNATIVE CHOICE FOR LEARNING IDENTITY ITEMS

1. I enjoy learning about subjects which are unfamiliar.
2. I get excited by new ideas.
3. I am interested in discovering how things work.
4. I see myself as a learner.
5. I would describe myself as someone who actively seeks as much information as I can in a new situation.
6. I am a curious person.

Alpha = .94

APPENDIX VI. DESCRIPTIVE STATISTICS OF VARIABLES IN STUDY 3

	Sex	Age	Education	Work experience	Self-report expertise	Perceived expertise	PGO	LGO	Learning identity	Self-report humility	Perceived humility	Self-report adaptability	Perceived adaptability	LFI
Mean	.74	47.47	3.71	18.818	6.3789	6.5746	5.2550	6.2588	6.5058	75.7767	6.0253	5.9666	6.2010	.6780
Std. Deviation	.444	11.629	.881	12.5400	.56021	.50212	.84359	.51909	.54914	11.10533	.57685	.52988	.57371	.15507
Skewness	-1.105	-.225	-.033	.185	-.702	-2.337	-.299	-.921	-.833	-.961	-.883	-.771	-.926	-.263
Std. Error of Skewness	.316	.316	.316	.316	.316	.316	.316	.316	.316	.316	.316	.316	.316	.316
Kurtosis	-.809	-1.042	.818	-1.373	-.610	9.597	-.129	1.518	-.384	.874	2.426	.748	2.242	-.238
Std. Error of Kurtosis	.623	.623	.623	.623	.623	.623	.623	.623	.623	.623	.623	.623	.623	.623
Minimum	0	26	1	.0	5.00	4.10	3.13	4.50	5.17	45.57	3.79	4.48	4.05	.34
Maximum	1	71	6	43.0	7.00	7.31	7.00	7.00	7.00	94.71	7.00	6.86	7.13	.98

All Skewness and Kurtosis values fall between -3 and 3, indicating normality of data. The only exception is Kurtosis for perceived expertise (9.60), but this value is still within the acceptable cut-off of Kurtosis < 20.

APPENDIX VII. PRINCIPAL COMPONENT ANALYSIS OF PERCEIVED HUMILITY AND ADAPTABILITY MEASURES

	Component						
	1	2	3	4	5	6	7
RAdaptability19	.823						
RAdaptability20	.685						
RAdaptability21	.680						
RAdaptability16	.668						
RAdaptability18	.656						
RHumility15	.436	.384					
RAdaptability17	.417						
RHumility14	.412						
RAdaptability09	.410					-.368	
RHumility18		.845					
RHumility16		.803					
RHumility17		.773					
RHumility19		.678					
RHumility11			.940				
RHumility10			.918				
RHumility12			.827				
RAdaptability14			.427		.358		
RAdaptability06				.828			
RHumility13				.716			
RAdaptability11				.684	-.396		
RAdaptability05				.682			
RAdaptability08	.355				-.502		
RAdaptability10				.352	-.408		

RAdaptability01						-.787	
RAdaptability02						-.708	
RAdaptability03						-.659	
RAdaptability04						-.583	
RAdaptability07				.412		-.544	
RAdaptability15						-.390	.343
RHumility07							.776
RHumility04							.742
RHumility06							.699
RHumility09							.673
RHumility08							.669
RHumility03							.642
RHumility01							.626
RHumility05	.388						.593
RHumility02							.575
RAdaptability12						-.409	.514
RAdaptability13						-.347	.408

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 17 iterations.

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