# Coaching for learning agility: The importance of leader behavior, learning goal orientation, and psychological safety

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ABSTRACT

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The present research explored associations between potential antecedents of subordinate learning agility and subordinate performance (perceived manager coaching behavior, subordinate learning goal orientation, and perceived manager-subordinate psychological safety). Two studies were conducted: one in a healthcare organization and another using crowd-sourced data. Findings demonstrated significant associations between study constructs. Specifically, structural equation modeling and regression results demonstrated that perceived manager coaching behavior was associated with perceived manager-subordinate psychological safety and with subordinate learning agility. Analyses also established that subordinate learning goal orientation was associated with subordinate learning agility. Additionally, results demonstrated that perceived manager-subordinate psychological safety was associated with subordinate learning agility. Finally, results did not verify an association between subordinate learning agility and subordinate performance, although this may have been due to methodological issues rather than empirical ones. Future research should assess causal mechanisms, other antecedents, and contextual elements such as the level of change in an organization. A fuller study of these constructs may provide more understanding of the importance of learning agility in the workplace. Implications for organizations are discussed.

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It is hard to synthesize this learning journey and put it into words. I remember, while studying for my master's degree at University College London, feeling incredibly bogged down and overwhelmed by where to start with a research question and how to relevant statistics to articulate my findings. At that point I felt completely lost in all the numbers, requirements for APA formatting, and I did not think I had the ability to ask relevant original questions. However, during the last five years I have undergone a professional transformation to get me to a place in which I feel confident and secure in my knowledge and my ability to provide value to organizations and the people in them.

My interests in organizational psychology remain diverse. I am so glad I have engaged in several different content and research areas that have allowed me the opportunity to explore diversity and inclusion, cognitive structures, as well as individual difference/personality traits and assessments specifically for this dissertation.

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# DEDICATION

*For my husband, Jonathan, and my parents, Barbara & George,*
*who have taught me about the true meaning of psychological safety.*

## Chapter I: Problem and Purpose

Organizations are facing the need to change today more rapidly than ever before. Recent change in the external environment has created several new streams of research that have demonstrated the importance of the ability to learn quickly and to adequately deal with this shifting environment (Dai, De Meuse, & Tang, 2013; DeRue, Ashford & Myers, 2012; De Meuse et al., 2011; Lombardo & Eichinger, 2000; Mitchinson, Gerard, Roloff, & Burke, 2012). Indeed, the study of learning agility, the ability to quickly physically or mentally reconfigure activities in light of change as new needs arise, suggests that learning agility could be critical to differentiating between average and high potential employees. Furthermore, it may help organizations make the best possible decisions about all employees in both selection and development contexts (Lombardo & Eichinger, 2000; Mitchinson et al., 2012).

While research in the area of learning agility is relatively new, researchers have begun to learn several important lessons. Learning agility is an important construct due to its purported link with performance. Indeed, one study recently showed a link between learning agility and performance (Smith, 2015). A meta-analysis on outcomes related to learning agility also supported this association (De Meuse, 2017). Additionally, in another recent study (Drinka, Catenacci & Burke, 2016), goal orientation was associated with learning agility as theorized by other researchers (DeRue et al., 2012), which may further provide support for the link between performance and learning agility and demonstrate that one's mindset going into a task has an impact on one's performance in that task.

The construct of learning agility itself is becoming clearer due to an increased research focus. A research team at Teachers College, Columbia University proposed that learning agility can be understood via the measurement of 38 specific behavioral practices (Burke et al., 2016). These behavioral practices can be further described by nine behavioral dimensions: Seven dimensions

measure "learning" processes, and the remaining two dimensions measure "agility." The learning dimensions cover feedback seeking, information seeking, interpersonal risk-taking, collaborating, performance risk-taking, reflection, and experimenting behavior. The agility dimensions describe speed and flexibility as important facets of behavior that influence one's learning agility capacity.

While learning agility is becoming better understood than ever before, antecedents and contextual elements are not as well defined and remain relatively unknown. Several models have been proposed in the learning agility and psychological safety literatures that may help shed light on the contextual and antecedent elements of learning agility. DeRue et al. (2012) noted that individual differences, such as learning goal orientation, are important antecedents to consider. Learning goal orientation, a personality trait, is the capacity to view opportunities as a desired challenge in order to demonstrate capabilities. Carol Dweck's seminal (1986) work, when applied to organizations, demonstrated that people with a high degree of learning goal orientation are more likely to be high performers (Colquitt & Simmering, 1998). Originally, she conducted her research on children and posited that there are two distinct motivational processes that undergirded how individuals achieve goals and how they view those goals. One of these processes is known as having a learning goal orientation, in which individuals seek to increase their competence and knowledge in a particular task domain out of the genuine desire to learn more. The other process is known as having a performance orientation in which individuals desire to gain positive judgments of their competence in a task domain or strive to avoid negative judgments of their competence. When Dweck's work was applied to organizations, people with a learning goal orientation were more likely to perform highly on tasks than their performance-oriented peers (Colquitt & Simmering, 1998).

Recent studies (e.g., Drinka et al., 2016) demonstrated significant associations between learning goal orientation and learning agility, which may support the notion that when one has a mindset intent upon learning when going into a specific task, one behaves in a way that is more learning

agile. However, the difference between these two constructs is unclear. At this juncture, learning goal orientation is most likely a personality trait that is an antecedent of learning agility, although further research seeks to understand this relationship to a greater extent.

Another important contextual element relates to psychological safety. Psychological safety is defined as the belief among individuals on a team that engaging in interpersonal risk-taking is acceptable (Edmondson, 1999). Furthermore, the belief is primarily a tacit one that is taken for granted and usually not discussed explicitly. Edmondson's work on teams has focused on general contextual constraints needed for a leader to support his or her followers effectively. One factor Edmondson takes into account is learning behaviors, which are similar to the 38 behavioral practices defined by researchers at Teachers College. Indeed, Edmondson's work showed that teams that have a shared belief that their climate is psychologically safe are more likely to learn in the workplace. Edmondson's work on psychological safety was studied at the team level of analysis, however, some work was done to understand psychological safety at the dyadic level of analysis (Edmondson & Woolley, 2003). For example, this phenomenon can be extended to understanding both the shared beliefs between a manager and subordinate or the perception of psychological safety that a subordinate directs towards his or her manager. In a relationship characterized as having a high degree of psychological safety, a subordinate might believe that he or she can propose solutions that "push the envelope" to his or her manager in order to solve a particular problem.

Psychological safety has many practical implications. Edmondson (2004), and other scholars before her (e.g., Argyris, 1993; Schein, 1993a) argued that psychological safety between a leader and his or her subordinates has practical implications for the workplace. Early on, the construct was rooted in research indicating that psychological safety was necessary for people to feel safe and able to change. Argyris (1993) was interested in understanding how individuals and organizations could learn from their actions. He proposed that a context in which individuals are able to say what they

really mean – that they do not fall into "defensive routines" in which people say whatever is the politest thing to say – is important to organizational learning. He believed that people are likely to behave in ways that reduce their learning when they see the threat of embarrassment. At the same time, Schein (1993a) noted that "containment" is important for organizational learning, in which people can express emotionality and tension without a detrimental impact on relationships.

Another important contextual element in the study of learning agility is the fact that one's manager or leader* may have an impact on a subordinate's motivation to learn on-the-job. Further research may be able to elucidate the ongoing dynamics between manager effectiveness and a subordinate's ability to learn. Some research has resulted in a better understanding of specific behavioral styles that leaders exude (e.g., coaching) and how it may help subordinates learn (Edmondson, 1999; Hackman & Wageman, 2005). A coaching stance links to learning agility because when a manager enacts a coaching stance, subordinates may feel more interpersonally supported and be able to learn more quickly. Part of this learning may be exhibited by feeling freer to experiment with new ideas to solve problems, which is a critical component of learning agility. Similarly, research shows that leaders who are empathetic and exhibit emotional intelligence have more effective teams than leaders who do not demonstrate these traits (Hogan, Curphy & Hogan, 1994; Kellett, Humphrey & Sleeth, 2002). Finally, other applicable research relates to how leaders influence the specific psychological states of followers in a way that supports risk-taking, a key facet of learning agility (Amabile, Schatzel, Moneta, & Kramer, 2004). In Amabile and colleagues' study, perceived leader support was related to increased creativity in subordinates who worked on creative

* In the current study, the terms manager and leader are used interchangeably. They are used to refer to anyone who manages and/or leads people broadly. While there is a theoretical and practical distinction between the two (Kotterman, 2006), that is not the scope of the present research.

projects at seven different companies. Support was defined as perceived encouragement from a leader.

While the efficacy of coaching in driving performance has been demonstrated in general (e.g., Smither et al., 2003), the specific behaviors managers engage in with their subordinates in order to coach them to learn has not been studied extensively. Edmondson (1996; 1999) found that when leaders are supportive and coaching-oriented, they were able to create a safe space that enables learning. For example, in a study in hospitals, employees were more willing to report mistakes when leaders adopted a particular behavioral style. These leaders reduced the climate of fear on the team so that employees could discuss and identify problems and seek feedback from leaders that allowed them to learn from their mistakes. When employees learned from their mistakes, they were likely to perform at a higher level.

Other research on a similar topic has pointed to specific coaching behaviors that enhance learning in a dyadic relationship (e.g., Parker, Hall & Kram, 2014). Parker, Hall & Kram focused their work on peer coaches. While peer coaches have a different level of authority from manager coaches that may have an impact on outcomes, their work may be illustrative because the coaching process is a similar type of supportive dyadic relationship. Parker and colleagues found that when peer coaches act out specific behaviors, they can drive learning through creating a safe holding environment. Behaviors that may contribute to psychological safety were defined as honoring confidentiality of discussion and mutually agreeing upon the scope of the engagement. They also noted that effective peer coaches listened more than they spoke and were able to engage in reflection with their peer coachee. Furthermore, effective peer coaches posed thoughtful questions that surfaced assumptions rather than only giving advice. While this work is helpful to get a better

grasp of coaching behaviors, at this juncture, the nature of effective coaching behavior, especially in a manager relationship, is not entirely clear.

In sum, organizational outcomes may be related to learning agility. Specifically, performance is one of these that is considered in the present study, but performance may also be sub-divided further to encompass other essential facets like complex problem solving and innovation. Other antecedents may be related to learning agility, as well. At the individual level this may be composed of personality dimensions like learning goal orientation as well as an employee's level of experience and development. Leadership may also have an impact on learning agility – for example, leaders may be able to create psychological safety by coaching subordinates and also increase their learning agility directly. Finally, while not the focus of this study, organizational culture, organizational strategy, and the need to adapt may be other important factors that have an impact on learning agility in organizations.

A key purpose of this research is to discern what coaching behaviors managers engage in with their subordinates that drive effective performance. Coaching is an important behavioral style to focus on because managers have a considerable impact on creating a climate of safety in which learning behavior can take place. When managers support the learning of their subordinates, they may help their subordinates grow, and subordinates may be more likely to create high quality work. Furthermore, organizations might want to focus on this particular behavioral style in managers because it can be increased through learning and development efforts. The impetus of this study may demonstrate the need for leaders to coach for greater learning agility in their subordinates. Finally, the purpose of this research is to develop a model to better understand the process of how dyadic-level learning between a manager and subordinate occurs.

## Chapter II: Literature Review and Hypotheses

### Learning agility & performance

Our current understanding of learning agility came from earlier studies related to how employees learn from experience. The capacity to learn quickly from experience sets high performing employees apart from their peers. Two CCL studies found that when employees have powerful experiences on-the-job, they are able take lessons from these experiences in order to increase their long-term success (McCall, Lombardo & Morrison, 1988; Morrison, White & Van Velsor, 1992). In the McCall et al. (1988) study, high-performing executives displayed similar patterns of behavior that demonstrated their learning from particular job appointments. Examples of job assignments in which executives demonstrated new learning were career transitions such as an increase in the scope of their current assignment or moving from a line to a staff job. In the Morrison, White & Van Velsor (1992) study, employees learned lessons that required new skills and they were more likely to be successful. Those who failed to adapt to new experiences were more likely to become stuck and were hindered from career progression. Later studies demonstrated similar findings.

One such study demonstrated the importance of learning from experience and was conducted by Spreitzer, McCall & Mahoney (1997). They illustrated that learning in an expatriate sample was related to employee ability to learn quickly from experience. Those managers and executives who were decidedly curious, adventurous, and who enjoyed learning new things were more likely to be higher performers than their peers. Specifically, these employees who initially paid the "price of admission" to get initial attention from peers and superiors, in part by taking risks, were more likely to be identified as being "high potential" to advance within the organization. Once in a new role, if they took specific opportunities to learn, in part by learning from other cultures to understand new ways of accomplishing tasks and by seeking out feedback, they were more likely to be successful in the future. Finally, high-performing managers and executives were able to reflect on their

experience in order to further understand which behaviors were useful and which behaviors were not in order to increase future effectiveness.

Lombardo & Eichinger (2000) noted in their research that those who learned from experience tended to have more task variety from which to learn new things. In order to tackle new challenges, leaders learned new skills and acquired new patterns of thinking. Successful leaders were more likely to seek out feedback on what they could do to perform better in future. They also found that those who experienced failure were unable to learn new things. Lombardo & Eichinger thought of the high performers as "high learners." They posited that these were people who had the capacity to learn quickly in the face of changing situations.

In light of studies in which executives learn from experience, learning agility can been thought of as the ability to reconfigure activities, either physically or mentally, to quickly meet changing demands in the face of new tasks or a shifting environment. Individuals who possess a high level of learning agility engage in behaviors that help them both efficiently execute and thoughtfully learn in unfamiliar contexts. Put succinctly, these individuals are both adept at understanding the requirements of a specific task and can quickly and flexibly deploy a solution that works. Learning agility is more than just trial-and-error learning to throw a solution at a problem until something works: It involves taking in new information from one's environment through feedback, collaboration with others, and keeping up-to-date with emerging trends, as well as other strategies, to make an informed decision about what will work and making that decision quickly.

In consideration of previous studies, several researchers have worked to develop a tool to measure what they purport to be learning agility. De Meuse et al. (2011) and Dai et al. (2013) developed a tool to measure learning agility that was linked to some performance outcomes, however, their tool was not theoretically grounded in a current understanding of learning agility (DeRue et al., 2012). Several criticisms have been lodged against this specific assessment. One

criticism is that a dimension ("results agility") appears to confound purported learning agility with performance. Many of the items that measure learning agility appear to also tap into performance directly, giving the impression that their measure of learning agility is not assessing the construct itself. This issue poses a challenge in order to accurately gauge content validity. Additionally, the measure is problematic when considering whether learning agility is a unique construct that predicts performance. For example, a sample item is "Performs well under first-time conditions." Clearly, this item taps into the perception of performance. The other criticism with this tool is that it is not behavioral in nature and therefore, it is not well positioned for those seeking to change their learning agility through development.

DeRue and colleagues (2012) proposed a more comprehensive model of learning agility. They indicated that several important processes – learning from experience and unlearning challenging patterns of behavior effectively, for example, undergird learning agility. Additionally, they asserted that both cognitive and behavioral processes are factors that should be considered. Specifically, important cognitive processes are cognitive simulations, counterfactual thinking and pattern recognition. Cognitive simulations are similar to visualization: A cognitive process that allows individuals to think about situations they may encounter in the future in which they can build upon and experiment with considering their previous experience. Cognitive simulations are significant because they allow people to think about behavioral strategies they can use in future situations. Counterfactual thinking, another cognitive process, is a retrospective form of cognitive simulation. It allows individuals to generate ideas to help them understand why a particular outcome might have occurred and also allows them to strategize about how to change their behavior for the next time they encounter such a situation. Finally, pattern recognition is a process through which individuals detect commonalities of relationships when they are faced with large amounts of complex information. When individuals quickly perceive patterns within a complex array of information,

they can apply their learning to the next situation. Individuals who are adept in recognizing patterns quickly may be able to apply the information they have gleaned from previous experience to similar situations. Therefore, an individual who has these capacities may be able to apply lessons they have learned from patterns they have perceived across a broad range of experiences and situations. Understanding cognitive factors are important in order to understand how learning agility works; also important in DeRue and his colleagues' model of learning agility are behavioral processes. The behavioral processes that play a role and are potential ingredients are feedback seeking, experimentation and reflection, similar to dimensions of the model developed at Teachers College. These cognitive and behavioral factors work in concert to influence one's learning agility capacity.

A behavioral model to explain learning agility was developed by a team of researchers at Teachers College into a 38-item inventory (Burke et al., 2016). The authors who developed this assessment conceptualize learning agility as a unique construct – one that sits at the intersection of personality traits, cognitive constructs, and behavioral tendencies. The measure is based on nine dimensions of learning agility. The authors of this learning agility model conceived of seven dimensions that measure "learning", and the remaining two dimensions that measure "agility" for a nine-factor model. The learning dimensions are as follows: information seeking, feedback seeking, performance risk-taking, reflecting, experimenting, interpersonal risk-taking and collaborating. Additionally, the agility dimensions are speed and flexibility. The learning factors can be further defined (Burke et al., 2016); please see Table 1. For examples of each dimension, please see sample items in Table 2.

A unique aspect of this model is that test-makers developed it for individuals to become more aware of and develop their ability for learning agility over time. Part of how the tool seeks to do this is through providing developmental feedback on specific behavioral dimensions. Once assessed, an individual is scored as being either low, average, or high on each of the nine dimensions and

corresponding feedback is disseminated so that the test-taker can modify his or her behavior on each dimension. Then, the individual can 1) become more aware of their behavior in order to develop their ability over time and 2) become more aware of the effort they put into tasks in order to increase their learning agility (both of which, effort and ability, are known to have a significant impact on performance (Anderson & Butzin, 1974)).

Another vein of research that is relevant to the broader discussion of learning agility relates to innovation and creativity. A good deal of research has pointed to the finding that when leaders engage in specific behaviors, they can drive follower performance through innovation (e.g., Amabile, Schatzel, Moneta and Kramer, 2004; Howell & Avolio, 1993; Krause, 2004). Howell & Avolio (1993) measured the impact of perceived supportive leader behavior on subordinate innovation behavior using items that asked about, among other things, the extent to which leaders had coached subordinates. Perceived leader support was significantly associated with an increase in performance. This relationship was moderated by an increase in support for innovation. Amabile, Schatzel, Moneta and Kramer (2004) found that perceived leader support was essential in helping followers innovate. Supportive leader behaviors encompassed activities like providing encouragement for a subordinate overseeing a project and providing clear goals to complete necessary work. A similar finding was supported by work by Krause (2004) who found that when leaders granted autonomy and freedom and used expert knowledge and information, their subordinates engaged in innovation behavior more frequently.

The research on innovation and creativity is important because there are several parallels with research on learning agility. The psychological state an individual is in when they innovate can be characterized as being learning agile. Specifically, innovative behaviors are described as a process in which individuals explore opportunities to innovate, for example, through gathering information (Klysen & Street, 2001) – similar to the information seeking dimension in the Teachers College nine-

factor learning agility model. When an individual innovates, he or she engages in formative investigation – a process by which a person formulates ideas, experiments with them, and evaluates them. This process is similar to the experimentation dimension of the nine-factor learning agility model. Additionally, the whole process of innovating can be characterized as risky – indeed, when someone innovates they do not know the outcome of their proposed new solution (Krause, 2004). For this reason, the innovation process is similar to the performance risk-taking dimension in the nine-factor model. Furthermore, when individuals engage in innovation behavior, performance typically increases (e.g., Gong, Huang & Farh, 2009). Gong, Huang & Farh (2009) found that employee innovation (measured as the extent to which employees were perceived as creative and developed custom-made services for clients) was related to an increase in sales (performance) and supervisors also rated employees as being more productive. Taken together, these studies demonstrate a clear association between learning agility and innovation.

Other research has explicitly tied learning agility to performance. Smith (2015) empirically linked the model of learning agility developed at Teachers College to performance in the financial services industry. He demonstrated that there were significant associations between a leader's ability to be learning agile and performance on-the-job. Additionally, in a recent meta-analysis, De Meuse (2017) noted that based on Smith (2015) and other studies, there is a robust relationship between leader performance and learning agility. In De Meuse's (2017) meta-analysis, he reviewed 19 field studies that examined the associations between learning agility and leader success. He found that there is a relationship between learning agility and both leader performance and leader potential on the magnitude of nearly $r=0.50$ for both indicators of leader success. In these studies, it should be noted that tasks that individuals were rated on, as part of their performance in a particular role, were likely to be complex tasks. For example, in the De Meuse meta-analysis, he noted that performance could be indicated by the number of promotions over a period of time. In order to be promoted,

one surely has to perform well at a range of complex tasks. In other studies, as part of the meta-analysis, competency ratings were used to understand leader success. The tasks that individuals engaged in were not rote nor were they repetitive. Instead, they were complicated and required synthesis of information from multiple sources to make informed decisions. In these circumstances, learning agility is likely to be associated with performance.

*Hypothesis 1: Subordinate learning agility is positively associated with subordinate performance. Those individuals with high learning agility are likely to have associated high performance.*

For a model of interpersonal learning processes in organizations, please see Figure 1. The model is a process that may occur over time in line with study hypotheses.

**The importance of psychological safety**

In order to fully develop one's capacity to be learning agile, several antecedent elements need to be better understood. One of these antecedents is psychological safety. Kahn (1990) defined psychological safety as, "being able to show and employ one's self without fear of negative consequences of self-image, status or career" (p. 708) and noted its importance in promoting workplace engagement. Later on, Argyris (1993) and Schein (1993a) argued the importance of psychological safety for learning and for facilitating teamwork. They posited that a climate in which an individual feels psychologically safe enables him or her to have learning-oriented conversations with others. They also said that a psychologically safe climate is necessary in order for learning and information transfer to occur between individuals in a group. Elaborating on this point, Schein (1993b) stressed the importance of psychological safety in order to learn – because learning cannot occur when an individual is highly anxious or fearful about task failure:

> For change to happen, people have to feel psychologically safe; that is, they have to see a manageable path forward, a direction that will not be catastrophic. They have to feel that a change will not jeopardize their current sense of identity and wholeness. They must feel that new habits are possible, that they can learn something new.

Edmondson (1999; 2003) noted that several factors underlie her definition of psychological safety. Psychological safety, in large part, depends on others: when one feels psychologically safe, he or she relies on others who will continue to trust him or her, even if an error arises. Additionally, psychological safety spans very narrow temporal boundaries. It covers interactions between individuals in the short-term when one interacts with another in a particular manner. It describes an interpersonal sense of safety that emerges over a short period of time for a given group of people. Psychological safety can vary across a group – for example, one group member may feel very safe in a particular group, and another may not. In other groups, the level of psychological safety may be more uniform.

Psychological safety mat be most potent at the group level of analysis. Edmondson (1999; 2004) developed a model of team-level learning that links psychological safety to specific learning behaviors in order to maximize information transfer within a group. Please see figure 2 for her original model. Argyris (1993) and Schein (1993b) originally argued that the importance of psychological safety is relevant for information transfer within a group. Schein noted that

> The key to reducing anxiety in organizations is based on the psychological fact that it is easier to tolerate anxiety in the presence of sympathetic others than alone. To speed up learning, therefore, we must create psychological safety by creating … systems in which to develop new norms that favor learning, and these…systems must be built around supportive groups that help to contain and reduce anxiety… the anxieties inherent in this new learning are manageable only

> if they are shared and managed jointly in a group that is accountable for the organization's ultimate welfare. A trusting group can help leaders to own up to and deal with their anxieties, which is a necessary process if realistic planning and learning are to take place.

While psychological safety is usually studied at the group level of analysis because it is a group phenomenon (Edmondson & Lei, 2014; Frazier et al. 2017; Newman, Donohue & Eva, 2017). Some studies have measured it by examining only manager-subordinate dyads. Such research has captured the perception that one individual may have about how their manager's behavior had an impact on their individual feelings of safety. One problem with this is that it may miss out on the feelings the entire group shares, and it may also not take into account how peers and other team members may make an individual safe. For example, asking about an individual's perception of psychological safety in terms of how their manager behaves may neglect to understand the notion that a peer can have an impact on another individual's perception of psychological safety within the same team. Edmondson and Wooley (2003) carried out research by examining perceptions through a dyadic level of analysis in order to understand learning and information transfer between a subordinate and manager. They noted that, "if the interpersonal climate is characterized by psychological safety, individuals are more likely to experiment with new behaviors, ideas, or tools. Thus, an interpersonal climate in which it is safe to take the risks involved for learning is critical to encouraging new behaviors" (p. 5). This justified the use of the construct at the dyadic level. Furthermore, while scholars argue that understanding psychological safety may be the most potent at the team level (Newman *et al.,* 2017), researchers have measured it at the individual level, in which individuals are asked to recall their perceptions of team-level psychological safety based on Edmondson & Wooley's (2003) measure (Carmeli & Gittell, 2009; Carmeli, Reiter-Palmon, & Ziv, 2010; Madjar & Ortiz-Walters, 2009).

Another important dimension of psychological safety is that it provides an opportunity to learn from mistakes. According to Schein (1993b), this is essential. He noted that

> The culture of management is built around the assumption that mistakes will occur but that one should not make the same mistake twice. To learn a complex new skill, however, we will make mistakes over and over again as we practice and slowly get better. To speed up this kind of learning we have to provide practice fields and coaching in a psychologically safe environment.

De Meuse et al. (2010) also noted that when one learns from experience, he or she may very well fail. When failure is added to a culture that punishes people for making errors, this context for learning can have a negative impact upon one's motivation to learn. Indeed, research has found that in organizations in which failure is tolerated so that individuals can learn from the experience to quickly root out errors, performance is higher. In this particular research, toleration of failure was defined as the ability to talk about failure and communicate how to remedy it with others on one's team (Van Dyck et al, 2005). Taken together, individuals who want to learn from failure, especially quickly and from experience, need to feel psychologically safe.

*Hypothesis 2: Perceived manager-subordinate psychological safety is positively associated with subordinate learning agility. Manager-subordinate relationships with higher perceived psychological safety are more likely to be associated with higher subordinate learning agility.*

Psychological safety, a construct that can characterize the beliefs about the relationship between subordinate and manager, may not play a direct role in shaping individual outcomes like subordinate performance (Edmondson, 1999, Edmondson & Lei, 2014; Frazier et al. 2017; Newman et al., 2017). Instead, psychological safety allows the subordinate to take the necessary steps in order

to accomplish the work they need to be effective in their role. Therefore, learning agility may mediate the effects of psychological safety on performance outcomes.

Research on innovation may help to explain the mechanisms behind this potential mediation. Baer & Frese (2003) noted that psychological safety is related to firm performance. They also argued that psychological safety is a key ingredient needed for innovation. Given the link between innovation, risk-taking, and other learning agility dimensions, these factors might be indicative of the importance of the presence of learning and its relationship with psychological safety in order to yield performance.

*Hypothesis 3: Subordinate learning agility mediates the relationship between perceived psychological safety and subordinate performance.*

**The importance of leader and manager coaching behavior**

Research has supported the finding that coaching is important for predicting learning and performance (Smither et al., 2003) however, the exact behaviors managers engage in to encourage their subordinates' performance are not as well understood. Coaching behaviors may be an antecedent for subordinate beliefs of psychological safety about the manager-subordinate relationship. Edmondson (1996; 1999; 2004) noted that the coaching behaviors a manager engages in with his or her subordinates predicted beliefs about the psychological safety of the relationship, that enhanced group learning. Specifically, she found that leaders who were coaching-oriented, provided support, and were non-defensive in receiving feedback from others in order to create a safe environment were most supportive of learning. In the same vein, Marsick & Watkins (2001) established that informal and supportive learning processes, like coaching, that they call "informal and incidental learning" is an important process for adults to engage in to help review and expand

their learning. In their research, coaching provided an avenue for individuals to review learning needs. Their learning could be taken for granted but can be probed and then explored and expanded. Informal learning processes, like those that take place in coaching relationships, can be classified as having the following characteristics: They are integrated into daily routines, they are an inductive process of reflection and action, and they are linked to learning through others.

In the innovation literature, Amabile et al. (2004) examined specific behaviors leaders enact to create environments characterized as being psychologically safe, that in turn allowed their subordinates to take risks and innovate. Some of these specific behaviors the researchers observed and termed were the following: Showing support for a team member's actions or decisions, helping alleviate stressful situations for subordinates, maintaining regular contact with and providing general guidance to subordinates, disclosing personal information, reacting to problems at work with both understanding and help, asking for team members' ideas and opinions, and collaborating with subordinates.

Similar to the work of Amabile et al. (2004), Carmeli, Reiter-Palmon, and Ziv (2010) found that leaders perceived as inclusive by their subordinates created climates that were also perceived as psychologically safe, which in turn had an impact upon and helped to produce creative and innovative work. Inclusive behaviors that leaders enacted were openness (such as a manager being open to hearing new ideas about how to solve a problem), availability (such as a manager being ready to listen to subordinate requests), and accessibility (such as a manager being accessible to discuss emerging problems). All together, these results suggest that specific leader and manager behaviors are related to creating the perception of psychological safety for subordinates.

An important caveat to note is the following: An assumption underlying the link between learning agility and performance is that a performance increase is indicative that some form of learning has occurred. However, a well-known conceptualization of output sees performance as a

combination of one's effort and one's ability (Anderson & Butzin, 1974). Therefore, an alternative argument is that instead, individual effort, rather than just ability, has increased to have an impact upon performance.

It is important to note that in this supposition, ability is more powerful than effort (Nicholls, 1976); however, effort is still an important factor to account for. While learning agility may play an indirect role in the relationship between psychological safety and performance, it is hard to tease these two facets of performance (effort and ability) apart. When someone is being coached, a performance increase, rather than a learning increase, may be what's salient in that relationship and such a performance increase may be a goal of coaching. Within the conceptualization of performance being a combination of effort and ability, effort, rather than ability, may be what a coach and coachee may focus on and want to increase instead of ability in the short term. However, over time, performance as a result of increased ability may occur. For example, if a subordinate is being coached by her manager and she understands that increased learning may be indicative of increases in her performance, she may choose to focus on the amount of effort she puts into completing tasks in the short term. In this way, her performance (due to increased learning) may increase as a result of more effort. However, though coaching with her manager in the long term, she may become more self-reflective, ask for more feedback, seek out new information to make decisions with, and take risks with her performance, and she may do this without much effort and it might become something she does subconsciously. In this way, her performance may increase as a result of greater ability. Therefore, due to the fact that both effort and ability are difficult to tease apart in this context, coaching may or may not focus on increases in effort, but it is difficult to isolate from ability since performance is a combination of both elements.

*Hypothesis 4: In the manager-subordinate relationship, perceived manager coaching behaviors are positively associated with perceived manager-subordinate psychological safety. Higher perceived manager coaching behavior is associated with higher perceived psychological safety.*

Another mediation relationship may occur. Edmondson's (1999, 2003) research has demonstrated that both creating the belief of psychological safety within the manager-subordinate relationship and perceived manager coaching behaviors were likely to facilitate subordinate learning agility and learning capacity. Perceived psychological safety within the manager-subordinate relationship therefore may be a mechanism that translates perceived manager coaching behaviors into behavioral outcomes for the subordinate. But, the mechanism between perceived manager coaching behaviors and learning agility is likely to be indirect.

Research on innovation is also important to take into account given its similarity with learning agility to more fully understand the mechanisms behind this potential mediation. When individuals innovate, they take risks – similar to several specific facets of learning agile behavior. Carmeli et al. (2010) specifically found that psychological safety mediated the relationship between inclusive leader behaviors and innovation and creativity. Inclusive leader behaviors cultivated psychological safety between the leader and his or her subordinate, which in turn, was related to them taking risks and experimenting with new ideas at work.

*Hypothesis 5: Perceived manager-subordinate psychological safety mediates the relationship between perceived manager coaching behavior and subordinate learning agility.*

Coaching behaviors that leaders and managers engage in with their subordinates may have an impact on learning agility directly, in addition to the potential conduit provided by psychological

safety. In a qualitative study, Ellinger and Bostrom (1999) point to specific behaviors that managers engage in that motivate their employees to learn. Some of these behaviors, similar to those espoused in a learner-centered coaching paradigm, included asking thought-provoking questions to encourage their subordinates to develop their own solutions rather than relying on their managers to provide answers. Other behaviors included offering feedback to subordinates to help them analyze and understand their performance. Finally, effective managers facilitated meetings with employees with the aim of discussing any potential problems or roadblocks in order to find solutions together and bring closure to issues.

The manager coaching behaviors of importance noted by Ellinger & Bostrom (1999) are paralleled in other frameworks. Heslin, Vandewalle & Latham (2006) focused on manager coaching behaviors such as providing guidance and feedback to subordinates. They noted that when managers held a view that is similar to learning goal orientation (that an individual's capacities can be developed), they were more likely to engage in coaching with their line reports. When they did not view their subordinates as having the capacity to grow, they were less likely to coach and provide feedback. Part of the learning process that managers and their subordinates engaged in included collaborating with subordinates by offering advice and suggestions help them develop their ideas and to facilitate the creative thinking process. Of note is that many of these behaviors are similar to learning agility. Indeed, feedback seeking and collaboration with others to develop ideas are two important components of learning agility. Therefore, in addition to the importance of psychological safety to promote increased learning agility, managers may directly increase subordinate learning behavior through coaching.

*Hypothesis 6: Perceived manager coaching behavior is positively associated with subordinate learning agility. Higher perceived manager coaching behavior is associated with higher subordinate learning agility.*

**Learning goal orientation & learning agility**

DeRue et al. (2012) hypothesized that learning goal orientation, which has been studied for many years (Dweck, 1986), may be an antecedent of learning agility. DeRue et al.'s rationale was that individuals with high learning goal orientation may be less focused on one stream of thought when solving problems and such cognitive flexibility may help them seek out new opportunities to learn quickly. These two attributes are similar to the speed and flexibility factors within the learning agility model developed at Teachers College.

Furthermore, one's capacity for adopting a learning goal orientation may influence individual feedback-seeking behavior (VandeWalle & Cummings, 1997; VandeWalle et al., 2000). VandeWalle and colleagues assessed this relationship and found that specific types of goals, such as having a learning goal, could shape one's feedback-seeking process. Individuals who were highly motivated to learn from new experiences were far more likely to seek out feedback from others. When one held a learning goal orientation, he or she was more likely to put in effort to solve a problem. He or she was also more likely to hold strong feelings of self-efficacy. Both self-efficacy and effort were related to performance increases over time. Individuals who did not hold a learning goal orientation were far less likely to achieve these outcomes.

Additionally, having a learning goal orientation is associated with a greater motivation to learn (Colquitt & Simmering, 1998). Those who had a learning goal orientation (compared to those who held performance orientations) were far more likely to be motivated to learn both before and after receiving feedback. Furthermore, those with learning goal orientations were more likely to make a cognitive association between the effort they put into the task and the performance such effort would yield. Finally, they were more likely to value performance increases on a task.

Similarly, McKenna, Boyd & Yost (2007) found evidence, like that of Eichinger and Lombardo (2000), which suggested that people who adopt a learning focus and are willing to admit to their

mistakes are better able to learn from experience. In their study, the researchers examined religious leaders. They noted that those clergy members who pushed themselves to the edge of their comfort zones to learn from formative experiences, including taking feedback and learning from errors, were more likely to manage change and complexity while in their roles. The most effective strategy clergy members used was composed of taking a learning agile stance.

Research on innovation within teams sheds light on some of these relationships. Gong et al. (2009) demonstrated that specific facets of follower beliefs have an impact on the climate for learning. They found that when employees have a learning orientation, teams tended to support workplace creativity. Creativity was measured as the extent to which employees were perceived as creative by others and developed custom-made services for clients. Gong and colleagues also found that employee innovation was related to an increase in actual sales performance and perceived performance (as rated by supervisors).

Recent research has also shown that learning agility and learning goal orientation are highly correlated: Individuals who perceived goals as a learning opportunity rather than as a threatening situation in which they could fail were more likely to be learning agile (Drinka et al., 2016). Therefore, the perception of learning as an opportunity to develop may have an impact on one's behavioral practices. This may happen when such an individual can quickly reconfigure behavioral patterns to find one that yields successful outcomes. While such a study is compelling because learning goal orientation seems to be a personality trait related to learning behaviors, such findings show an association, rather than how one construct might be an antecedent of one another. Yet, these results suggest that learning goal orientation could be an antecedent to learning agility.

*Hypothesis 7: Subordinate learning goal orientation is positively associated with subordinate learning agility. Higher subordinate learning goal orientation is associated with higher subordinate learning agility.*

## Chapter III: Methodology

Data for this study came from two sources. The first was from a healthcare organization in a metropolitan area in the Northeast US. Data were collected in two phases (June 2016 and October 2016). A second source of data was from Amazon's crowd-sourced data-collection platform, MTurk. Both sets of data were collected under IRB protocols 16-308 and 17-279. Please see Figure 3 for an overview.

### *Organizational data collection*

*Participants – June 2016*

A sample of n=465 participants were recruited based on a previous partnership with the organization. 200 participants were dropped from the total sample because they did not pass the attention check, bringing the sample to n=265. Participants were removed from the sample if they failed at least one attention check, of which there were three. Attention check items, for example, were questions such as, "if you're still paying attention, please select 'always.'" This suggests that many participants who entered the survey were not paying attention during the survey and were clicking at random. Furthermore, when examining identifying information that those who entered the survey provided, several participants appeared to enter the survey multiple times or partially enter the survey (by responding to very few items). This led to hypotheses about two potential issues that may have had an impact on survey attrition: 1) an online connection that may have timed out, resulting in participants needing to enter the survey more than once and 2) participants who hoped to increase their chances of winning an incentive (explained in the next section), also resulting in their entering the survey more than once. Furthermore, the physical design of a survey is known to have an impact on participant drop-off rates (Tourangeau, Conrad, & Couper, 2013) which may partially explain why the pool of participants removed from the sample was so high.

Participants on average were about 40 years of age (*M*=42.30, *SD*=26.58) and had just over 20 years of work experience (*M*=20.16, *SD*=13.32). The sample was almost two-thirds female (62.9%, *n*=298). Males made up 16.5% (*n*=78) of the sample and 20.7% of participants did not respond to this question (*n*=98). Most participants identified as White/Caucasian (66.2%, *n*=314). Only 7% identified as Latino(a)/Hispanic *(n*=33), 2.3% identified as Asian/Asian-American (*n*=11), 2.1% identified as Black/African-American (*n*=10), and1.3% identified as Biracial/Multiracial (*n*=6) while 20.7% did not respond (*n*=98). Most participants stated they were individual contributors that managed only their own work (61%, *n*=289). A small proportion of participants (17%, *n*= 81) said they worked in a manager or managerial capacity while 21.9% did not respond (*n*=104).

When a similar analysis was completed for those who failed the attention check items only, all participants were noted as having "system missing" data. Therefore, it is highly likely that those participants who failed the attention check items were merely clicking through and sporadically answering the questions, which may be in line with the earlier hypotheses proposed. Participants may have experienced an online connection that could have timed out, resulting in their needing to enter the survey more than once. In this instance, a participant may have clicked through or skipped over questions to get to where he or she had been previously within the survey before the connection timed out. Participants may have been motivated to re-enter the survey in order to increase their chances of winning an incentive.

*Procedure*

Data collection occurred during late June 2016. Performance data was collected in October 2016 covering the months of July, August, and September 2016. During the data collection in June 2016, data were collected using a survey link. The link was sent out by the CEO of the organization via email who encouraged employees to respond to survey that would help researchers understand how people learn in the workplace. In the email, the CEO noted that there was an incentive for

participation in the study: A chance to win a $50 gift card would be provided. Once the study was complete, an employee was chosen at random and sent information for an Amazon $50 gift card.

*Measures – June 2016*

*Learning Goal Orientation* is a 5-item subscale of VandeWalle's (1997) Goal Orientation measure. Each item was assessed on a 6-point Likert scale (1 = strongly disagree to 7 = strongly agree). A sample item was, "I am willing to select a challenging work assignment that I can learn a lot from."

*Leader coaching behaviors* is a 3-item scale developed by Edmondson (1999). The items were measured on a 7-point Likert scale (1 = never to 7 = always). A sample item was, "My manager is available for consultation on problems."

*Psychological safety* was assessed using a set of 6 items on a 7-point Likert scale (1 = very inaccurate to 7 = very accurate) developed by Edmondson & Wooley (2003) to measure perceived dyadic psychological safety. A sample item was, "If I was thinking about leaving this company to pursue a better job elsewhere, I would talk to my manager about it." This measure is based on an instrument by Edmondson (1999) that has been rigorously validated and used in many studies (Carmeli & Gittell, 2009; Carmeli, Reiter-Palmon, & Ziv, 2010; Madjar & Ortiz-Walters, 2009; Roussin & Webber, 2012). Indeed, Newman et al., 2017 have posited that this is the assessment of choice among psychological safety researchers because of its sound and rigorous psychometric properties.

*Burke Learning Agility Inventory (BLAI).* Participants were prompted to consider how frequently they engaged in various behaviors at work. Items were assessed on a 7-point scale (1=not at all to 7=very frequently). A sample item was, "I discuss my mistakes with others."

*Measures – October 2016*

*Performance.* Information on participant performance was collected and varied depending on participant role. For example, lab technologist performance was indicated by the number of patients scanned per hour and physician performance was indicated by the number of patient charts read per day. Performance data was collected for six different types of roles present throughout the organization (see table 3 for specific information). This information was collected through an online system in which employees recorded their outputs. For example, if a lab technologist had completed a patient scan, this was indicated in an online system so that they could proceed with the next patient scan. Then, all performance information was captured so that it could be accessed by organization administers. For the current research, the administration collected aggregated information and sent it to researchers. For the performance measures, researchers took the mean value across the three months of data collection.

### *Crowd-sourced data collection*

*Participants*

A sample of *n*=247 participants were recruited through Amazon's crowd-sourced Mechanical Turk online platform. All participants were U.S.-based adults. 48 participants were dropped from the total sample because they did not pass the attention check items, bringing the *n*=199 (89 female; 110 male). Participants were M = 34.96 years old (SD=9.58) and had M = 13.87 years of work experience (SD= 9.53). The majority of those in the sample were White (75.9%), 9.0% were Black, 6.0% were Hispanic, and 6.0% were Asian. Most respondents were employed (96.00%, *n*=191) when the survey was administered.

*Procedure*

The survey was hosted on Amazon's MTurk and launched in November 2016. After obtaining informed consent, participants were presented with all measures (except for the BLAI) at

random. After completing the randomized items, participants completed the BLAI. Following this, they answered demographic questions. The survey took approximately 20 minutes and participants were paid $2.50 for their time.

*Measures*

All measures previously collected from the organization-based study were administered, with the exception of performance information. Additionally, more items on coaching behavior were collected.

*Detailed coaching behaviors* were measured using a 10-item scale developed by Heslin *et al.* (2006). Items utilized a 7-point Likert scale (1 = not at all to 7 = to a very great extent). A sample item was, "To what extent does your manager help you analyze your performance?"

## Chapter IV: Results

Prior to data collection, a power analysis revealed that in order for an effect to be detected with 80% certainty and a medium effect size (0.3), a sample of 165 participants was needed (Soper, n.d.).

In order to analyze the data, two separate analyses were conducted. One, composed of regression models, was completed for the organizational data and the other, composed of structural equation modelling, was completed using only the crowd-sourced data.

### Organizational sample results

A visual scan of Q-Q plots, or Quantile-Quantile plots, which indicate the extent to which a variable is normally distributed (Ford, 2015), was performed in order to assess normality of study variables. One outlier was removed on performance data that was abnormal because its observed value was much higher when compared to its expected value (figures 4-8). After removal, the final sample was N = 264.

*Reliability analysis*

A Cronbach's alpha analysis was conducted in order to assess scale reliability. The 5-item learning goal orientation scale yielded $\alpha = 0.71$ (M = 5.73, *SD*=0.80). The 6-item psychological safety scale yielded $\alpha = 0.73$ (M = 5.15, *SD*=1.21). The 3-item manager coaching behavior scale yielded $\alpha = 0.80$ (M = 4.99, *SD*=1.57). Finally, the 38-item learning agility scale yielded $\alpha = 0.94$ (M = 4.86, *SD*=0.88). Given that all Cronbach's alpha coefficients were greater than 0.70, all scales as they were analyzed were considered sufficient to move forward with subsequent analyses (Hinkin, 1998).

*Covariate analysis*

The possibility of including covariates was explored through non-parametric Spearman correlations for continuous data. Spearman correlations were used in order to err on the side of

caution due to the fact that some data appeared to violate normality assumptions. Learning agility, learning goal orientation, psychological safety, and manager coaching behavior were all significantly inter-correlated. There was one exception, however: learning goal orientation and manager coaching behavior were not significantly correlated with each other (table 4).

Additionally, job type and job status, which were categorically coded, were analyzed using one-way ANOVAs on study outcome variables. Job type included eight different types of roles present at the organization including nurses, radiologists, lab technicians, and schedulers. Job status included whether an individual was a full-time employee, a part-time employee or a seasonal/per diem employee.

The ANOVA for job status on study outcome variables (performance, learning agility, and psychological safety) did not yield any significant results (tables 5a, b, c). The ANOVA for job type did, however, yield significant results for study outcome variables (tables 6a, b, c). Specifically, the ANOVA for performance displayed significant differences between groups ($F(4, 124) = 34.73$, $p < .001$, table 6a). Radiologists demonstrated the highest levels of performance ($M = 865.67$) followed by schedulers/operators ($M=579.04$), which was then followed by front desk employees ($M = 321.67$) and lab technicians ($M=209.51$). Other leadership had, on average, the lowest performance values ($M=32.33$). Other job types did not have enough employees within each group to run this analysis. These differences between job types may have been due to the range of performance measures that were collected. For example, the performance of radiologists was not assessed using the same performance indicators as other staff positions such as medical billers.

Additionally, the ANOVA for learning agility also yielded significant differences between groups ($F(7, 211) = 3.77$, $p = .001$, table 6b). Other leadership demonstrated the highest levels of learning agility ($M=5.71$) followed by other administrators ($M=5.15$), which was then followed by front desk employees ($M = 4.93$). These employees were then followed by lab technicians

(M=4.72), nurses (M=4.63), miscellaneous employees (M=4.54), and then schedulers/operators and radiologists (who shared the same group mean, M = 3.92). This finding may support the notion that learning agility may be an important capability for more complex tasks such as leadership, while employees who may be engaged in less complex tasks like schedulers/operators do not need to rely on learning agility to such a great extent.

The ANOVA for psychological safety did not yield significant differences between groups. Given the results of these analyses, job type, but not job status, was included as a covariate in subsequent analyses.

*Hypothesis testing*

For the organizational sample, regression analyses were completed. In order to test H1 (that subordinate learning agility is positively associated with subordinate performance), a regression model was created. The first block of all regression models needed to be allotted to the control variables in order to understand how hypothesized variables would have an impact on outcome variables over and above control variables. Since covariate (job type) was categorically measured, it needed to be dummy coded and then input to the regression model. Therefore, the first block of the model was allotted to the control variable, job type. Since there were eight job types, seven dummy variables were created. The dummy variables are as follows: front desk vs. others, schedulers/operators vs. others, radiologists vs. others, technicians vs. others, leadership vs. others, admin vs. others, miscellaneous vs. others.

In similar research, significant results of covariates are typically reported. In this study, schedulers/operators vs. others ($\beta = 0.50$, $p < 0.001$, table 7), radiologists vs. others ($\beta = 0.38$, $p < 0.001$), technicians vs. others ($\beta = -0.34$, $p < 0.001$) and leadership vs. others ($\beta = -0.14$ $p < 0.05$) were all significant covariates. While there were two additional dummy variables in the broader analysis (admin vs. others and miscellaneous vs. others), they were not allowed to be included in this

particular analysis because too many cells were missing. The significant covariates indicated that schedulers/operators, compared to other job types, were more likely to achieve higher levels of performance. Additionally, radiologists, compared to other job types, were more likely to achieve higher levels of performance. Technicians, compared to other job types, were more likely to achieve lower levels of performance. Finally, leadership positions were more likely to achieve lower levels of performance compared to other job types.

Then, the next block in the regression was allotted to learning agility. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.57$, $F(6, 122) = 29.27$, $p < 0.001$. In the second step of the model, learning agility was not significantly associated with performance ($\beta = 0.08$, p = ns, table 7). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in learning agility, performance scores increased by 0.08 standardized units.

In order to test H2 (that perceived subordinate psychological safety is positively associated with subordinate learning agility), a regression analysis was completed. The first block was allotted to the control variable, job type. Job type radiologists vs. others ($\beta = -0.17$, $p < 0.01$, table 8) was a significant covariate. The significant covariate indicated that radiologists, compared to other job types, were more likely to achieve lower levels of learning agility.

Then, the next block in the regression was allotted to psychological safety. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.13$, $F(8, 182) = 3.38$, $p < 0.01$. In the second step of the model, psychological safety was significantly associated with learning agility ($\beta = .18$, $p < 0.05$, table 8). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in psychological safety, learning agility scores increased by 0.18 standardized units.

In order to test for H3 (that perceived subordinate psychological safety enhances

subordinate learning agility and may in turn be positively associated with subordinate performance), a mediation analysis was completed (table 9). The indirect path was not significant, demonstrating that learning agility did not mediate the relationship between psychological safety and performance ($\beta$ = 0.00, p = ns).

In order to test H4 (that perceived manager coaching behaviors are positively associated with perceived psychological safety), a regression analysis was completed. The first block was allotted to the control variable, job type. Front desk vs. others ($\beta$ = -0.19, $p < 0.05$, table 10) and admin vs. others ($\beta$ = -0.20, $p < 0.05$) were significant covariates. The significant covariates indicated that front desk employees, compared to other job types, were more likely to achieve lower levels of psychological safety. Additionally, the other significant covariate meant that other administrative staff, compared to employees in all other types of jobs, were more likely to achieve lower levels of psychological safety.

Then, the next block in the regression model was allotted to manager coaching behavior. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.53$, $F(8, 120) = 18.93$, $p < 0.001$. In the second step of the model, manager coaching behavior was a significantly associated with psychological safety ($\beta$ = .75, $p < 0.001$, table 10). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in manager coaching behavior, psychological safety scores increased by 0.75 standardized units.

In order to test for H5 (that perceived manager coaching behavior is associated with perceived manager-subordinate psychological safety and was also associated with subordinate learning agility), a mediation analysis was completed (table 11). The indirect path was not significant, demonstrating that perceived manager-subordinate psychological safety did not mediate the relationship between perceived manager coaching behavior and subordinate learning agility ($\beta$ =

0.00, p = ns). Interestingly, the direct path was significant ($\beta = 0.22$, $p < 0.001$) indicating that perceived manager coaching behavior was significantly associated with learning agility directly.

In order to test H6 (that perceived manager coaching behavior is positively associated with subordinate learning agility), a regression analysis was completed. The first block was allotted to the control variable, job type. Leadership vs. others ($\beta = 0.14$, $p < 0.05$, table 12) was a significant covariate. The significant covariate indicated that other leadership positions were more likely to achieve higher levels of learning agility compared to other job types.

Then, the next block in the regression model was allotted to manager coaching behavior. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.12$, and the omnibus model was significant: $F (8, 189) = 4.45$, $p < 0.001$. Manager coaching behavior was significantly associated with learning agility ($\beta = .28$, $p < 0.001$, table 12). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in manager coaching behavior, learning agility scores increased by 0.28 standardized units.

In order to test H7 (that subordinate learning goal orientation is positively associated with perceived manager-subordinate learning agility), a regression analysis was completed. The first block was allotted to the control variable, job type. Radiologists vs. others ($\beta = -0.19$, $p < 0.01$, table 13) and leadership vs. others ($\beta = 0.30$, $p < 0.05$) were significant covariates. The significant covariates indicated that radiologists, compared to other job types, were more likely to achieve lower levels of learning agility. Finally, other leadership positions were more likely to achieve higher levels of learning agility compared to other job types.

Then, the next block in the regression was allotted to learning goal orientation. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.28$, $F (8, 254) = 13.93$ $p < 0.01$. In the second step of the model, learning goal orientation was significantly

associated with learning agility ($\beta = .46$, $p < 0.001$, table 13). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in learning goal orientation, learning agility scores increased by 0.46 standardized units.

For an overview of results, see figure 9.

**Crowd-sourced sample results**

Before analyzing the data, a visual scan of normality was completed. The visual scan through the use of Q-Q plots demonstrated some normality aberrations, however, no outliers were removed as data points did not appear to have extreme points that differed when comparing expected to actual residuals (figures 10-13).

*Reliability analysis*

Cronbach's alpha was completed in order to assess scale reliability of study variables. The 5-item learning goal orientation scale yielded $\alpha = 0.93$ ($M = 5.01$, $SD=1.27$). The 6-item psychological safety scale yielded $\alpha = 0.81$ ($M = 4.62$, $SD=1.22$). The 13-item manager coaching behavior scale yielded $\alpha = 0.97$ ($M = 4.86$, $SD=1.41$). Finally, the 38-item learning agility scale yielded $\alpha = 0.96$ ($M = 4.89$, $SD=1.01$). Given that all Cronbach's alpha coefficients were greater than 0.70, all scales as were considered sufficient to move forward with subsequent analyses.

*Covariate analysis*

The possibility of including covariates was explored through non-parametric correlations (due to the fact that some data did not appear to be normally distributed). Spearman correlations were conducted on study variables and potential covariates. Level of education received, and current job level were significantly correlated with study variables. Level of education was continuously coded and ranged from 1 =high school/GED received to 6 = professional degree

received. Job level ranged from 1 = individual contributor to 6 = senior leadership position. Learning agility, psychological safety, learning goal orientation, and manager coaching behavior were all significantly inter-correlated (table 14).

Employment status, which was categorically coded, was analyzed using a one-way ANOVA on study outcome variables that yielded some significant results (tables 15 a & b). Specifically, the ANOVA for learning agility displayed significant differences between groups ($F(1, 197) = 11.09$, $p = .001$, table 15a). Those who were currently employed demonstrated the highest levels of learning agility ($M=4.64$) compared to those who were not currently employed ($M=3.45$).

The ANOVA for psychological safety did not yield significant differences between groups. (table 16b) Given the results of these analyses, employment status, level of education received, and current job level were included as covariates in subsequent analyses.

*Hypothesis testing*

For the crowd-sourced sample, a path model was analyzed. The analysis was demonstrated the following overall fit indices $\chi^2=290.08$ (1*, N*=198), (*CFI*=0.99, *RMSEA*=0.07, *SRMR*=0.011*)*. The model shows good fit as indicated by the various fit indices (Kenny, 2015).

In order to test H2, H6, and H7 (that perceived subordinate psychological safety, perceived manager coaching behavior, and subordinate learning goal orientation are positively associated with subordinate learning agility, respectively), the specific path between subordinate psychological safety, subordinate learning agility, and subordinate learning goal orientation was examined within the path model. No covariates were significant. Psychological safety was not significantly associated with learning agility ($\beta = 0.00$, $p$ = ns, table 16). Manager coaching behavior was significantly associated with learning agility ($\beta = 0.43$, $p<0.1$). Learning goal orientation was a significantly associated with learning agility ($\beta = .39$, $p < 0.001$). Given potential issues with normality, it is important to take the

magnitude of the slope into account. For every one-unit increase in manager coaching behavior and learning goal orientation, learning agility scores increased by 0.43 and 0.39 standardized units, respectively. All variables were measured on 7-point scales, so the associated increases may be noteworthy.

In order to test H4 (that perceived manager coaching behaviors is positively associated with perceived manager-subordinate psychological safety) the specific path between perceived manager coaching behavior and subordinate learning goal orientation was examined within the path model. No covariates were significantly associated with psychological safety. Manager coaching behavior was significantly associated with psychological safety ($\beta = .74$, $p < .001$, table 17). This meant that for every one-unit increase in manager coaching behavior, psychological safety scores increased by 0.74 standardized units. Both of these variables were measured on 7-point scales, so the associated 0.74 unit increase may be noteworthy.

In order to test the mediation hypotheses, indirect effects in the path model were examined. H5 (that perceived manager coaching behavior is associated with perceived manager-subordinate psychological safety and with subordinate learning agility) was tested and revealed a non-significant indirect path ($\beta = 0.00$, $p = ns$, table 18).

Furthermore, an $R^2$ analysis indicated that of the dependent variables tested in the model, both learning agility and psychological safety accounted for a significant proportion of variance. Learning agility accounted for 50% of model variance; psychological safety accounted for 54% of model variance (table 19).

For an overview of results, see figure 14.

**Exploratory analyses**

Upon analyzing both the organization and crowd-sourced data, contradictory results on H2 (that perceived subordinate psychological safety is positively associated with subordinate learning agility) emerged. In the organizational sample, the result was statistically significant, while in the crowd-sourced sample, the result was not statistically significant. Furthermore, significant correlations occurred between psychological safety and learning goal orientation, in addition to significant correlations between psychological safety and learning agility. Therefore, further analysis was required to attempt to explain the results that were not in line with theory. Given the significant correlations, a moderation relationship may exist between psychological safety, learning goal orientation, and learning agility as a dependent variable, instead of a mediation relationship. A final regression analysis was conducted in light of this exploratory research question.

*Organizational sample*

The first block was allotted to control variables. Several covariates were significant: radiologists vs. others ($\beta = -0.22$, $p = 0.001$) and miscellaneous vs. others ($\beta = -.17$, $p = 0.01$, table 20). The significant covariates indicated that radiologists, compared to other job types, were more likely to achieve higher levels of learning agility. Additionally, miscellaneous roles, compared to other job types, were more likely to achieve higher levels of learning agility.

Then, the next block in the regression was allotted to learning goal orientation and psychological safety. Learning goal orientation was significantly associated with learning agility ($\beta = 0.44$, $p < 0.001$, table 20). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in learning goal orientation, learning agility scores increased by 0.44 standardized units.

In the third and final block of the regression, an interaction term between learning goal orientation and psychological safety was created. The omnibus model accounted for a significant

proportion of variance: adjusted $R^2 = 0.33$, $F(1, 180) = 10.53$, $p < 0.001$. The interaction term was not significantly associated with learning agility ($\beta = -0.03$, $p = ns$, table 20).

*Crowd-sourced sample*

The first block was allotted to control variables. One covariate was significant: employment status ($\beta = -0.12$, $p < 0.05$, table 21). The significant covariate indicated that those who were currently employed demonstrated the highest levels of learning agility.

Then, the next block in the regression was allotted to learning goal orientation and psychological safety. Learning goal orientation was significantly associated with learning agility ($\beta = 0.43$, $p < 0.001$). Psychological safety was significantly associated with learning agility ($\beta = 0.31$, $p < 0.001$). Given some potential issues with normality of study variables, the magnitude of the slope should be taken into account. For every one standardized unit increase in learning agility, learning goal orientation scores increased by 0.43 standardized units and psychological safety scores increased by 0.31 standardized units.

In the third and final block of the regression, an interaction term between learning goal orientation and psychological safety was created. The omnibus model accounted for a significant proportion of variance: adjusted $R^2 = 0.33$, $F(1, 180) = 10.53$, $p < 0.001$. The interaction term was marginally significantly associated with learning agility ($\beta = -0.10$, $p = 09$, table 21).

In light of these findings, an updated proposed model of interpersonal learning processes in organizations may be more appropriate (figure 15).

## Chapter V: Discussion

The results of the present study indicated several key findings that may have an impact upon how individuals learn in organizations. The role of psychological safety in the present research revealed several results. Specifically, psychological safety had a direct relationship with learning agility as was noted in the organizational sample study. This finding is in line with current theory – an individual is likely to learn when he or she perceives a psychologically safe environment in which to learn, experiment, take risks, and try new things. Additionally, both studies in the present research did not demonstrate that psychological safety mediated the relationship between manager coaching behavior and learning agility, however, there were significant associations between manager coaching behavior, psychological safety, and learning agility.

The lack of support for the mediation hypotheses suggests that some variance in scores results from the direct relationship between manager coaching behavior and learning agility, negating the possibility of psychological safety mediating the relationship between these two variables. Therefore, some proportion of variance did not appear to depend on perceived psychological safety between a subordinate and his or her manager, while some proportion of variance did depend on the perceived psychological safety between a subordinate and his or her manager.

Results did not corroborate the notion that learning agility has a significant association with performance. However, the lack of associations between these two constructs may be due to methodological reasons rather than empirical ones, which was a limitation of the present research. The methods used to measure performance may tap into quantity, rather than quality of performance. Previous studies, when performance was measured based on quality, do support this relationship (Smith, 2015). Additionally, a meta-analysis on the topic has noted a robust relationship between both leader performance and potential with learning agility (De Meuse, 2017). The reason for the current finding may be that learning agility is more likely to affect performance on tasks that

require learning (more complex tasks) rather than rote performance on repetitive tasks such as was measured in the present study.

An interesting finding also occurred in the organizational sample in which leadership positions demonstrated the highest levels of learning agility compared to other roles. This may support the notion that learning agility is an important capability for more complex tasks such as leadership. Employees who may be engaged in less complex tasks like schedulers/operators did not need to rely on learning agility to such a great extent in order to complete tasks.

The role of psychological safety may not be clear cut in terms of its relationship with learning agility and other constructs. In the exploratory analysis conducted on the crowd-sourced sample, a marginally significant interaction term was detected. However, in the organizational sample, no interaction term of significance was detected. Therefore, the role of psychological safety may need to be explored further in terms of how it is related to learning agility and learning goal orientation.

*Directions for future research*

An important research question pertains to exploring other antecedents of learning agility, and specifically leader behaviors (via psychological safety). For example, Edmondson (2004) suggested that leaders who both invite input from followers and model openness and fallibility may be important antecedents to psychological safety, which may be antecedent of learning agility. Some dimensions of manager coaching behavior seem to tap into the construct of servant leadership, which may be an antecedent of learning agility (again, via psychological safety). Schaubroeck, Lam & Peng (2011) noted that leader behaviors that engendered psychological safety and increased team performance were servant leader behaviors. The association between these behaviors, like emotional healing, empowering others, putting subordinates first, and developing relationships may be important to understand in more depth than has been studied currently (Liden et al., 2008).

Other leader behaviors may be important such as leader inclusiveness (Bienefeld & Grote, 2014; Carmeli et al., 2010), leader support (May et al., 2004), leader trustworthiness (Madjar & Ortiz-Walters, 2009), the capacity for leaders to be open to new ideas and suggestions (Detert & Burris, 2007), leader behavioral integrity and honesty (Palanski & Vogelgesang, 2011), and the propensity for leaders to conduct themselves in an ethical manner (Walumbwa & Schaubroeck, 2009). These potential antecedents may be part of the same nomological network, defined as a representation of related constructs and their observable expressions as well as interrelationships between similar constructs.

Another dimension that is ripe for future research that is also related to psychological safety is what some psychologists term the *tensility* of relationships. Tensility of relationships is defined as the capacity of interpersonal relationships to withstand strain (Carmeli, et al., 2009). This construct is slightly different from psychological safety, so measuring it more specifically may be another direction for future research. Psychological safety captures the perception that individuals in a group feel safe to experiment with new behaviors; tensility captures the behaviors that individuals engage in as part of high quality relationships when they feel as though their relationships can withstand strain. High quality relationships are associated with the perception of psychological safety (Carmeli et al, 2009). It is likely that relationships between managers and subordinates that are highly tensile may be associated with higher subordinate learning agility.

Future research on learning goal orientation may want to focus on differences between individuals with a performance orientation and those with a learning goal orientation in terms of subsequent associations with learning agility and performance (DeRue et al., 2012). Previous research demonstrated that there may be links between these personality trait antecedents and psychological safety, even though this research did not support such links. Specifically, previous work has shown that when individuals perceived their workplace as psychologically safe, they were

less likely to rely on an achievement (or performance) orientation. (Tangirala, Kamdar, Venkataramani, and Parke, 2013).

Future studies might also focus these potential antecedents in environments with both high and low levels of change. In an environment with high levels of change, change can create fear. Fear usually works against the creation of psychological safety. Merrill & Reid (1981) note that when leaders are under stress as a result of a high level of change in either their organization or the external environment, their behavior changes. Under these conditions, they are more likely to go into an authoritarian and controlling mode of behavior. In these types of situations, there is likely little psychological safety present. Therefore, an interesting research question would focus on what happens to the learning agility of subordinates in such situations. Subordinates who have high levels of learning goal orientation may be able to override challenging situations and directly exhibit their learning agility while individuals with low learning goal orientation may not get the opportunity to be coached on their learning agility nor might they perceive psychological safety in the presence of an authoritarian leader to exhibit their learning agility successfully.

In a similar vein, in organizations in which there is a great deal of safety, the need for learning agility needs to be better understood. In environments where there is little change and the business is thriving, the extent and need of learning agility is not known. It is possible that learning agility may be conditional upon the level of psychological safety present in a given environment. Therefore, such a question should be explored further.

*Limitations*

Given the known importance of organizational culture and how it can have an impact on behavior, one flaw in the crowd-sourced sample study was how little was known about these participants. They were U.S.-based adults, but their work history and exposure to various types of

organizational cultures was not known. Compared to the organizational sample, in which all participants came from within the same organization, the culture could not be accounted for or held constant, which may have led to additional error within the sample.

Another limitation in the present study was how performance data was measured. Performance data can be measured in a multitude of ways, and has been in previous research (e.g., Church, 1997). The performance data appeared to be based on rote measures of productivity, rather than creativity or solving complex problems. This may be an issue when studying learning agility, because measuring the extent to which completing a specific task requires the involvement of learning is essential. For future research, quality-based measures in which individuals have solved complex and creative problems may be ideal measures of performance.

In the organizational study, a smaller set of items was used to measure coaching behavior, although these items have less face-validity than the measure utilizing more detailed behaviors. This smaller set of items had to do with manager-coach availability in terms of time a manager may have to support subordinates, rather than the coaching behavior itself. The shorter set of items seemed to be a more passive measure of coaching rather than measuring the extent to which a manager really sits with and questions the assumptions of a subordinate in an effort to increase their learning. The reliability between these items and the broader coaching behavior measure used in the crowd-sourced sample was high, however, the nomological network of constructs may be somewhat different.

*Implications for organizations*

The overarching finding of the current research is that manager coaching behavior is important for augmenting learning agility. Two mechanisms occur by which managers can increase subordinate learning. Managers who coach are able to directly teach their subordinates how to learn

and think more critically in support of successful future learning. Managers who coach also create more psychological safety between themselves and their subordinates, which also has a positive impact on subordinate learning agility. Ultimately, individuals with high learning agility are more likely to have high performance (Smith, 2015), which has a positive impact on the bottom line for organizations.

The importance of this research may be mostly in situations in which leader coaching can make a difference. When the work product does not involve creativity, manager coaching behavior may not have an impact on performance. When the work is innovative and requires creative problem-solving, manager coaching behavior may be an important driver of subordinate learning agility and performance. Therefore, the impact of manager coaching behavior is likely to be significant in these types of situations. For organizations, this may be an opportunity for learning and development efforts in order to grow and develop future leaders.

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## Appendices

*Appendix A: Informed consent and participant's rights script – Organizational sample*

Teachers College, Columbia University

525 West 120th Street New York NY 10027

212 678 3000

www.tc.edu

INFORMED CONSENT

DESCRIPTION OF THE RESEARCH: You are invited to participate in a research study on personality and learning differences in members of the U.S. workforce. You will be asked to fill out several personality and behavioral assessments. The research will be conducted by Dr. Warner Burke, and his research team associates: Lauren Catenacci, Ginevra Drinka, and Dr. Kathryn Roloff. The researchers are partnering with your organization to collect data, however, all data will be collected online.

RISKS AND BENEFITS: There is minimal risk associated with participation in this study. Participants might benefit from reflecting on their emotions and behaviors.

PAYMENTS: You will be entered into a drawing for a $50 Amazon Gift Card. One raffle winner will be drawn from the pool of employees participating from your company at the conclusion of the study.

DATA STORAGE TO PROTECT CONFIDENTIALITY: Your responses are confidential. However, the data will be stored in a password-protected file only accessible to the research team. This data will be stored for seven years.

TIME INVOLVEMENT: Your participation will take approximately 20-30 minutes.

HOW WILL RESULTS BE USED: The results of the study will possibly be published in academic journals and/or presented at conferences. The results will be aggregately reported to your organization. Your individual responses will not be reported back to your organization. PARTICIPANT'S RIGHTS: Principal Investigator: W. Warner Burke, PhD Research Title: "Reactions to workplace challenges" I have read and discussed the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study. My participation in research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to future medical care, employment, student status or other entitlements. The researcher may withdraw me from the research at his/her professional discretion. If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue to participate, the investigator will provide this information to me. Any information derived from the research project that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law. If at any time I have any questions regarding the research or my participation, I can contact the investigator, who will answer my questions. The investigator's phone number is (212) 678-3249. If at any time I have comments, or concerns regarding the conduct of the research or questions about my rights as a research subject, I should contact the Teachers College, Columbia University Institutional Review Board /IRB. The phone number for the IRB is (212) 678-4105. Or, I can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY, 10027, Box 151. I should print a copy of the Research Description and this Participant's Rights document. If I have any questions, I may contact the research investigators at LAresearchstudy@gmail.com

*Appendix B: Informed consent and participant's rights script – Crowd-sourced sample*

Teachers College, Columbia University

525 West 120th Street

New York NY 10027

212 678 3000

www.tc.edu

DESCRIPTION OF THE RESEARCH: You are invited to participate in a research study on how personality is related to behaviors at work among members of the U.S. workforce. You will be asked to fill out several personality and behavioral assessments. The research will be conducted by Dr. Warner Burke, and his research team associates: Lauren Catenacci, Ginevra Drinka, Jennifer Kim, and Kathryn Roloff. The research will be conducted online using your mTurk account.

RISKS AND BENEFITS: There is minimal risk associated with participation in this study. Participants might benefit from reflecting on their emotions and behaviors.

PAYMENTS: You will receive $2.75 deposited to your Mturk account for participating.

DATA STORAGE TO PROTECT CONFIDENTIALITY: Your responses are completely anonymous. However, the data will be stored in a password-protected file only accessible to the research team.

TIME INVOLVEMENT: Your participation will take approximately 30-35 minutes.

HOW WILL RESULTS BE USED: The results of the study will possibly be published in academic journals and/or presented at conferences.

PARTICIPANT'S RIGHTS

I have read and discussed the informed consent with the researcher. I have had ample opportunity to ask questions about the purposes, procedures, risks and benefits regarding this research study. I

understand that my participation is voluntary. I may refuse to participate or withdraw participation at any time without penalty. The researcher may withdraw me from the research at his or her professional discretion. If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue my participation, the investigator will provide this information to me. Any information derived from the research study that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law. I should print a copy of the Informed Consent document. If I have any questions, I may contact the research investigators at LAresearchstudy@gmail.com

*Appendix C: Letter of Intent and Express Permission from Organization*

Steven Mendelsohn, M.D., CEO

Zwanger-Pesiri Radiology

150 East Sunrise Highway

Lindenhurst, NY 11757

April 12, 2016

I have the authority to grant Dr. W. Warner Burke and his research team permission to conduct research at our facility for his study, "Organizational Concurrent and Predictive Validity." I do grant the research team permission to conduct this research. I understand that our participation as an organization is voluntary. Participants will also participate on a voluntary basis – their participation is not required.

I understand that the purpose of the study is to understand how learning agility relates to performance and other measures. For their participation, participants will have the chance to win a $50 gift card.

Signed: Dr. Steven Mendelsohn

*Appendix D: Institutional Review Board approval*

**TEACHERS COLLEGE**
COLUMBIA UNIVERSITY

*Teachers College IRB* *Exempt Study Approval*

To: Ginevra Drinka
From: Curt Naser, TC IRB Administrator
Subject: IRB Approval: 17-279 Protocol
Date: 05/16/2017

Thank you for submitting your study entitled, "*Learning agility & performance: An antecedent model*;" the IRB has determined that your study is **Exempt** from committee review (Category **4**) on 05/16/2017.

Please keep in mind that the IRB Committee must be contacted if there are any changes to your research protocol. The number assigned to your protocol is **17-279**. Feel free to contact the IRB Office by using the "Messages" option in the electronic Mentor IRB system if you have any questions about this protocol.

You can retrieve a PDF copy of this approval letter from the Mentor site.

Best wishes for your research work.

Sincerely,
Curt Naser, Ph.D.
TC IRB Administrator
curtn@axiomeducation.com

*Appendix E: Stimulus materials*

***Detailed coaching behavior***

*From:* Heslin, P. A., Vandewalle, D., & Latham, G. P. (2006). Keen to help? Managers' implicit person theories and their subsequent employee coaching. *Personnel Psychology*, *59*(4), 871-902.

- To what extent does your manager… (actual prompt was "to what extent does the person to whom you are providing feedback"
- 1 = not at all; 7 = to a very great extent
  - Guidance
    - Provide guidance regarding performance expectations?
    - Help you analyze your performance?
    - Provide constructive feedback regarding areas for improvement?
    - Offer useful suggestions regarding how you can improve your performance?
  - Facilitation
    - Act as a sounding board for you to develop your ideas?
    - Facilitate creative thinking to help solve problems?
    - Encourage you to explore and try out new alternatives?
  - Inspiration
    - Express confidence that you can develop and improve?
    - Encourage you to continuously develop and improve?
    - Support you in taking on new challenges?

***Shortened coaching behavior:***

*From:* Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350-383.

- All items had textual anchors ranging from "never" (1) to "always" (7).
- My manager…
  1. Initiates meetings to discuss my progress.
  2. Is available for consultation on problems.
  3. Is an ongoing "presence" at work - someone who is readily available.

***Perceived dyadic psychological safety***

- *From:* Edmondson, A. C., & Woolley, A. W. (2003). Understanding outcomes of organizational learning interventions. *International Handbook of Organizational Learning and Knowledge Management.* London: Blackwell, 185-211.
- Doesn't say what point-scale, but it is a Likert-type scale, and it should be an agreement scale.
  1. If I make a mistake in this job, it is often held against me (R)
  2. It is difficult to ask others in this department for help (R)
  3. My manager often encourages me to take on new tasks or to learn how to do things I have never done before
  4. If I was thinking about leaving this company to pursue a better job elsewhere, I would talk to my manager about it
  5. If I had a problem in this company, I could depend on my manager to be my advocate

6. Often when I raise a problem with my manager, s/he does not seem very interested in helping me find a solution (R)

***Learning goal orientation***

- VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. Educational and Psychological Measurement, 57(6), 995-1015.
- 1 = strongly disagree; 7 = strongly agree
  1. I am willing to select a challenging work assignment from which I can learn a lot.
  2. I often look for opportunities to develop new skills and knowledge.
  3. I enjoy challenging and difficult tasks at work where I will learn new skills.
  4. For me, development of my work ability is important enough to take risks.
  5. I prefer to work in situations that require a high level of ability and talent.

**Table 1**

**Learning agility dimensions**

| | Learning agility dimension | Definition |
|---|---|---|
| **Learning dimensions** | Feedback seeking | The extent to which an individual solicits feedback about his or her performance. |
| | Information seeking | The extent to which an individual updates continuously updates preexisting knowledge with new information. |
| | Interpersonal risk-taking | The extent to which a person admits failings, mistakes, and other issues on-the-job and tries to get help to right these issues. |
| | Collaborating | The extent to which an individual tries to broker the learning process for others in their environment. |
| | Performance risk-taking | The degree to which a person places himself or herself in ambiguous situations and are unclear about the process or the outcome of the situation |
| | Reflecting | The degree to which a person reflects on an experience – how something happened, why it happened, how the outcome could have been different, and how to make changes in the future. |
| | Experimenting | The degree to which a person tries out new ideas or ways to get work done, usually through seeking out new information in their environment. |
| **Agility Dimensions** | Speed | The extent to which an individual is a "quick study" and is swift but not hasty while operating at their full potential. |
| | Flexibility | The extent to which an individual displays adaptation, fluidity, resilience, the ability to bend under pressure, and the ability to switch between different modes of operating in their work. |

**Table 2**
**Learning agility sample items**

***Burke Learning Agility Inventory***

- Prompt: Below you will find a list of behaviors that can describe how people perform their work. Please evaluate how well each statement describes how you engage your work.
- Scale: 1 = not at all; 4 = somewhat; 7 = very much
- Sample items

| | Learning agility dimension | Sample item |
|---|---|---|
| **Learning dimensions** | Feedback seeking | Ask my peers to provide me with feedback on my performance |
| | Information seeking | Update my knowledge and expertise through formal training or education |
| | Interpersonal risk-taking | Discuss my mistakes with others |
| | Collaborating | Ask a variety of stakeholders for their points of view |
| | Performance risk-taking | Try different approaches to see which one generates the best results |
| | Reflecting | Take time to reflect on how to be more effective |
| | Experimenting | Experiment with unproven ideas by testing them out |
| **Agility Dimensions** | Speed | Readily grasp new ideas or concepts |
| | Flexibility | Switch between different tasks or jobs as needed |

**Table 3**

**Performance data collected for corresponding job types**

| Job type | Performance data collected |
|---|---|
| Technologists | Number of patients scanned per hour |
| Physicians | Number of exams read per day |
| Front desk receptionist | Number of patients registered per hour |
| Billing department personnel | How many exams are coded each day (coders only) |
| Schedulers/operators | 1) Number answered calls per day<br>2) Percent work time spent on the phone with patients |
| IT staff | Number of help desk tickets closed per day |

**Table 4**

**Organizational sample study variable correlations**

| | M | SD | N | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. Learning agility | 4.86 | 0.88 | 263 | - | | | | |
| 2. Learning goal orientation | 5.73 | 0.8 | 264 | .51** | - | | | |
| 3. Psychological safety | 5.15 | 1.21 | 192 | .19** | .21** | - | | |
| 4. Managerial coaching behavior | 4.99 | 1.57 | 198 | .28** | .10 | .67** | | |
| 5. Performance | 299.69 | 189.43 | 130 | .08 | .14 | .16 | 0.13 | - |

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

**Tables 5 (a-c) Job Status ANOVAs for Study Outcomes**

**a) Performance**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 2 | 10151.72 | 5075.86 | .13 | .88 |
| Within groups | 116 | 4445008.13 | 38319.04 | | |
| Total | 118 | 4455159.85 | | | |

Full-time (M = 307.14); part-time (M=287.70); per diem/seasonal (M=223.33).

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

**b) Learning agility**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 2 | 1.00 | .50 | .64 | .53 |
| Within groups | 219 | 172.71 | .79 | | |
| Total | 221 | 173.72 | | | |

Full-time (M = 4.89); part-time (M=4.68); per diem/seasonal (M=5.11).

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

**c) Psychological safety**

| Source | df | SS | MS | F | *p* |
|---|---|---|---|---|---|
| Between groups | 2 | .33 | .17 | .11 | .90 |
| Within groups | 158 | 234.74 | 1.49 | | |
| Total | 160 | 235.07 | | | |

Full-time (M = 5.10); part-time (M=5.29); per diem/seasonal (M=5.42).

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

**Tables 6 (a-c) Job Type ANOVAs for Study Outcomes**

**a) Performance**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 4 | 2441204.68 | 610301.17 | 34.73 | .000*** |
| Within groups | 124 | 2179178.58 | 17574.02 | | |
| Total | 128 | 4620383.26 | | | |

Front desk (M = 321.67); schedulers/operators (M=579.04); radiologist (M = 865.67); technician (M=209.51), other leadership (M=32.33); other admin (M= N/A)†; miscellaneous (M= N/A)†; nurse (M=N/A)†.

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

† not enough N to calculate.

**b) Learning agility**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 7 | 18.87 | 2.70 | 3.77 | .001** |
| Within groups | 211 | 150.98 | .72 | | |
| Total | 218 | 169.85 | | | |

Front desk (M = 4.93); schedulers/operators (M=3.92); radiologist (M = 3.92); technician (M=4.72), other leadership (M=5.71); other admin (M=5.15); miscellaneous (M=4.54); nurse (M=4.63).

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

**c) Psychological safety**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 7 | 15.49 | 2.21 | 1.54 | .16 |
| Within groups | 161 | 231.37 | 1.44 | | |
| Total | 168 | 246.86 | | | |

Front desk (M = 5.22); schedulers/operators (M=5.09); radiologist (M = 4.22); technician (M=5.02), other leadership (M=5.95); other admin (M= 4.98); miscellaneous (M= 5.56); nurse (M=5.83).

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

**Table 7**

**Regression: Effect of learning agility on performance controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | 0.06 | 31.28 | | 0.91 | |
| | Schedulers/ operators vs. others | 0.50 | 43.91 | | 65.12*** | |
| | Radiologists vs. others | 0.38 | 71.00 | | 38.75*** | |
| | Technicians vs. others | -0.34 | 26.76 | | 26.37*** | |
| | Leadership vs. others | -0.14 | 70.23 | | 5.17* | |
| Step 2 | Learning agility | 0.08 | 12.94 | | 1.59 | 29.27*** |
| Total | | | | 0.57 | | |

[a] Regression weights are standardized coefficients obtained at step 2. [b] Individual F values are at step of entry.

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

**Table 8**

**Regression: Effect of psychological safety on learning agility controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | -0.03 | 0.20 | | 0.12 | |
| | Schedulers/ operators vs. others | -0.12 | 0.26 | | 2.13 | |
| | Radiologists vs. others | -0.17 | 0.41 | | 5.43* | |
| | Technicians vs. others | -0.13 | 0.18 | | 1.99 | |
| | Leadership vs. others | 0.11 | 0.40 | | 2.17 | |
| | Admin vs. others | 0.07 | 0.22 | | 0.72 | |
| | Miscellaneous vs. others | -0.13 | 0.29 | | 2.98 | |
| Step 2 | Psychological safety | 0.18 | 0.05 | | 6.51* | |
| Total | | | | 0.13 | | 3.38* |

[a] Regression weights are standardized coefficients obtained at step 2. [b] Individual F values are at step of entry.

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

**Table 9**

**Psychological safety as a potential mediator between learning agility and performance**

| | Standardized coefficient | Standard error | p-value |
|---|---|---|---|
| **Indirect effects** | 0.00 | 0.00 | 0.80 |

**Table 10**

**Regression: Effect of manager coaching behavior on psychological safety controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | -0.19 | 0.25 | | 5.87* | |
| | Schedulers/ operators vs. others | -0.11 | 0.32 | | 2.69 | |
| | Radiologists vs. others | -0.08 | 0.49 | | 1.38 | |
| | Technicians vs. others | -0.08 | 0.22 | | 0.84 | |
| | Leadership vs. others | 0.11 | 0.48 | | 2.67 | |
| | Admin vs. others | -0.20 | 0.27 | | 7.09* | |
| | Miscellaneous vs. others | -0.03 | 0.35 | | 0.13 | |
| Step 2 | Manager coaching behavior | 0.75 | 0.05 | | 137.15*** | |
| Total | | | | 0.53 | | 18.93*** |

[a] Regression weights are standardized coefficients obtained at step 2. [b] Individual F values are at step of entry.
*p < .05. **p < .01. ***p < .001.

**Table 11**

**Psychological safety as a potential mediator between manager coaching behavior and learning agility**

| | Standardized coefficient | Standard Error | p-value |
|---|---|---|---|
| **Indirect effects** | -0.02 | 0.08 | 0.79 |
| **Direct effects** | 0.22 | 0.06 | 0.00 |

**Table 12**

**Regression: Effect of manager coaching behavior on leaning agility controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | -0.04 | 0.20 | | 0.23 | |
| | Schedulers/ operators vs. others | -0.13 | 0.26 | | 2.86 | |
| | Radiologists vs. others | -0.12 | 0.40 | | 2.84 | |
| | Technicians vs. others | -0.11 | 0.17 | | 1.48 | |
| | Leadership vs. others | 0.14 | 0.40 | | 3.97* | |
| | Admin vs. others | 0.04 | 0.22 | | 0.26 | |
| | Miscellaneous vs. others | -0.15 | 0.28 | | 3.88 | |
| Step 2 | Manager coaching behavior | 0.28 | 0.04 | | 15.79*** | |
| Total | | | | 0.12 | | 4.45*** |

[a] Regression weights are standardized coefficients obtained at step 2. [b] Individual F values are at step of entry.
*p < .05. **p < .01. ***p < .001.

**Table 13**

**Regression: Effect of learning goal orientation on learning agility controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | 0.02 | 0.15 | | 0.13 | |
| | Schedulers/ operators vs. others | -0.10 | 0.20 | | 2.60 | |
| | Radiologists vs. others | -0.19 | 0.30 | | 11.42** | |
| | Technicians vs. others | -0.08 | 0.14 | | 1.39 | |
| | Leadership vs. others | 0.12 | 0.30 | | 4.46* | |
| | Admin vs. others | 0.05 | 0.17 | | 0.64 | |
| | Miscellaneous vs. others | -0.07 | 0.22 | | 1.30 | |
| Step 2 | Learning goal orientation | 0.46 | 0.06 | | 75.53*** | |
| Total | | | | 0.28 | | 13.93** |

[a] Regression weights are standardized coefficients obtained at step 2. [b] Individual F values are at step of entry.

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

**Table 14**

**Study variable correlations**

| | M | SD | N | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Learning agility | 4.59 | 1.01 | 199 | - | | | | | |
| 2. Learning goal orientation | 5.01 | 1.27 | 199 | .59** | - | | | | |
| 3. Psychological safety | 4.62 | 1.22 | 199 | .41** | .35** | - | | | |
| 4. Managerial coaching behavior | 4.86 | 1.41 | 199 | .60** | .41** | .70** | - | | |
| 5. Education | 4.36 | 1.2 | 199 | .15* | .17* | 0.07 | 0.13 | - | |
| 6. Job level | 2.02 | 1.13 | 199 | .20** | .21** | 0.08 | .15* | -0.01 | - |

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

**Tables 15 (a & b) Job Status ANOVAs for Study Outcomes**

**a) Learning agility**

| Source | df | SS | MS | F | p |
|---|---|---|---|---|---|
| Between groups | 1 | 10.83 | 10.83 | 11.09** | .001 |
| Within groups | 197 | 192.45 | 0.98 | | |
| Total | 198 | 203.28 | | | |

Employed (M = 4.63); unemployed (M=3.44).

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

**b) Psychological safety**

| Source | df | SS | MS | F | *p* |
|---|---|---|---|---|---|
| Between groups | 1 | .05 | .05 | .04 | .85 |
| Within groups | 197 | 292.28 | 1.48 | | |
| Total | 198 | 292.33 | | | |

Employed (M = 4.62); unemployed (M=4.54).

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

**Table 16**

**Path model: Effect of psychological safety, manager coaching behavior, and learning goal orientation on learning agility controlling for employment status, education level & job level**

| Predictor | IV | Estimated Coefficient β | Standard Error | p |
|---|---|---|---|---|
| | Education level | 0.03 | 0.05 | 0.60 |
| | Job level | 0.05 | 0.05 | 0.33 |
| | Employment status | -0.09 | 0.05 | 0.09 |
| | Learning goal orientation | 0.39 | 0.05 | 0.00 |
| | Psychological safety | 0.00 | 0.07 | 0.93 |
| | Manager coaching behavior | 0.43 | 0.07 | 0.00 |

**Table 17**

**Path model: Effect of manager coaching behavior on psychological safety controlling for employment status, education level & job level**

| Predictor | IV | Estimated Coefficient β | Standard Error | p |
|---|---|---|---|---|
| | Education level | -0.03 | 0.05 | 0.58 |
| | Job level | -0.03 | 0.05 | 0.49 |
| | Employment status | 0.06 | 0.05 | 0.19 |
| | Manager coaching behavior | 0.74 | 0.03 | 0.00 |

**Table 18**

**Indirect effects: Mediation of manager coaching behavior to learning agility**

| | β | p |
|---|---|---|
| Total | 0.42 | 0.00 |
| Total indirect | 0.00 | 0.93 |

**Table 19**

**Model $R^2$ values**

| Predictor | IV | β | p |
|---|---|---|---|
| | Learning agility | 0.50 | 0.00 |
| | Psychological safety | 0.54 | 0.00 |

**Table 20**

**Organizational sample: Effect of learning goal orientation x psychological safety on learning agility controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Front desk vs. others | -0.09 | 0.21 | | 1.14 | |
| | Schedulers/ operators vs. others | -0.12 | 0.26 | | 2.94 | |
| | Radiologists vs. others | -0.22 | 0.38 | | 11.35** | |
| | Technicians vs. others | -0.15 | 0.19 | | 2.78 | |
| | Leadership vs. others | 0.10 | 0.35 | | 2.14 | |
| | Admin vs. others | 0.03 | 0.23 | | 0.13 | |
| | Miscellaneous vs. others | -0.17 | 0.29 | | 6.22* | |
| Step 2 | Learning goal orientation | 0.44 | 0.06 | | 51.14*** | |
| | Psychological safety | 0.10 | 0.06 | | 2.84 | |
| Step 3 | Learning goal orientation x Psychological safety | -0.03 | 0.06 | | 0.25 | |
| Total | | | | 0.33 | 1.14 | 10.53*** |

[a] Regression weights are standardized coefficients obtained at step 3. [b] Individual F values are at step of entry.

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

**Table 21**

**Crowd-sourced sample: Effect of learning goal orientation x psychological safety on learning agility controlling for job type**

| Predictor | IV | Coefficient [a] | Standard Error | Adjusted $R^2$ | $F^b$ | F |
|---|---|---|---|---|---|---|
| Step 1 | Education | 0.05 | 0.05 | | 0.91 | |
| | Job level | 0.06 | 0.05 | | 1.20 | |
| | Employment status | -0.12 | 0.29 | | 4.45* | |
| | Learning goal orientation | 0.43 | 0.05 | | 49.53*** | |
| Step 2 | Psychological safety | 0.31 | 0.05 | | 27.42*** | |
| | Learning goal orientation x Psychological Safety | -0.10 | 0.05 | | 2.86 | |
| Step 3 | | | | | | |
| Total | | | | 0.41 | | 23.46*** |

[a] Regression weights are standardized coefficients obtained at step 3. [b] Individual F values are at step of entry.

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

**Figure 1**

**A model of interpersonal learning processes in organizations**

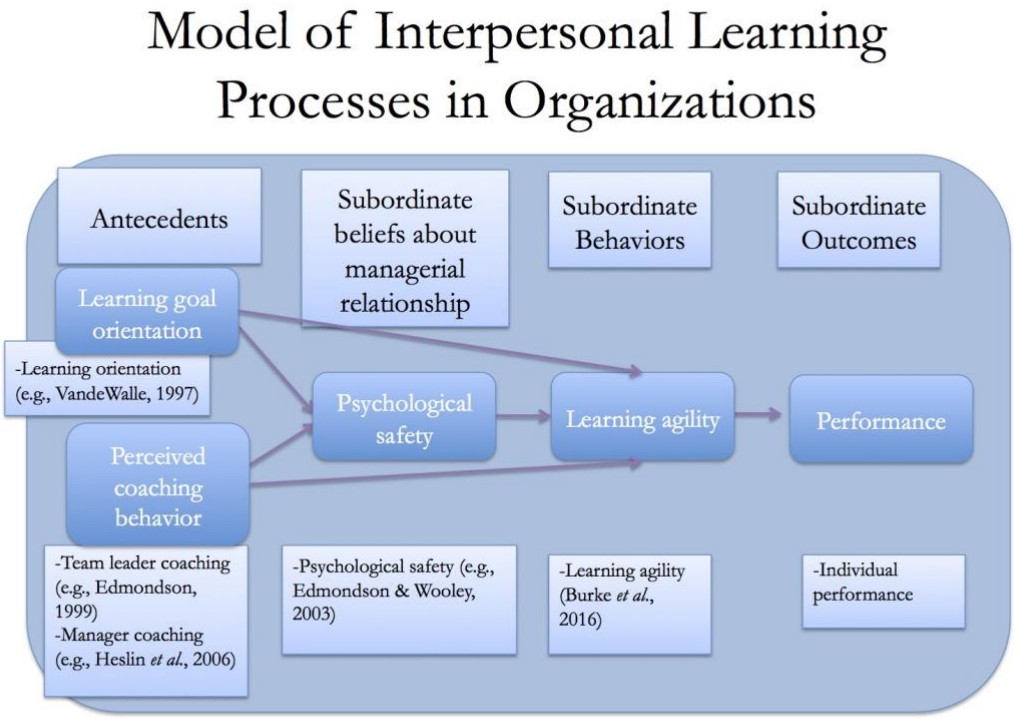


**Figure 2**

**Edmondson's (1999) model of team learning**

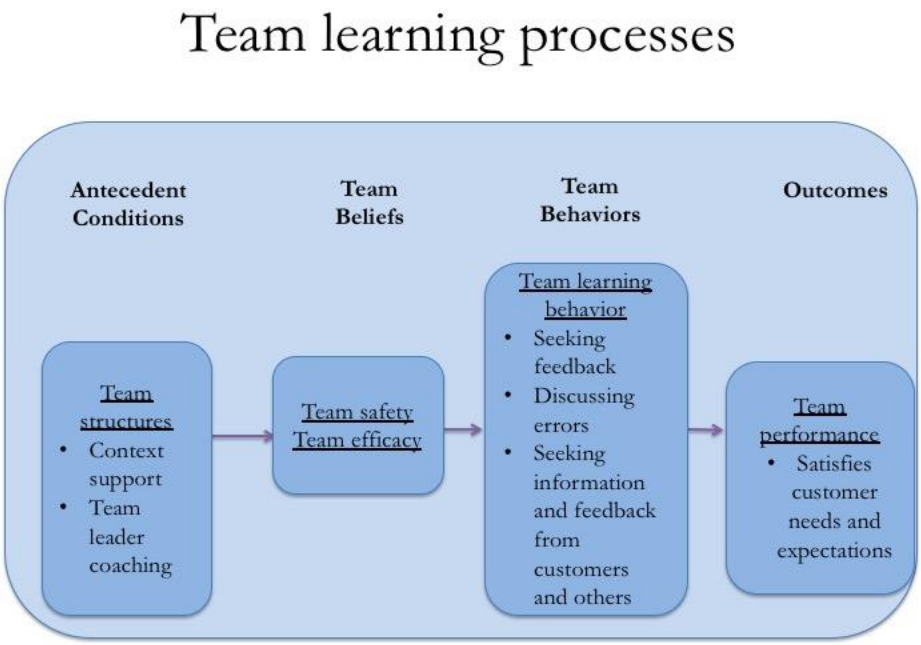


**Figure 3**

**Overview of data collection process**

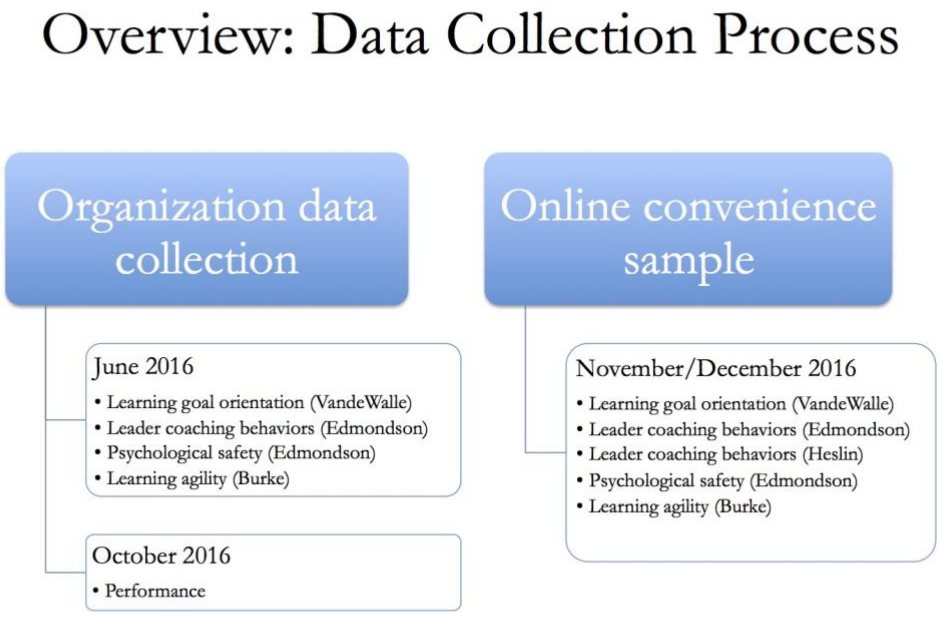


**Figure 4**

**Q-Q Performance plot – Organizational sample**

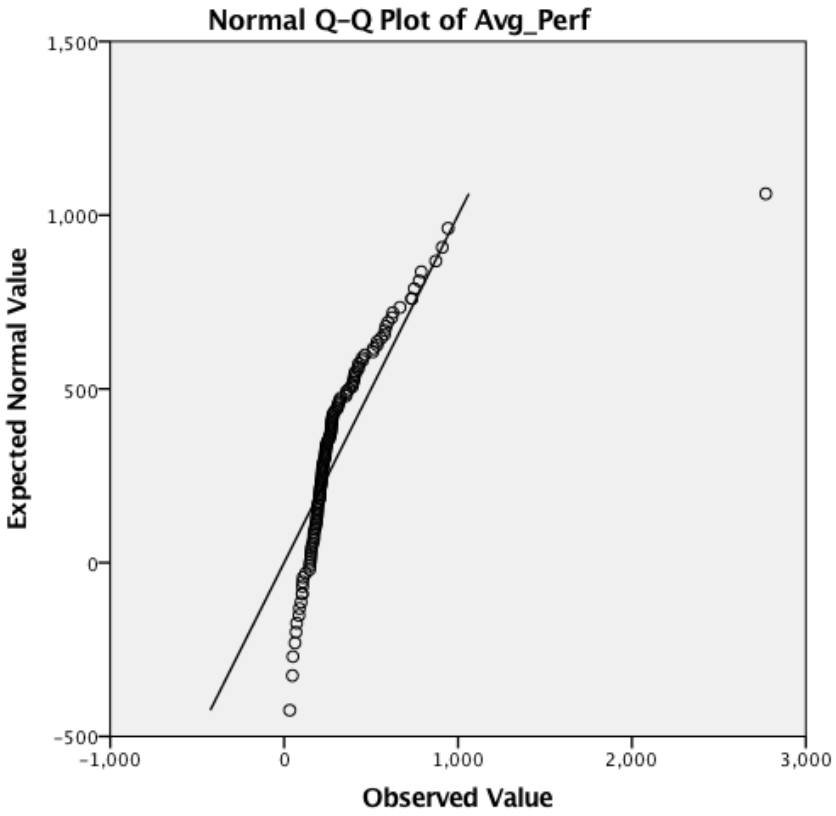
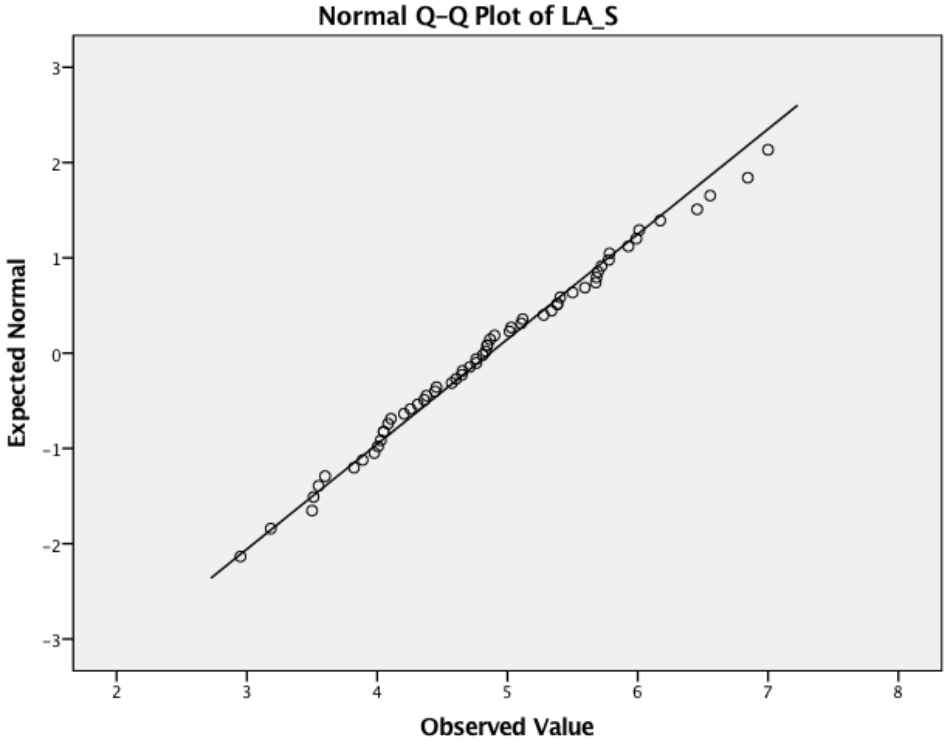


**Figure 5**

**Q-Q learning agility plot – Organizational sample**



## Figure 6

**Q-Q learning goal orientation plot – Organizational sample**

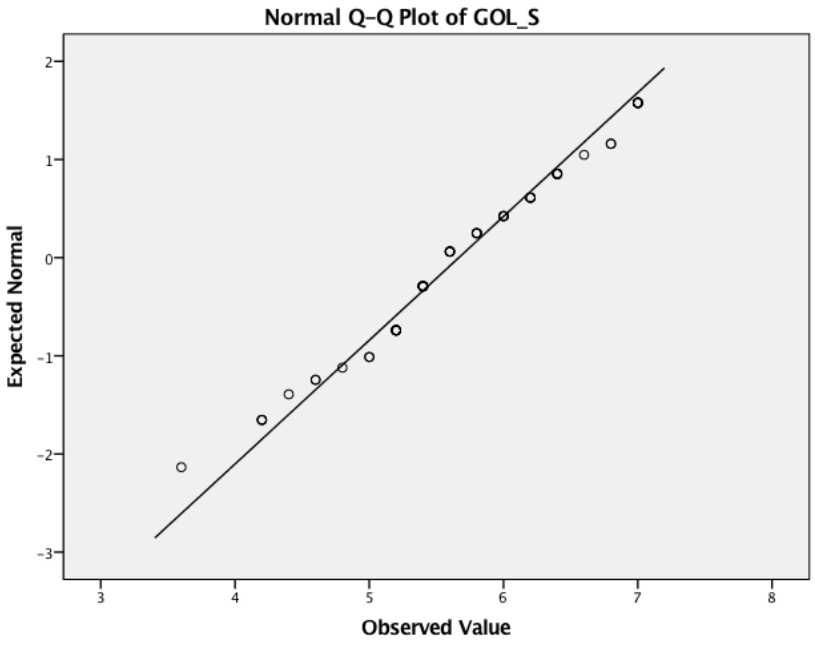


**Figure 7**

**Q-Q psychological safety plot – Organizational sample**

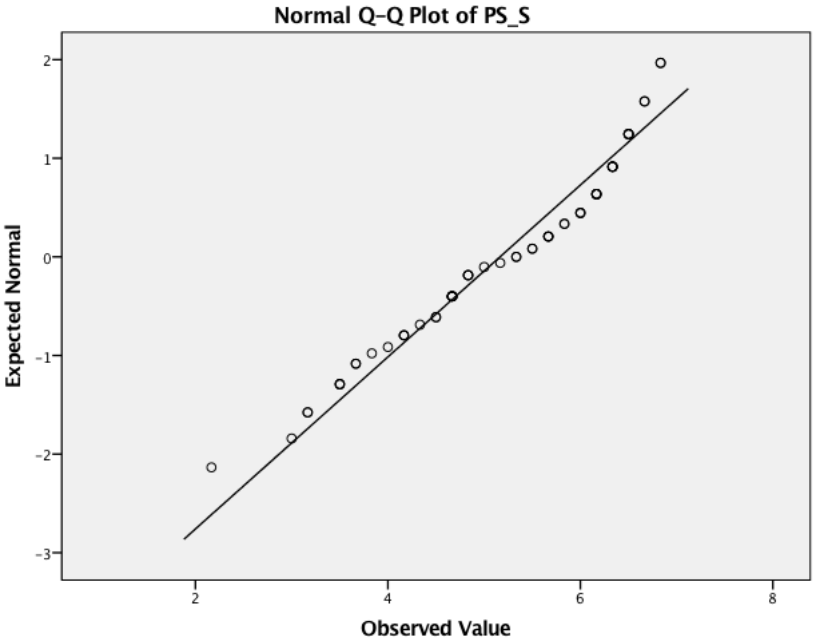


**Figure 8**

**Q-Q manager coaching behavior plot – Organizational sample**

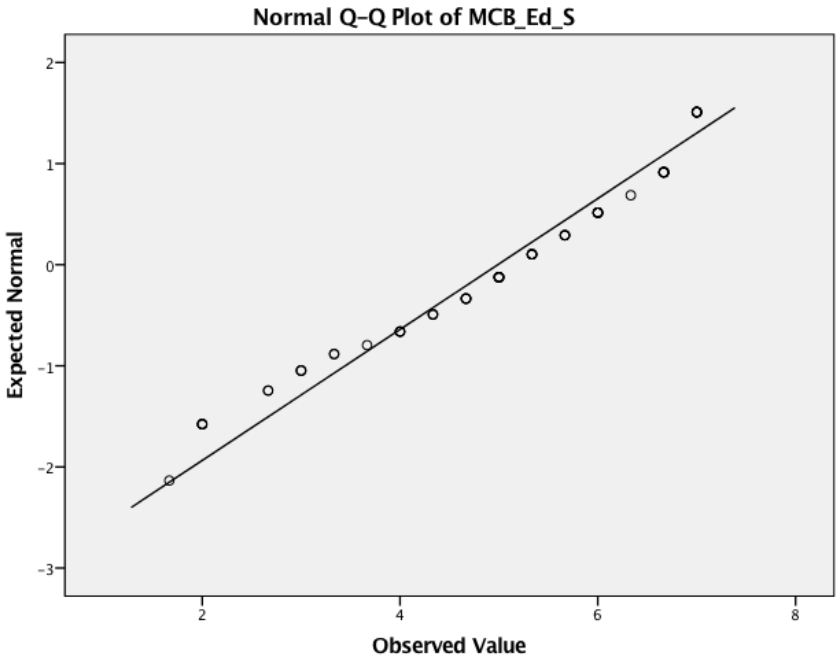


**Figure 9**

**Summary of study results – Organizational sample**

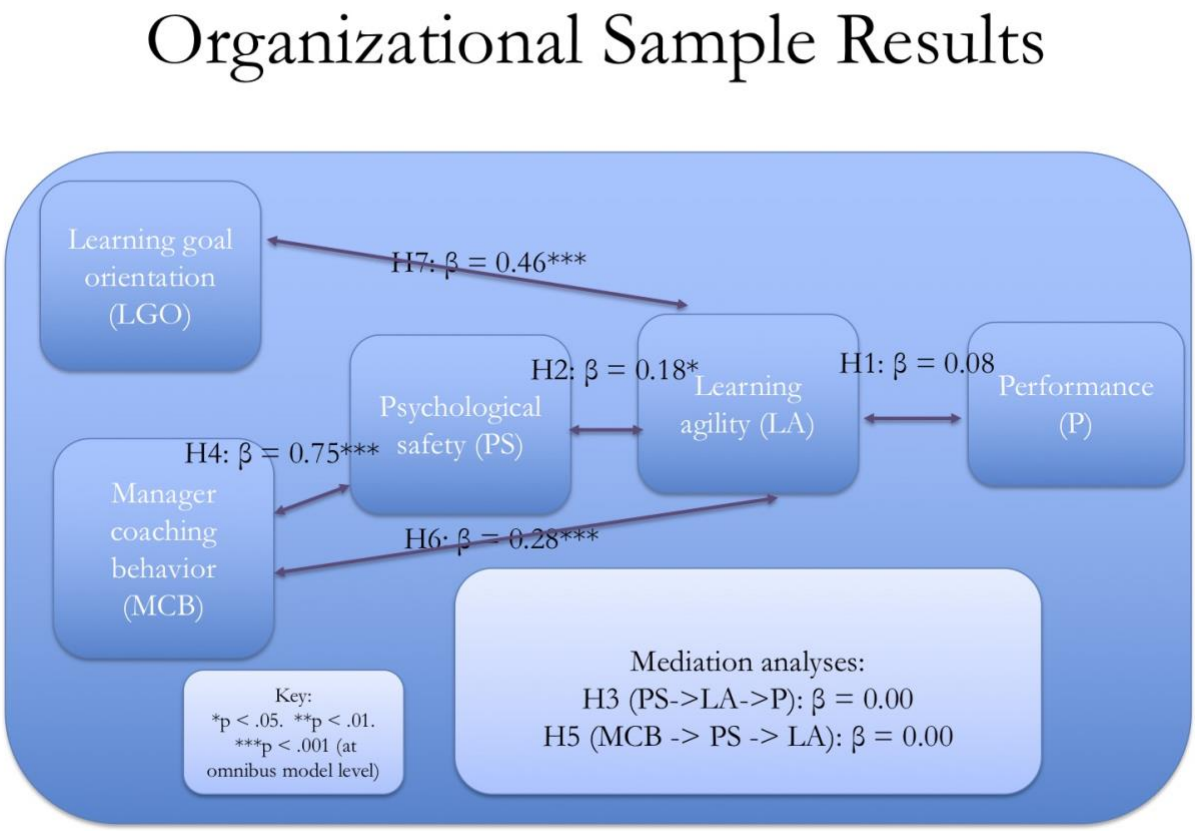


**Figure 10**

**Q-Q learning agility plot – Crowd-sourced sample**

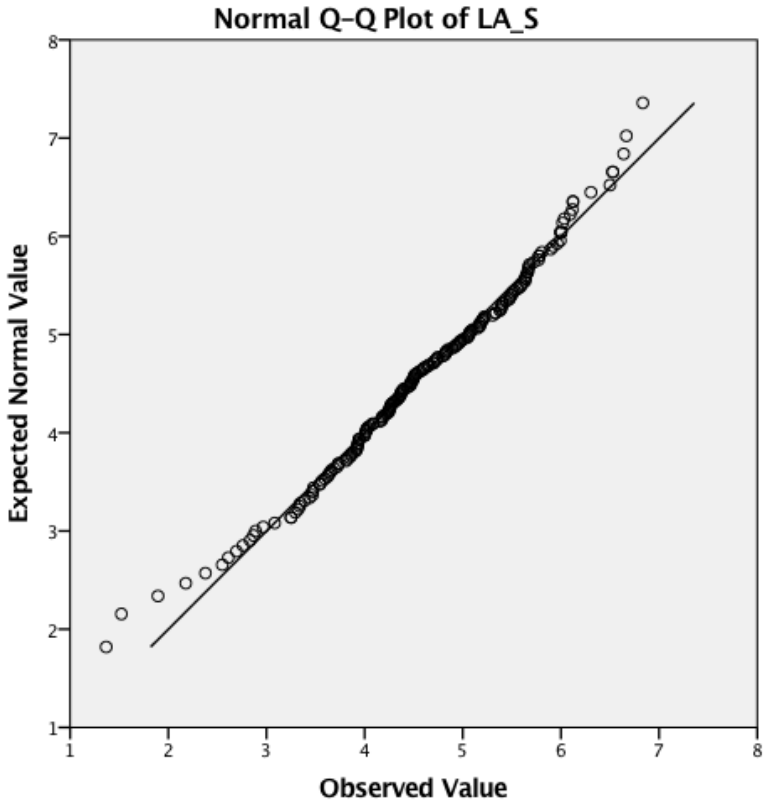


**Figure 11**

**Q-Q psychological safety plot – Crowd-sourced sample**

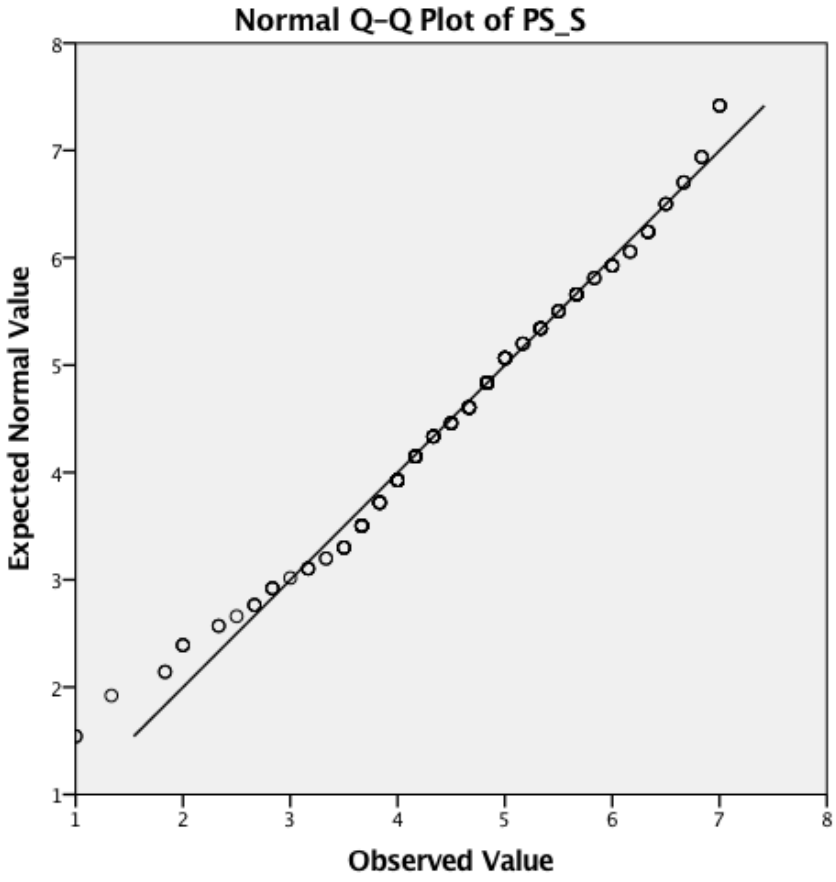


**Figure 12**

**Q-Q learning goal orientation plot – Crowd-sourced sample**

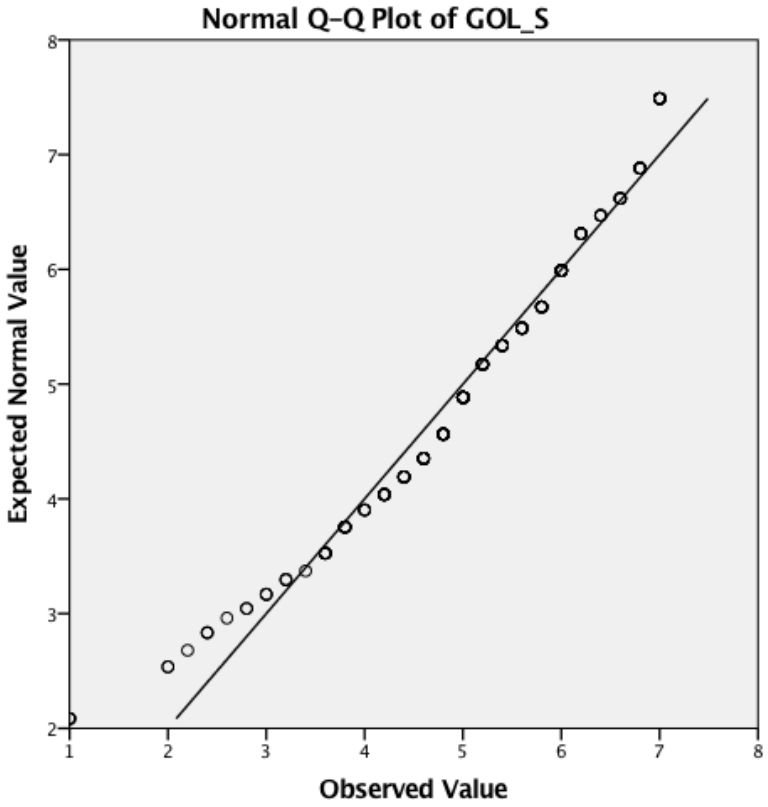


**Figure 13**

**Q-Q manager coaching behavior – Crowd-sourced sample**

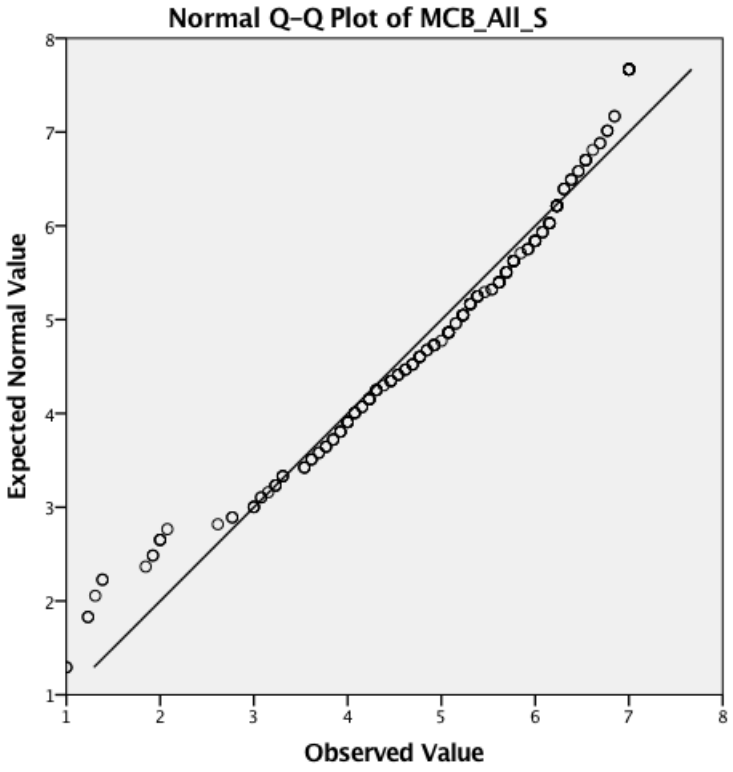


**Figure 14**

**Summary of study results – Crowd-sourced sample**

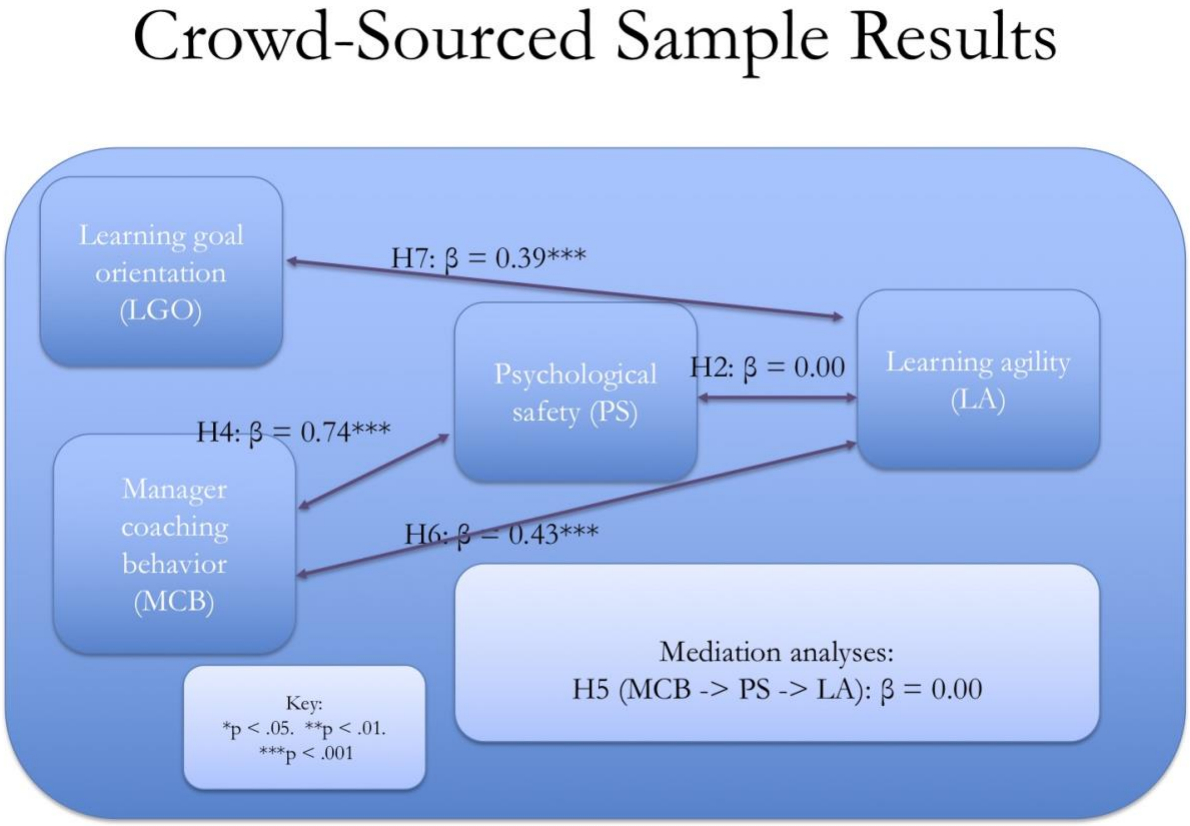


**Figure 15**

**Proposed model of interpersonal learning processes in organizations**