CHRONOLOGICAL AGE AND TRAINING OUTCOMES: EXAMINING PSYCHOLOGICAL PROCESSES AND COGNITIVE ABILITY

by

Tracy Christine McCausland
A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Doctor of Philosophy
Psychology

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Date: _____ Spring Semester 2014
George Mason University
Fairfax, VA

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DEDICATION

My dissertation is dedicated to my family (especially my mother, Susan, my father, Mark, and my brother, Douglas McCausland) and my mentors (Drs. Eden King, Stephen Zaccaro, Scott Tonidandel, and John Kello).

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to my dissertation chair and advisor, Dr. Eden King, for her unwavering encouragement, superior guidance, and countless revisions. My dissertation committee members, Drs. Stephen Zaccaro and Lois Tetrick, provided invaluable help, support and insight. I am also incredibly grateful to my father, Mark McCausland, for his enthusiasm, resourcefulness, and dedication to the completion of this project. Finally, I am indebted to the trainers for their eagerness to implement this study, to the cooperating airlines for permitting access to their employees, and to the trainees for their willingness to participate.

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ABSTRACT

CHRONOLOGICAL AGE AND TRAINING OUTCOMES: EXAMINING PSYCHOLOGICAL PROCESSES AND COGNITIVE ABILITY

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George Mason University, 2014

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Employee training and development programs are typically regarded as universally beneficial; however, research suggests that this assumption does not hold for older trainees and little is known about why and under what conditions older trainees are likely to underperform relative to their younger colleagues. This study examined the mediating effects of motivation to learn and cognitive ability on the relationship between chronological age and training outcomes. The results of an empirical study involving 251 employees from the airline industry participating in mandatory software training indicated that motivation to learn, but not cognitive ability, transmitted the effect of chronological age on certain training outcomes such that older trainees reported lower levels of motivation to learn, which in turn was related to poorer outcomes. Furthermore, this indirect effect was more pronounced among trainees with relatively low levels of task self-efficacy immediately prior to training and trainees with limited views of remaining occupational time; high task self-efficacy and perceptions of open-ended remaining occupational time weakened the negative effects of older employee age in a

training context. The implications of these findings for understanding and improving age-related workplace dynamics are discussed.

INTRODUCTION

The global workforce is "graying." By 2020, over 25% of the United States labor force will be composed of people age 55 or older (US Bureau of Labor Statistics, 2012) and similar projections are expected in other industrialized countries (Commission of the European Communities, 2005). Given this trend, one particularly urgent concern is the effectiveness of training programs for older workers. Investments in employee development and training are estimated to total $134 billion annually and have been linked with gains in employee productivity and organizational profitability (Huselid, 1995; Lyau & Pucel, 1995; Sepúlveda, 2010). Assumptions that targeted competencies are mastered upon training completion are not always warranted – especially for older trainees (Colquitt, LePine, & Noe, 2000; Kubeck, Delp, Haslett, & McDaniel, 1996; Ng & Feldman, 2008). The implications of poor training outcomes include serious threats to older workers and their employing organizations.

The role of chronological age[1] in voluntary learning contexts has received substantial scholarly attention (e.g., Maurer, 2001; Maurer, Weiss, & Barbeite, 2003; Renaud, Lakhdari, & Morin, 2004; Salthouse & Maurer, 1996; Stagner, 1985; van Vianen, Dalhoeven, & de Pater, 2011). These studies investigate several individual, situational, and motivational factors involved in older workers' relatively lower likelihood to seek out, request, and/or participate in such opportunities. In addition, ample

evidence confirms average mean level differences between younger and older trainees for several types of training outcomes (Colquitt et al., 2000; Kubeck et al., 1996; Ng & Feldman, 2008). However, there is surprising little research exploring the personal characteristics (e.g., ability, attitudes, beliefs, and motivation) and training environments responsible for these losses before, during, and after *mandatory* training. To this end, scholars have recently recommended that chronological age be at the forefront of the training research agenda (Beier & Kanfer, 2010).

The goals of the current investigation are to better understand age-related discrepancies in training effectiveness by (1) identifying the primary causes of age-related differences in training outcomes and (2) determining which psychological factors are likely to intensify or reduce these differences. Based on prior conceptual, theoretical and empirical work, I propose and justify a moderated mediation model specifying motivation to learn as the primary mechanism through which chronological age influences training outcomes. Then, I identify and describe three factors -- task self-efficacy, perceived relative age, and future occupational time perspective -- that are likely to influence the indirect effect that chronological age exerts on training outcomes. In my efforts to more fully understand the relationships between age and training outcomes, I describe cognitive ability as an alternative explanation to the aforementioned psychological processes.

Chronological Age and Training Outcomes

When workplace training is designed and implemented properly, a variety of benefits are realized at all levels of the organization (e.g., Aguinis & Kraiger, 2009;

Brown & Sitzmann, 2011; Tannenbaum & Yukl, 1992). Unfortunately, gains acquired through training are not universal and certain trainee populations appear vulnerable to demonstrating sub-optimal performance (e.g., Kubeck et al., 1996, Shapiro, King, & Quiñones, 2007; Towler & Dipboye, 2001). To date, three meta-analyses have examined the relationship between chronological age and training performance (Colquitt et al., 2000; Kubeck et al., 1996; Ng & Feldman, 2008) and there is compelling evidence to suggest that older trainees perform more poorly in training than their younger colleagues across a range of performance measures (mastery of the training material, declarative knowledge, post-training self-efficacy, time to complete the final task and training program). The most frequent explanations for average age-related discrepancies in training are attributed to motivational (e.g., Kanfer & Ackerman, 2004) and ability (e.g., Salthouse, 2012) factors.

To achieve the main goals of the current study, I begin by examining relationships that are well-documented in the literature (i.e., replication). Verifying that these data align with well-supported findings reinforces the reproducibility of established conclusions and facilitates the model building process for more novel contributions. Utilizing Kraiger, Ford, and Salas's (1993) tripartite model of learning, I investigate affective and cognitive learning outcomes. Affective learning outcomes refer to trainee attitudes (e.g., about learning or training) and motivation (e.g. post-training self-efficacy, goal setting). Cognitive learning outcomes refer to the amount and type of knowledge acquired including declarative knowledge (information about what), procedural knowledge (information about how), structural knowledge (e.g., mental models) and

cognitive strategies. In the current investigation, training outcomes include (a) training evaluations, (b) post-training task self-efficacy, and (c) performance.

Given the extensive empirical evidence for mean age-related discrepancies in training (Colquitt et al., 2000; Kubeck et al., 1996; Ng & Feldman, 2008) and theoretical rationale for why these differences occurs (motivation, Kanfer & Ackerman, 2004; ability, Salthouse, 2004), I predict that c*hronological age is negatively related to all training outcomes (Hypothesis 1).* See Figure 1 for the full model.

Mediator(s) of Chronological Age-Training Outcomes Relationship

To better understand the relationship between chronological age and training outcomes, it is important to identify the construct(s) responsible for their association. Or rather, *why* does chronological age affect training outcomes? From an intrapersonal perspective, there are two likely explanations: what a person "will do" and what a person "can do." The "will do" explanation refers to an individual's *motivation* to learn and the "can do" explanation refers to an individual's *ability* to learn. I first focus on the malleable construct of motivation to learn.

Motivation to Learn.

Across a number of influential theoretical and empirical models, motivation to learn -- "a specific desire of the trainee to learn the content of the training program" (Noe, 1986, p. 743) -- is the most direct antecedent of training outcomes (Beier & Kanfer, 2010; Colquitt et al., 2000; Noe, 1986; Noe & Schmitt, 1986). For example, in their meta-analytic review (Colquitt et al., 2000), motivation to learn was positively related to declarative knowledge, skill acquisition, trainee reactions, post-training self-efficacy, and

training transfer. Furthermore, more recent empirical evidence continues to support the importance of motivation to learn (Bell & Ford, 2007; Tziner, Fisher, Senior, & Weisberg, 2007). Collectively, there is sufficient evidence to suggest that motivation to learn plays an essential role in training success because in order to acquire novel information trainees must choose to pursue a goal (i.e., learn the training material), dedicate the necessary amount of effort toward achieving that goal, and invest the necessary amount of time to pursue that goal (Diefendorff & Chandler, 2011). Similar to above, these analyses are for the purpose of replication. Formally, I hypothesize that m*otivation to learn is positively related to all training outcomes (Hypothesis 2).*

Research on motivation in training has been the subject of extensive scholarly attention; yet, there are topics still unexplored. For instance, Beier and Kanfer (2010) highlighted the need to better understand the impact of chronological age on motivational processes before, during, and after training. Of the seminal motivational models (Colquitt et al., 2000; Noe, 1986; Noe & Schmitt, 1986), only one includes chronological age and age was not of primary interest (Colquitt et al., 2000). This is particularly concerning because chronological age is frequently implicated as the reason for which older adults are not willing to learn new material (Posthuma & Campion, 2009). Yet, these assumptions are largely untested posing a serious gap in the literature and one that the current study will address.

Kanfer and Ackerman (2004) developed an integrative theoretical framework of adult motivation in the workplace by expanding Kanfer's (1987) variant of expectancy theory (Vroom, 1964) and placing it in a life-span context. Kanfer and Ackerman's

theory paper addresses motivation at work more generally; nevertheless, their propositions are applicable to the formal training context as well.

Kanfer's motivation model (1987) theorizes that individuals devote personal resources as a function of effort, performance, and utility. Of particular relevance to older learners, the utility (i.e., perceived value or attractiveness) that trainees attach to expended effort and achieved performance is likely to predictably differ as a function of age. Kanfer and Ackerman (2004) observed multiple distinct patterns of aging; of primary importance to the current investigation is the aging pattern that relates to the reorganization of goal structures. Specifically, Kanfer and Ackerman suggested that there is "some type of discontinuity in adult development that creates a qualitatively different constellation of motives for action" (p. 444).

Carstensen's (1998) socioemotional selectivity theory offers the most current theoretical understanding of motive changes across adulthood. Desired social interactions transform over the life span as a function of a shifting time perspective from "time since birth" to "time until death" and one's orientation toward time influences the selection and pursuit of social interactions and goals. Accordingly, younger adults (with expansive frames) are motivated to engage in social interactions for their informational value and the possibility of future opportunities (i.e., achievement motives such as knowledge acquisition, mastery demonstration). In contrast, older adults (with limited time frames) are motivated to engage in social interactions to gain emotional satisfaction and reaffirm their identity (i.e., positive affect motives such as emotion regulation, self-concept preservation). Stated differently,

> "When time is perceived as open-ended, goals that become most highly prioritized are most likely to be those that are preparatory, focused on gathering information, on experiencing novelty, and on expanding breadth of knowledge. When time is perceived as constrained, the most salient goals will be those that can be realized in the short-term… As people age and increasingly perceive time as finite, they attach less importance to goals that expand their horizons and greater importance to goals from which they derive emotional meaning" (Carstensen, 2006, p. 1914).

Put simply, the theories of Kanfer and Ackerman (2004) as well as Carstensen (1998) predict, compared to younger workers, older workers will be less oriented toward the acquisition of new information. Following this logic, I anticipate that c*hronological age is negatively related to motivation to learn (Hypothesis 3).* Combining the simple hypothesized relationships and acknowledging that there are likely additional explanatory factors (e.g., ability), I predict that *motivation to learn partially mediates the relationship between chronological age and training outcomes (Hypothesis 4)*.

Moderators of the Chronological Age – Motivation to Learn Relationship

Theoretically, predictions about the relationship between age and motivation are clear; however, empirically, results are mixed and lead to differing conclusions. On one hand, contrary to theoretical expectations, a recent meta-analysis (Gegenfurtner & Vauras, 2012) found chronological age to show a positive, albeit non-significant, relationship with motivation to learn (ß = .44). Utilizing a different methodology, the majority of unemployed adults (over 90%; age 51-75) participating in focus groups

indicated that their ideal job would afford them the opportunity to learn new material (Lee, Czaja, & Sharit, 2008). On the other hand -- in support of theoretical predictions -- a separate meta-analysis (Colquitt et al., 2000) found chronological age to be significantly and negatively related to motivation to learn (r_c = -.18). Inconsistencies in empirical results suggest that moderators are present.

Older workers are not a homogenous group and certain psychological characteristics are likely to protect against predicted declines in motivation to learn. Therefore, I explore select individual differences that represent three distinct features likely to preserve older trainees' motivation to learn: confidence in personal abilities, the surrounding environment, and anticipated occupational outlook. Respectively, these individual difference variables are task self-efficacy, perceived relative age, and future occupational time perspective.

Task Self-Efficacy.

Self-efficacy is defined as an individual's belief in his or her capacity to perform at a certain level in a specific domain (Bandura, 1986). In the current research, I am interested in *task self-efficacy*, or rather self-efficacy for acquiring task-related knowledge. Self-efficacy is at the core of Bandura's social-cognitive theory (Bandura, 1977), which is one of the most widely studied and influential theories (Smith, 2002). Anchored in an agentic perspective of self-development and incorporating widely accepted constructs such as Vroom's (1964) expectancy component, self-efficacy is intuitively appealing and, perhaps as a result, received an abundance of empirical and theoretical attention.

Gist and Mitchell (1992) summarized three key aspects of self-efficacy. First, self-efficacy is a comprehensive judgment of one's capability to perform in a specific domain by utilizing information attained from the individual, the task, and the environment. Second, self-efficacy is a dynamic construct; as individuals acquire new information (i.e., about the individual, task, and/or environment), a person may revise his or her confidence level. Third, self-efficacy involves "the construction and orchestration of adaptive performance to fit changing circumstances" (Bandura, 1989). In other words, two individuals with the same skill set may perform differently depending on their "utilization, combination, and sequencing" of required skills (Gist & Mitchell, 1992, p. 185). In short, self-efficacy is an extremely complex and a continually evolving construct.

In the workplace training literature, research traditionally examines a direct link from self-efficacy to motivation and consistently finds a moderate to strong positive relationship at the between-persons level of examination (e.g., Colquitt et al., 2003; Gist & Mitchell, 1992; Latham & Pinder, 2005). In the current research, I extend these findings to focus on the ways in which individual differences in efficacy influence the nature of the relationship between age and motivation.

Outside the workplace training literature, self-efficacy has been found to be a meaningful between-person moderator (e.g., Brown, Ganesan, & Challagalla, 2001; Brown, Lent, & Larkin, 1989; Eden & Kinnar, 1991; Grau, Salanova, & Peiró, 2001; Huamao, Ying, & Ronghuai, 2006; Jex & Bliese, 2000). Indeed, data from Charness, Kelly, Bosman, and Mottram (2001) found experience to interact with chronological age

to predict performance in technical training, such that previous computer experience eliminated age differences in technical knowledge acquisition. Because experience is the strongest predictor of self-efficacy (Bandura, 1997), I extend this logic to propose self-efficacy's interactive effects with chronological age on motivation to learn. Formally, I hypothesize that *task self-efficacy moderates the negative relationship between chronological age and motivation to learn such that this negative effect is weaker for trainees with high task self-efficacy than for trainees with low task self-efficacy (Hypothesis 5*).

Perceived Relative Age.

Thus far, the conceptualization of age has been limited to chronological age; however; the discussion of how to define and measure age has received a resurgence of scholarly interest (e.g., Schalk, van Veldhoven, de Lange, de Witte, Kraus, Stamov-Roßnagel, et al., 2010). Aging is a multidimensional process of physical, psychological, and social change that occurs over time (Erber, 2005). Therefore, the term *age* refers to a snapshot of these factors at a given time and is necessarily a multidimensional construct. Although the multidimensional nature of age may be implicitly understood and accepted, it is not captured by modern day language and measurement. Given current societal trends and medical advancements, the aging process occurs more dynamically making life trajectories (e.g., physical capability, cognitive functioning, life events experienced, career stage) more variable across individuals, especially among older adults (i.e., differential aging, Peeters & van Emmerik, 2008). Thus chronological age is insufficient and requires articulation of additional age facets (Barack, 1987; Baum & Boxely, 1983;

Cleveland, Shore, & Murphy, 1997; Cleveland & Lims, 2007; Finkelstein, Heneghan, Jenkins, McCausland, & Siemieniec, 2011; Pitt-Catsouphes, Matz-Costa, & Brown, 2010; Kastenabum, Derbin, Sabatini, & Arrt, 1972; Lawrence, 1988; Sterns & Doverspike, 1989).

The pivotal work of Cleveland and Shore (1992) offered the first empirical support for a multidimensional conceptualization of age in the workplace by demonstrating that alternative measures of age yielded different relationships with work outcomes. Their superordinate category of context-oriented age suggests that features of the environment influence how age is perceived and interpreted (Lawrence, 1988; Sterns & Alexander, 1987). This argument is consistent with the basic tenets from social comparison theory, which states that in the absence of "objective" information, people will evaluate their status on a given attribute by looking to others for social information (Festinger, 1954; Mussweiler, 2003). Chronological age could be classified as "objective," but due to the difficulty (and uselessness) of associating a specific chronological number to an age group (e.g., young, middle-aged, or old), the descriptors of "younger" and "older" are arguably more appropriate and this appraisal of age is likely to depend on whom the target is being compared to. Individuals are continually selecting comparisons, evaluating themselves against that referent, and assigning attributions and/or judgments about their own status, capabilities and/or attitudes based on that comparison (Buunk & Gibbons, 2007; Festinger, 1954; Greenberg, Ashton-James, & Ashkansay, 2007; Suls, Martin, & Wheeler, 2002).

Simply extending this argument to the current context, perceived relative age refers to an individual's perception of his or her age as compared to a specified referent (Cleveland & Shore, 1992; Lawrence, 1984). Surprisingly, only a few studies have directly assessed *perceived* (as compared to *actual*) relative age (Armstrong-Stassen, & Lee 2009; Cleveland & Shore, 1992; Cleveland et al., 1997; Maurer et al., 2003) with preliminary evidence suggesting that, in the workplace, this dimension of age is meaningful. Indeed, Maurer et al. (2003) found that perceived relative age was associated with an entirely different set of variables than chronological age. Although the interaction between these two age types was not investigated, the data suggest that perceived relative age may offer incremental utility in prediction. Cleveland and Shore (1992) came to the same conclusion; perceived relative age accounted for variance in work outcomes above and beyond what was already explained by chronological age.

In organizational contexts, the salience of individual identities can be triggered by examining similarities and differences among their work group (*cf.*, Festinger, 1954; Robinson & O'Leary-Kelly, 1998). Salience may be especially strengthened when group composition is predominately similar (e.g., middle-aged) with the exception of one individual being noticeably younger or older. In an age diverse environment (i.e., there is representation from at least two individuals with noticeably different ages), age identity (i.e., age group membership) is likely to become salient and may automatically activate age-related stereotypes. Stereotypes are mental structures applied to members of a social group (e.g., older workers) to make social information more manageable and meaningful (Aronson, Wilson, & Akert, 2010; Weber & Crocker, 1987). Bargh, Chen, and Burrow's

(1996) conducted a classic study demonstrating that implicitly priming people with age-related stereotypes affects future behavior. Extending Bargh et al.'s (1996) findings to the current context, perceiving oneself to be older – in spite of one's normative standing – may elicit certain age-related stereotypes (e.g., an old dog can't learn new tricks) and in turn may affect his or her behavior in training (e.g., reduced effort). When a trainee perceives him- or herself to be older than his or her fellow trainees, the effect of chronological age on motivation is likely intensified. Therefore, I predict *perceived relative age moderates the negative relationship between chronological age and motivation to learn such that this negative effect is stronger for trainees that perceive their relative age (to the trainee group) to be older than trainees that perceive their relative age to be younger (Hypothesis 6).*

Future Occupational Time Perspective.

Time is a critical component to virtually all psychological phenomena; yet, this factor is characteristically ignored in the social sciences (Carstensen, 2006). Instead, the explicit study of time falls within the domain of physics, philosophy, and astronomy yielding two dominant perspectives: absolute and relativistic (Carstensen, Isaacowitz, & Charles, 1999; Fried & Slowik, 2004). Focusing on the relativistic perspective, adult developmental psychologists were the first to give serious consideration to the inclusion of time in motivational theories. Socioemotional selectivity theory (Carstensen et al., 1999) -- the dominant life-span theory of motivation in cognitive psychology -- advocates that time monitoring (time since birth/time until death) plays a fundamental role in the selection and pursuit of social goals.

Recently, Zacher and Frese (2009) borrowed the notion of 'monitoring time horizons' and applied it to the work context. Instead of time since birth/time until death, *occupational* future time perspective refers to time since starting employment/time until retirement. Moreover, researchers have found empirical support for two qualitative dimensions of occupational future time perspective: focus on occupational opportunities and remaining occupational time (Cate & John, 2007; Zacher & Frese, 2009). Focus on occupational opportunities involves one's future goals, options, and possibilities at work and remaining occupational time refers to one's perceived duration in the workforce.

As indicated above, these two dimensions of future time perspective are a relatively new additions to the occupational literature and, to my knowledge, no empirical studies have investigated these dimensions in the context of training. Nevertheless, previous research does indirectly support its relevance to training motivation. Indeed, Colquitt et al. (2000) identified the related constructs of "*career exploration*" (defined as the "self-assessment of skill strengths and weaknesses, career values, interests, goals, or plans, as well as the search for job-related information from counselors, friends, and family members" p. 679) and "*career planning*" (defined as "the extent to which employees create and update clear, specific, plans for achieving career goals" p. 679) in their integrative theory of training motivation.

Although the dimensions of occupational future time perspective are associated with chronological age (e.g., younger trainees anticipate endless occupational opportunities; Zacher & Frese, 2009, 2011), findings suggest that chronological age can be decoupled from traditional time monitoring through experimental methods (i.e.,

through planned manipulations; Fredrickson & Carstensen, 1990; Fung, Carstensen, & Lutz, 1999) or naturally occurring sub-groups (i.e., young people living with a terminal illness; Carstensen & Fredrickson, 1998). In line with the differential aging argument (Peeters & van Emmerik, 2008), older trainees are likely to show more variety in their occupational outlook than younger trainees. Specifically, if an older trainee anticipates a large amount of future occupational opportunities and/or expansive remaining occupational time then he or she may see more potential benefits of training, which could eliminate the negative effect of chronological age on training motivation.

Drawing from an extensive body of research in developmental psychology (e.g., Carstensen, 2006; Carstensen et al., 1999) -- particularly data suggesting that future time perspective is malleable (Carstensen & Fredrickson, 1998; Fung et al., 1999; Fredrickson & Carstensen, 1990) -- I expect that high focus on occupational opportunities and open-ended views of remaining occupational time can negate the negative effects of chronological age on motivation to learn. Thus, I predict that *focus on occupational opportunities will moderate the negative relationship between chronological age and motivation to learn such that the negative effect of chronological age on motivation to learn is weaker for trainees with high focus on occupational opportunities than for trainees with low focus on occupational opportunities (Hypothesis 7a*) and *remaining occupational time will moderate the negative relationship between chronological age and motivation to learn such that the negative effect of chronological age on motivation to learn is weaker for trainees with expansive views of remaining occupational time than for trainees with limited views of remaining occupational time*.

Extending my arguments for each moderator, I am ultimately interested in how these boundary conditions influence training outcomes (i.e., moderated mediation). As such, I expect the following relationships. Formally, *the indirect effect of chronological age on training outcomes through motivation to learn will be moderated (first stage) by task self-efficacy (Hypothesis 8a); perceived relative age (Hypothesis 8b); focus on occupational opportunities (Hypothesis 8c); and remaining occupational time (Hypothesis 8d) such that the negative effect of chronological age is weaker for trainees with (a) high task self-efficacy; (b) low perceived relative age; (c) high focus on occupational opportunities; and (d) expansive views of remaining occupational time than for trainees with (a) low task self-efficacy; (b) high perceived relative age; (c) low focus on occupational opportunities; and (d) limited views of remaining occupational time, respectively.*

An Alternative Explanation for the Age-Motivation to Learn Relationship

Cognitive Ability as Mediator.

In addition to psychological processes, a second explanation for why older employees achieve comparatively poorer outcomes in training programs can be attributed to 'can-do' (or ability) factors. Although there are a number of well documented physical declines associated with age (e.g., Birren & Fisher, 1995; Park & Reuter-Lorenz, 2009), most relevant to working professionals are cognitive capabilities (Ones, Dilchert, Chockalingam, Viswesvaran, & Salgado, 2010; Spearman, 1970; Thurston, 1960). These arguments revolve around maximal capabilities (Noe, 2010). Crystallized intelligence represents abilities that are most associated with general experience (either obtained

through formal education or experiential learning), depth of vocabulary, and verbal comprehension (Cattell, 1971). Over the course of one's career, individuals amass a wealth of knowledge and research suggests this accumulation increases until approximately 60 years old and then gradual declines (Salthouse, 2012). Fluid intelligence refers to the abilities that are most associated with working memory, abstract reasoning, attention, and processing new information (Cattell, 1971). Across samples, methods, and measures, cognitive psychologists consistently conclude that fluid intelligence peaks in the early- to mid-twenties and then exhibits a monotonic decline throughout the remainder of life (Salthouse, 2012).

Although growth in crystallized intelligence is likely to offset the projected losses in fluid intelligence in general job performance (Kanfer & Ackerman, 2004), age related deficits in training performance may be explained by the negative relationship between chronological age and fluid intelligence-type abilities. These abilities (e.g., attention and working memory) are needed to acquire novel skills and/or new knowledge (i.e., a positive relationship). Because the pool of available resources from which older trainees have to draw is comparatively smaller, older trainees are likely to perform less well than younger trainees. This rationale underlies the logic of one widely-accepted, account for why older trainees perform more poorly in learning novel material.

Although there are well-established links between chronological age, cognitive ability and training performance, I suggest a more accurate description of the mechanisms that influence training performance will consider both ability and non-ability factors. For the reasons reviewed above, I expect motivation to learn and cognitive ability

to *both* partially mediate the relationship between chronological age and training outcomes. Previous research has investigated and found a partial mediation effect for motivation to learn and cognitive ability (Colquitt et al., 2000 and Beier & Ackerman, 2005, respectively), but as noted by Beier and Ackerman, both variables, to our knowledge, have yet to be examined in the same investigation with chronological age. Examining both ability and non-ability factors will provide a more complete assessment of the issues facing older trainees. Nevertheless, I propose that motivation to learn will account for more variance than cognitive ability. Formally, I predict that *the indirect effect of chronological age on training outcomes through motivation to learn will be greater than the indirect effect observed for the alternative mediator of cognitive ability (Hypothesis 9).*

METHOD

Guiding Considerations

Two primary considerations guided the methodology: context and content. First, I decided to pursue a field study instead of a laboratory study. A common criticism of laboratory studies is that they are artificial constructions of reality and results garnered in one setting are not necessarily transferable to the other. Moderator analyses conducted in Kubeck and colleague's (1996) meta-analysis suggests that study setting (field vs. laboratory) is meaningful: correlations between chronological age and training outcomes tended to be smaller when conducted in the field as compared to the laboratory. Furthermore, the connections between self-efficacy and various training outcomes also depended upon setting, such that variables' relationships were (again) typically different in the field relative to the laboratory (Sadri & Robertson, 1993; Stajkovic & Luthans, 1998). There are a number of possibilities for the empirically-supported disconnect between the two contexts, such as sample characteristics (working professionals vs. undergraduate students/older volunteers) and participant motivation (career-related consequences vs. class credit/voluntary). Therefore, to gain the most accurate illustration of older trainees' experiences I must examine "real" training scenarios in a high-stakes organizational environment.

Second, the content of training has sparked discussion among scholars. Based on their meta-analytic work, Ng and Feldman (2008) speculated that their significant (negative) relationship between chronological age and training performance may be

attributed to an overrepresentation of primary studies examining technology training. Stated differently, older workers may be disadvantaged when learning technical content. Although possible, given the predominance of technology in today's workplace activities, I want to evaluate my hypotheses within this type of subject matter.

Data Source

I partnered with a software company that provides comprehensive aircraft maintenance and integrated logistics software to the airline industry (see Appendix A). In addition to software development, my partner company also conducts implementation services such as user training. It is through these training sessions that I collected data.

Participants

Participants included 251 trainees between the ages of 18 and 64 (*M*, = 37.8, *SD* = 9.5, range = 18 - 64) composed of predominately males (male = 87.3% & female = 12.7%) employed by three different organizations in the airline industry. Two of the three organizations are headquartered in the United States (*n* = 27 and 25) and the third is in Middle East (*n* = 199; see Table 1). Trainees reported 18 different countries of origin, with the largest representation coming from India (37.5%), United States (18.7%), and Pakistan (17.9%). Trainees were selected for training by their employer as a function of their job role. Prerequisites to training selection included English literacy and basic knowledge of computers (e.g., how to use a mouse, turn on a monitor, type on a keyboard). To evaluate previous computer experience, participants reported on "How long have you been using a computer?" (97.2% reported use for over 3 years) and "About how many hours a week do you use a computer?" (79.7% reported more 11 per week).

Moreover, trainees were asked "How important do you feel this subject was for your overall understanding?" with the majority considering the material to be important (95.2%). Participation in training was mandatory because it directly related to trainees' job; however, participation in the research study was voluntary.

Procedure

All training sessions were conducted in a classroom by a professional trainer (with subject matter expertise) and each trainee had individual computer access. Class size ranged from 4 to 16; however, the majority of sessions were composed of 9 or more students (24 out of 32). There were a total of 15 different software products trained and the duration of training ranged from 3 hours to 2 business days. Furthermore, training was implemented such that it immediately preceded user need (i.e., trainees returned to their job and started using the software), for 226 of the 251 trainees.

Upon arrival, trainees were introduced to the research agenda and then asked to complete pre-training measures administered through Qualtrics (see Appendix B). These surveys included task self-efficacy, focus on occupational opportunities, motivation to learn, and cognitive ability. Please note that perceived relative age was counterbalanced, such that half of the participants in each session were randomly assigned to complete this measure before training and half completed it after. My partner company was responsible for all the materials and procedures utilized in training (e.g., supporting manuals, classroom lectures, trainer demonstrations, trainee practice activities, etc.).

Trainers began formal training by conveying the general purpose of the product, followed by an overview of why this product can improve job performance. Next,

trainers introduced course objectives and outlined how training would be conducted. Following a detailed training protocol, the trainer then embarked on a mix of traditional lectures supplemented by product demonstrations (i.e., behavioral modeling). After each capability was explained and modeled, trainers provided trainees with real-world data and opportunities to practice the desired function(s). This cycle was repeated until all the required functional capabilities were presented and practiced. All training was conducted in English.

Upon conclusion of the training session, all trainees completed post-training measures (see Appendix B), which included a training evaluation, post-training task self-efficacy, remaining occupational time, perceived relative age (counterbalanced), computer experience, course importance, and demographic questions (chronological age, sex, and country of origin) through Qualtrics. Participants were then administered a competency exam (unique to each product), which was developed and vetted by multiple subject matter experts.

Measures

The measures selected for the current investigation were based on previously validated scales (i.e., a priori knowledge of the variables' factor structure) and if there were modifications, they were relatively minor. Nevertheless, to verify, I considered it necessary to examine the extent to which all the current scales were suitable indicators of their respective latent construct and to evaluate their internal consistency and reliability. Therefore, I examined the full measurement model for all Likert-type scales (executed in AMOS 22). Results were inspected for items which did not load highly onto the latent

variable ($\lambda_x < .40$), which did not significantly relate to the latent factor ($p > .05$), or which had low squared multiple correlations ($R^2 < .30$). Model fit was also assessed (CMIN/df = 1.62; RMSEA = .05; CFI = .95) values. Based upon these criteria, there were no poorly performing items so reliability analyses were then computed and all items demonstrated sufficient item inter-correlations ($r > .40$). In short, no changes were made to the pre-existing scales.

An additional concern related to measurement invariance. All trainees were literate in English (a training pre-requisite); however, given the national diversity in this sample, I was concerned about the possibility that participants' item interpretation was affected by culture. To ensure that items were not operating differently for certain participants, I examined measurement invariance as a function of culture. Culture was defined by country of employer (Eastern vs. Western) and measurement invariance was assessed (for each culture) using Gaskin's (2012) Stats Tool Package macro and guidelines. This macro compares unstandardized regression weights (for each culture) using the critical ratios for differences between parameters resulting in a z-score for each unrestricted parameter. None of my scales garnered significant z-scores for all the items, meaning that measurement invariance is not a concern.

Age.

Trainees were asked to provide their chronological age (in years) and perceived relative age. Chronological age was assessed by asking participants "How old are you?" and perceived relative age was evaluated by using Maurer et al.'s (2003) three-item scale ($\alpha = .85$). Respondents rated their perceived relative age in terms of how they feel, look,

and act as compared to the average age of members in their *training group*. Participants responded on a 5-point Likert-type scale (1 = *much younger,* 2 = *younger,* 3= *about the same age,* 4 = *older,* 5 = *much older).* The coefficient alpha for this scale was .80.

Task Self-Efficacy.

Task self-efficacy was measured using five items adapted from Bell and Kozlowski (2008). Participants indicated the extent to which they agreed with each item, samples of which include "I am sure I can learn how to utilize this software product effectively" and "I am certain that I can manage the requirements of this software product." The original, eight-item version demonstrated good internal consistency reliability (α = .92). Response options ranged from 1 (*strongly disagree)* to 5 (*strongly agree*). Based upon the premise that task self-efficacy is a continually evolving construct, task self-efficacy was also assessed upon the completion of training. In the current study, pre- and post-training task self-efficacy demonstrated good internal consistency reliability (α = .89 and α = .91, respectively).

Future Occupational Time Perspective.

To assess the first dimension of future occupational time perspective, focus on occupational opportunities, Zacher and Frese's (2011; α = 91) scale was used. An example item is "I expect that I will set many new goals in my occupational future." The response scale was coded as follows: 1 = *does not apply,* 2 = *applies a little,* 3 = *applies to some extent,* 4 = *applies moderately,* 5 = *applies completely*. The coefficient alpha for this four-item scale was .85. To assess the second dimension, remaining occupational time, participants responded to a single-item measure asking them to consider which

career stage they perceive themselves to currently occupy. Response options were coded as follows: 1 = *"near retirement,"* 2 = *"late career,"* 3 = *"mid-career,"* 4 = *"early career,"* 5 = *"have not begun,").* Thus, lower values represent limited remaining occupational opportunities and higher values represent abundant remaining occupational opportunities.

Motivation to Learn.

The scale assessing motivation to learn consisted of five items adapted from Noe and Schmitt (1986). Sample items include "I will try to learn as much as I can from the training program" and "I am motivated to pay careful attention to the training program. Response options ranged on a 5-point Likert- type scale from 1 (*strongly disagree)* to 5 (*strongly agree*). The internal consistency reliability of this scale was .93.

Cognitive Ability.

The Wonderlic Cognitive Ability Pretest (WPT-Q) is an abbreviated version of the full Wonderlic Personnel Test (WPT) and was used as an indicator of cognitive ability. The WPT-Q 30-item measure was administered online and limited completion time to eight minutes. A study independent of the current investigation found WPT-Q to yield a coefficient alpha of .81 and show a corrected correlation of .96 with the full WPT (Wonderlic, 2004).

Trainee Reactions.

Trainee reactions were derived from a combination of a pre-existing measure evaluation from my partner company and validated measures in the literature (Morgan & Casper, 2000) resulting in a 10-item measure. Sample items include "How do you rate the

trainer's ability to keep the class's interest?" and "How do you rate the organization of topics in the course materials?" on a scale of 1 (*very poor*) to 5 (*excellent*). Coefficient alpha for this scale was .93.

Cognitive Learning.

Specific items assessing cognitive learning outcomes depended upon the product being trained. In the current study, there were a total of 15 products trained and each product was paired with a different exam representative of the product's subject matter. All exams were created and vetted by multiple subject matter experts and composed of multiple choice, multiple answer, and true/false items. The number of items ranged from 8 to 18 and all scores were reported in percentages.

RESULTS

Preliminary Analyses

Descriptive Statistics.

The means, standard deviations, intercorrelations, and reliabilities among study variables are presented in Table 2

Non-Independence Assessment.

The current research questions pertain to the individual level of analysis and a key assumption to traditional OLS regression analyses is that the observations are independent of one another. These data were hierarchical in nature; namely, at the most superordinate level was organizational affiliation (3 companies), followed by the trainer (6 instructors), then the product trained (15 courses), and finally the session (32 classes). These classifications, however, were mixed: some of the trainers instructed multiple products across different organizations. Assessing the degree of non-independence due to possible clustering factors is important because unaccounted for clustered data will lead to negatively biased standard errors (i.e., too small) in OLS regression coefficients and result in an overestimation of significance (i.e., alpha inflation; Cohen, Cohen, West, & Aiken, 2003).

To investigate, Bartoko's (1976) ICC(1) formula from a one-way random-effects ANOVA model was utilized. Given the purpose -- assessing the degree of non-independence (rather than reliability) -- the ICC(1) statistic was derived by assigning the variable of interest as the dependent variable and the potentially influential factor as the independent variable. To be clear, separate ICC(1)'s were calculated for all the variables

of interest (pre-training self-efficacy, perceived relative age, focus on occupational opportunities, remaining occupational time, motivation to learn, cognitive ability, training evaluations, post-training self-efficacy, and performance) as a function of each, possible clustering variable (organizational affiliation, trainer, product trained, and training session; Bliese, 2000).

Guidelines for what constitutes meaningful ICC(1) value differ (e.g., Bliese, 2000; Cohen et al., 2003). In the current study, we considered a value of .05 or greater as sufficient evidence for clustering. After examining the values, there was not a clear "cluster factor," but rather three variables (cognitive ability, training evaluations, and performance scores) that appeared problematic across three nesting conditions (organizational affiliation, trainer, and product trained). Therefore, identifying a single level 2 variable to conduct multilevel modeling was inappropriate. Instead, I addressed interdependent data specific to each of the three most problematic variables to eliminate mean level differences between the various nesting conditions, which were irrelevant in this investigation.

Cognitive ability appeared most influenced by organizational affiliation (ICC(1) ≈ .56). Specifically, it appeared that the Middle East-based company had lower scores than those from the United States-based companies. Although all trainees are English literate (a training prerequisite), English is a second language for many employed by the Middle East company and the cognitive ability exam is likely to involve certain language nuances that may disadvantage those who are not completely fluent.

Furthermore, based on our criteria, focus on occupational opportunities achieved sufficient clustering levels for organizational affiliation (ICC(1) = .07). Drawing from Hofstede's (2014) cultural dimensions, uncertainty avoidance – "the extent to which members of a culture feel threatened by ambiguous or unknown situations have created beliefs and institutions that try to avoid these" – is documented to be dramatically different in the United States as compared to the Middle East company (Hofstede, 2014) and may be responsible for this clustering. In short, although the analysis was originally conducted as a function of organizational affiliation, the two United States based companies were very similar. Therefore, a more accurate and parsimonious description than organizational affiliation is culture (Middle East --Eastern and United States--Western). In the current study, culture refers to English literacy, uncertainty avoidance, and other well-documented differences on cultural dimensions between these two countries relevant to the training context (e.g., power distance and individualism). As such, I controlled for culture in all analyses (0 = *Eastern*, 1 = *Western*).

A major component of the training evaluations involved the trainer. In this sample, there were a total of six different trainers. Therefore, in order to ensure my results were not driven by trainer idiosyncrasies, I calculated a new evaluation variable, which was group mean centered around the average training evaluation score of each trainer. This method is also referred to as centering within context (CWC_1; Cohen et al., 2003).

The same rationale and method was applied to the products trained. There were a total of 15 products trained, which differed considerably in terms of content and

complexity making their performance scores not comparable. To address this issue, I computed a new performance variable which was group mean centered around the average score of each product. All subsequent analyses with training evaluations and performance scores used these CWC_1 variables.

I chose the CWC_1 approach over the more traditional disaggregated analysis with dummy-coded groups because of parsimony. To use the latter approach, I would have to include a set of (g-1) dummy codes as predictors where g is the number of groups. In my situation, this would amount to a total of 19 dummy codes. Like the disaggregated analysis with dummy-coded groups, the CWC_1 also eliminates all information on mean level differences between groups because the group means are subtracted out.

Tests of Hypotheses

Following Cohen et al. (2003), variables that acted as antecedents were grand mean centered. Consistent with my theoretical justification and to better understand the data, hypotheses were tested through a combination of piecemeal and holistic approaches. Piecemeal analyses refer to simple linear and moderated multiple regressions. Holistic analyses include mediation (product of coefficients) and conditional process analyses (i.e., moderated mediation; Preacher, Rucker, & Hayes, 2007). All data analyses were performed in SPSS and, specifically, the holistic analyses were conducted using the SPSS macro PROCESS (Hayes, 2012). As per the recommendation of Hayes, unstandardized coefficients are presented in addition to the commonly reported standardized coefficients. In addition to culture, sex was also (always) entered as a control variable (0 = *male,* 1= *female)* because there is limited evidence to suggest that males and females experience

the aging process differently (e.g., Morris, Venkatesh, & Ackerman, 2005; Montepare & Lachman, 1989).

Mediation Analyses.

To establish basic relationships between my variables of interest, I ran three sets of variable models (two dependent models and one mediator model). The first set of dependent variable models regressed the dependent variable (training evaluations, post training task self-efficacy, and performance) onto the independent variable (chronological age) and the controls (sex and culture; Hypothesis 1; top right of Table 3). The next row of dependent variable models simply replaces chronological age with motivation to learn (Hypothesis 2; middle right of Table 3). Next, the mediator variable model regressed the mediator (motivation to learn) onto the independent variable and the controls (Hypothesis 3; top left of Table 3). Finally, the last row of dependent variable models includes all of the variables mentioned above (chronological age and motivation to learn; Hypotheses 4; bottom right of Table 3).

Hypothesis 1 predicted a negative relationship between chronological age and training outcomes. Although the overall model for training evaluations was significant (R^2 = .03, F(3, 247) = 2.90, p < .05), the relationship between age and training evaluations was not. Instead, sex was primarily responsible for model significance (β = -.16, p < .05) with women evaluating training more negatively than men. Nevertheless, age was positively related to post-training task self-efficacy (β = -.25, p <.001) and performance (β = -.25, p <.001) offering partial support for Hypothesis 1.

As anticipated by Hypothesis 2, motivation to learn significantly predicted training evaluations ($\beta = .16$, $p < .05$), post-training task self-efficacy ($\beta = .32$, $p < .001$), and performance ($\beta = .14$, $p < .05$) such that higher motivation to learn was associated with higher training outcomes. Furthermore, trainee age was significantly related to motivation to learn ($\beta = -.26$, $p < .001$), such that older trainees reported declines in their motivation to learn (in support of Hypothesis 3).

Hypothesis 4 specified a partial mediation model. Indeed, age indirectly influenced training evaluations and post-training task self-efficacy through its effect on motivation to learn. As can be seen in Figure 2 and Table 3, older trainees reported lower levels of motivation to learn ($a = -.014$), and those with higher levels of motivation to learn evaluated training more favorably ($b = .121$) and possessed higher levels of post-training self-efficacy ($b = .273$). A bias-corrected bootstrap confidence interval for the indirect effects ($ab_{evaluation} = -.002$ & $ab_{efficacy} = -.004$) based on 5,000 bootstrap samples did not include zero (-.0038 to -.0002 & -.0071 to -.0016, respectively). I did not find support for an indirect effect of age on performance; however, there was evidence of a direct effect ($c' = -.395$, $p < .001$).

To explore an alternative explanation for why chronological age is related to training outcomes, I posited cognitive ability as a possible mediator (Hypothesis 9). A simple regression revealed that cognitive ability does not act as a mediating mechanism because trainees' age was not significantly related to declines in cognitive ability ($B = -.06$, $SE = .03$, $\beta = -.09$, $t = -1.74$, $p = .08$). Without support for this relationship, there is no way that mediation can occur. However, consistent with extensive research (e.g.,

Hunter & Schmidt, 1998), cognitive ability does predict performance (B = 1.02, SE = .25, β = .35, t = 4.08, $p < .001$).

Moderation Analyses.

I identified three constructs (pre-training task self-efficacy, perceived relative age, and future time perspective; Hypotheses 5-7) that could possibly alter the relationship between chronological age and motivation to learn. To test for a moderation effect, I estimated the OLS regression model predicting motivation to learn from age, the moderator, and their product (along with controls; Table 4). Results revealed that the effect of age on motivation to learn was dependent on pre-training task self-efficacy (Hypothesis 5) and remaining occupational time (Hypothesis 7b), with each interaction accounting for 2% of the variance in motivation to learn. See Figure 3 and 4 for a visual representation of each interaction, respectively. To further understand the nature of this moderation, conditional effects ("simple slopes") of age on motivation to learn were estimated using the "pick-a-point" approach (Hayes, 2013), with the sample mean and plus and minus one standard deviation from the mean representing "moderate," "high," and "low," respectively. Age was significantly and negatively related to motivation to learn at only the low level of task self-efficacy and low level (i.e., limited view) of remaining occupational time (Table 5). Indeed, further probing with the Johnson-Neyman technique revealed that levels of task self-efficacy below 3.99 and levels of remaining occupational time below 2.59 exerted a significant conditional effect of age on motivation to learn. Neither perceived relative age nor focus on occupational opportunities achieved acceptable levels of statistical significance to be classified as a

moderator of the chronological age-motivation to learn relationships (Hypotheses 6 and 7a).

Moderated Mediation Analyses.

The simple mediation analysis provided evidence of a negative indirect effect of chronological age on training evaluation and post-training self-efficacy (but not performance) through motivation to learn – with older trainees reporting lower levels motivation to learn, which in turn was related to lower training outcomes. The moderation analysis demonstrated that the effect of chronological age on motivation to learn depended on pre-training task self-efficacy and remaining occupational time (not perceived relative age nor focus on occupational opportunities), with the negative effect of age being greater for those with low levels of task self-efficacy and for those with limited views of remaining occupational time. Combining these two findings means that the "mediation is moderated" or rather that the indirect effect of age on training outcomes through motivation to learn depended on pre-training self-efficacy and remaining occupational time (analyzed independently; Model 7 in PROCESS).

To conduct a formal test of moderation of the indirect effect by the model moderator(s), I examined the index of moderated mediation for pre-training task self-efficacy and remaining occupational time as a function of each training outcome to determine if the value was statistically different from zero. Results revealed, for pre-training task self-efficacy, the index of moderated mediation was significant for training evaluation (B = .001, 95% CI: .0002 to .0040) and performance (B = .047, 95% CI: .0004

to .1377), but not post-training task self-efficacy. For remaining occupational time, none indices of moderated mediation were statistically different from zero.

To examine whether the indirect effects differ from zero at specific values of the moderator, I utilized 5,000 bootstrap estimates for the construction of a 95% bias-corrected confidence intervals for the conditional indirect effects. As can be seen in Table 6, the conditional indirect effect of age on training evaluations and post-training self-efficacy through motivation to learn was negative among those with low and moderate levels of pre-training self-efficacy. For performance, the conditional indirect effect was negative among only those with low levels of pre-training task self-efficacy. For remaining occupational time, only the low level (i.e., limited view) demonstrated a conditional indirect effect for training evaluation and post-training task self-efficacy.

DISCUSSION

The current results demonstrate that motivation to learn mediated the relationship between chronological age and certain training outcomes. Moreover, this indirect effect was dependent upon trainees' pre-training task self-efficacy and perceptions of remaining occupational time, such that high levels of task self-efficacy and open-ended views of remaining occupational time weakened the negative impact of chronological age on motivation to learn. This investigation directly responds to calls for research (Beier & Ackerman, 2005; Beier & Kanfer, 2010), and is the first study to explore both ability and non-ability factors as underlying causes for discrepancies in training outcomes as a function of age. In addition, this investigation acknowledges that older trainees are not a homogenous group and therefore expands upon previous research by refining our understanding of the relationship between chronological age and motivation to learn by identifying and examining three constructs likely to influence this relationship. Overall, the current investigation facilitates a more complete assessment of training issues relevant to older workers by pinpointing theoretical mechanisms and boundary conditions and thus informing future research agendas as well as organizational approaches.

The Role of Motivation

Results of my simple mediation analyses supports the notion that the negative association between chronological age and training outcomes was driven in part by motivation to learn. Chronological age was negatively related to motivation to learn, which in turn was linked with lower evaluations of training and reduced levels of post-

training task self-efficacy; however, not performance. The negative effect of chronological age on motivation to learn is not surprising and consistent with previous accounts including Kanfer and Ackerman's (2004) theory of workplace motivation and Carstensens's (1998) theory of socioemotional selectivity. For older trainees, the perceived utility of acquiring new knowledge does not outweigh the costs of perceived effort. Although, I did not investigate perceptions of effort directly -- an excellent avenue for future research -- my data support this account in that older trainees reported lower motivation to learn than younger trainees.

Aligning with theories of training motivation (Colquitt et al., 2000; Noe & Schmitt, 1986), motivation to learn positively predicted all the training outcomes examined in this study. This relationship suggests that motivated trainees allocate their personal resources so that they are more satisfied (i.e., training evaluation) and can be positioned for success -- both subjectively (e.g., post-training task self-efficacy) and objectively (e.g., performance). This is likely to occur because when a trainee considers mastery of the subject matter a priority then he or she is willing to dedicate sustained effort to attain such mastery.

The Role of Cognitive Ability

I expected that cognitive ability would contribute to explaining the negative effect that age exerts on training outcomes; however, it could not. While cognitive ability positively predicted performance – in line with previous evidence (Schmidt & Hunter, 1998) – chronological age did not predict cognitive ability; albeit, the relationship was in the expected (negative) direction and it was close to achieving acceptable levels of

significance (p =.08). This is extremely interesting because there has been extensive support for monotonic declines in fluid intelligence after the age of approximately 26 (Salthouse, 2012). Nevertheless, there are viable reasons for why I did not find support for a significant negative effect in the current data.

One possible explanation is that declines in fluid intelligence occurring within typical *working* years (approximately 18-65 years of age) are not meaningful. Indeed, much of the data on cognitive functioning is drawn from the entire life-span (18-99 years of age; e.g., Salthouse, 2012) and audiences may unintentionally ignore context when describing individuals as "older;" for example, an "older employee" (e.g., age 64) as compared to an "older adult" (e.g., age 90). An age gap of 18 to 90 is likely to be associated with meaningful fluid intelligence declines, but perhaps a gap of 18 and 64 is not. Studies conducted by Beier and Ackerman (2003, 2005) examined the association between age and fluid intelligence of individuals aged 19-70 and found chronological age to be significantly and negatively related to fluid abilities (r = -.22 & -.42, respectively). Clearly, there is still a sizable discrepancy between what has been found previously and the current study (r = -.13). Upon a closer review, Beier and Ackerman's participant criteria may offer a possible explanation for this inconsistency. Unlike the current investigation, participants were not necessarily employed. Therefore, it is not the range of typical working years per se, but perhaps what an individual does during those years (i.e., employment status). Indeed, exit from the workforce (retirement) is frequently used as an important transition point in one's cognitive functioning, such that post-retirement functioning is associated with varying degrees of decline (e.g., Fisher, Stachowski,

Infurna, Faul, Grosch, & Tetrick, 2014). Thus, for older employees, active employment may be especially important to help buffer losses in fluid intelligence and explain why I did not find a significant negative relation between chronological age and cognitive ability.

In summary, within a training context it appears that the "will-do" factor (motivation to learn) may play a more predictive role than the "can-do" factor (cognitive ability). In line with the preceding argument, the non-significant effect on cognitive ability may be attributed to a restriction of range, such that in order to perform job responsibilities (and maintain employment) currently working individuals require a higher level of cognitive functioning suggesting fluid intelligence declines may not be a major source of concern within the actively employed population. Especially when crystallized intelligence is also considered -- which is known to increase with chronological age (Salthouse, 2012) -- older adults in the workplace may not be as cognitively disadvantaged as previously thought.

Moderators of the Chronological Age-Motivation to Learn Relationship

The second major contribution of this study pertains to its analysis of moderating variables that clarify the factors that exacerbate and attenuate the effects of age on task motivation. As predicted, I found support for two variables affecting the relationship between chronological age and motivation to learn: task self-efficacy and remaining occupational time. Chronological age was only negatively related to motivation to learn for individuals with low task self-efficacy and limited views of remaining occupational time, respectively. Put differently, moderate to high levels of task self-efficacy as well as

infinite to open-ended views of remaining occupational time render chronological age a meaningless predictor of motivation to learn. The current specification of the relationship between chronological age, the moderators (pre-training task self-efficacy and remaining occupational time) and motivation to learn departs from previous conceptualizations (e.g., Colquitt et al., 2000; Zacher & Frese, 2009; 2011). Typically, only the main effects of task self-efficacy on motivation to learn are established or the direct effect of age on remaining occupational time is investigated; however, I found the interactions between age and the respective moderator to yield gains in variance accounted for beyond the main/direct effects.

Contrary to expectations, I found no statistical support for the moderating of effects perceived relative age and focus on occupational opportunities. In response, I conducted exploratory analyses to inform future consideration. Interestingly, when *perceived* relative age is compared to *actual* relative age of the group (as calculated by subtracting the average chronological age of the group by the individual's age) a different pattern between chronological age and motivation to learn emerges. In short, although the current study can offer no substantial claims, there does appear to be some influence of the immediate context because perceived age relative to the training group is capturing something different than actual age relative to the training group.

Theoretical and Practical Implications

There are several theoretical and practical implications of the current investigation. A major theoretical contribution of this research is that it clarifies the underlying mechanism responsible for older trainees' poorer training outcomes, when

compared to younger learners. Specifically, findings support that in job-related training settings of currently employed learners, motivation to learn – and not cognitive ability – is primarily responsible for inferior training outcomes achieved by older trainees. For purposes of including a more representative range of ages, prior studies focusing on this link often include individuals no longer active in the workforce, which may unintentionally contaminate the essential nature of the current inquiry. This non-significant finding is extremely promising because it implies that advanced age in the workplace is not automatically accompanied with meaningful loses in cognitive ability, which is the most predictive measure of training performance (Schmidt & Hunter, 1998).

Second, the current research demonstrates that the negative effect of chronological age on motivation to learn is dependent on psychological processes. Specifically, high task self-efficacy diminished the losses in motivation to learn for older trainees. Furthermore, exploratory analyses revealed that more open-ended perceptions of remaining occupational time also protected older trainees from loses in motivation to learn. Finding evidence for moderation is theoretically important because it informs scholarly dialogues as to why there are conflicting conclusions regarding the relationship between chronological age and motivation to learn (e.g., Gegenfurtner & Vauras, 2012; Kanfer & Ackerman, 2004), thus creating opportunity to develop preventative interventions.

The most obvious practical contribution of my work is that organizations should be aware that chronological age is meaningful in training contexts such that older trainees are vulnerable in certain situations to poorer training outcomes than younger trainees. A

more promising practical contribution is the identification of how to reduce these age-related declines in training. Although some research supports the stereotypic account that an "old dog *cannot* learn new tricks" because of upper limits placed on cognitive ability, the current study suggests that older trainees can, but they "may not *want* to learn new tricks." Motivation is subject to modification and I therefore advocate for interventions targeted at boosting task self-efficacy and focus on remaining occupational time prior to training. The specific implementation (i.e., content and delivery) of such interventions require subsequent research; however, the current findings offer encouraging avenues to pursue.

Limitations and Future Research

There are several additional avenues for future research that would clarify the study findings and facilitate understanding of the challenges older learners face in workplace training. First, although the current sample included a range of ages (18-64) and cultures (19 countries). Efforts should be made to evaluate the current research questions in a sample that is more gender balanced because limited evidence suggests there are gender differences in the area of technological knowledge acquisition (e.g., Morris et al., 2005; Montepare & Lachman, 1989).

A second limitation concerns the specific survey measures used in the current study. Some of the constructs evaluated here have received only limited empirical consideration and would greatly benefit from additional attention in an occupational setting (perceived relative age and focus on occupational opportunities). Perceived relative age was the subject of many early discussions and analyses (Cleveland & Shore,

1992; Cleveland et al., 1997; Lawrence, 1988; Sterns & Doverspike, 1989); however, it underwent a stage of dormancy (see Maurer et al., 2003 for an exception). Given today's increasingly age-diverse workforce, the conceptualization of age and its measurement have recently reemerged (Finkelstein, Heneghan, Jenkins, McCausland, & Siemieniec, 2011; Pitt-Catsouphes, Matz-Costa, & Brown, 2010; Kastenabum, Derbin, Sabatini, & Arrt, 1972). I strongly advocate the scholarly pursuit of multidimensional measurement tools by the aforementioned researchers and others. In addition, the construct of focus on occupational opportunities may be promising as a moderating variable; however, I did not find empirical support for the predicted relationship.

CONCLUSION

Although job-related competencies are acquired over the course of a career, the introduction of modern-day technologies, rapid increases in globalization, and unpredictable work role requirements necessitate that today's employees undergo continual training and development to maintain professional relevance. A growing proportion of today's workforce —older employees — are achieving poorer training outcomes as compared to their younger colleagues. The current research contributes to understanding of the underlying causes for chronological age's negative effect on mandatory training outcomes and further identifies malleable psychological constructs that can serve to lay the foundation for interventions. Together, these findings can inform future scholarship and organizational practice to support knowledge acquisition across all chronological ages.

Table 1. *Summary of Demographic Variables* (*N* = 251)

	Frequency	Percentage
Age		
18-30	62	24.7%
31-40	104	41.4%
41-50	52	20.7%
51-64	33	13.1%
Organization		
Company A	27	10.8%
Company B	25	10.0%
Company C	199	79.3%
Sex		
Male	219	87.3%
Female	32	12.7%
Country of Origin		
India	94	37.5%
United States	47	18.7%
Pakistan	45	17.9%
Philippines	21	8.4%
Sri Lanka	11	4.4%
United Arab Emirates	10	4.0%
United Kingdom	4	1.6%
Other [a]	19	7.6%

[a] Afghanistan (*n* = 1), Bangladesh (*n* = 1), Colombia (*n* = 1), Ecuador (n = 1), Egypt (*n* = 1), Jordan (*n* = 2), Kenya (*n* = 3), Malaysia (*n* = 1), Nigeria (*n* = 3), South Africa (n = 2), Spain (*n* = 1), Not specified (*n* = 2)

Table 2. *Descriptive Statistics and Correlation Coefficients for Study Variables*

	N	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Sex	251													
2. Culture	251			.22**										
3. Age	251	37.8	9.54	-.15*	.02									
4. TSE (pre)	251	4.09	.54	-.07	-.01	-.30**	(.89)							
5. PRA	243	2.89	.64	-.03	.16*	.47**	-.23**	(.80)						
6. FoO	251	4.21	.75	.04	.16**	-.31**	.42**	-.24**	(.85)					
7. ROT	250	3.03	.73	.08	.05	-.70**	.24**	-.42**	.27**					
8. M2L	251	4.47	.52	-.06	.03	-.24**	.47**	-.15*	.47**	.24**	(.93)			
9. Cog.	218	17.3	5.63	.27**	.61**	-.10	.04	.12	.18**	.06	.06			
10. Evals.	251	4.28	.48	-.12	.08	-.07	.18**	-.03	.16*	.07	.17**	.00	(.93)	
11. TSE (post)	251	4.17	.53	-.01	.08	-.24**	.47**	-.18**	.26**	.18**	.33**	.10	.38**	(.91)
12. Perf.	236	63.6	23.3	-.04	.00	-.24**	.17	-.20**	.06	.17**	.15*	.22**	.00	.09

Note. Age = chronological age. TSE (pre) = pre-training task self-efficacy. PRA= perceived relative age. FoO = focus on occupational opportunities. ROT = remaining occupational time. M2L = motivation to learn. Cog. = cognitive ability. Evals. = training evaluation. Perf. = performance. Correlations run on raw data. Due to missing data, *N* deviates from the value listed in the column for the following combinations: PRA X Sex (*N* = 243); PRA X Cognitive Ability (*N* = 210); PRA X Performance (*N* = 228); ROT X PRA (*N* = 242). ROT X Cognitive Ability (*N* = 218). ROT X Performance (*N* = 235). Cognitive Ability X Training Evaluations (*N* = 218); Cognitive Ability X TSE Post (*N* = 218); Cognitive Ability X Performance (*N* = 204). Sex is coded as 0= Male and 1= Female. Culture is coded as 0= Eastern and 1 = Western.
*$p < .05$. **$p \leq .01$.

Table 3. *Regression Results for the Estimated Coefficients of the Mediation Model*

		Mediator Variable			Dependent Variable								
		Motivation to Learn			Training Evaluation			Self-Efficacy (Post)			Performance		
Predictor		B(SE)	β	t	B(SE)	β	t	B(SE)	β	t	B(SE)	β	t
Constant		4.48(.04)		122.74**	.00(.03)		.04	-.02(.04)		-.33	.16(1.20)		.14
Sex		-.18(.10)	-.12	-1.82	-.21(.09)	-.16	-2.42*	-.11(.10)	-.07	-1.14	-4.05(3.15)	-.09	-1.29
Culture		.07(.08)	.06	0.91	.12(.07)	.11	1.73	.13(.08)	.10	1.59	1.12(2.54)	.03	.44
Age	*a*	-.01(.00)	-.26	-4.21**	.00(.00)	-.10	-1.56	-.01(.00)	-.25	-4.08**	-.43(.11)	-.25	-3.93**
H1 & H3		R^2 =.07			R^2 = .03			R^2= .07			R^2 = .06		
		F (3, 247) = 6.42**			*F* (3, 247) = 2.90*			*F* (3, 247) = 6.18**			*F* (3, 232) = 5.30**		
Constant					-.00(.03)		-.01	-.02(.04)		-.48	.10(1.22)		.08
Sex					-.17(.08)	-.13	-2.03*	-.01(.09)	-.01	-.13	-1.63(3.16)	-.03	-.51
Culture					.11(.07)	.10	1.55	.09(.08)	.07	1.16	.22(2.59)	.01	.08
Motivation to Learn					.13(.05)	.16	2.50*	.32(.06)	.32	5.36**	4.48(2.03)	.14	2.20*
H2					R^2= .05			R^2 = .11			R^2 = .02		
					F (3, 247) = 4.21*			*F* (3, 247) = 10.24**			*F* (3, 232) = 1.77		
Constant					.00(.03)		.02	-.01(.03)		-.40	.11(1.20)		.09
Sex					-.19(.09)	-.14	-2.17*	-.06(.09)	-.04	-.66	-3.58(3.16)	-.08	-1.13
Culture					.11(.07)	.10	1.61	.11(.08)	.08	1.39	.96(2.54)	.03	.38
Age	*b*				-.00(.00)	-.06	-.96	-.01(.00)	-.18	-2.93*	-.39(.11)	-.23	-3.48*
Motivation to Learn	*c'*				.12(.06)	.14	2.17*	.27(.06)	.28	4.50**	2.70(2.05)	.09	1.31
H4					R^2 = .05			R^2 = .14			R^2 = .07		
					F (4, 246) = 3.38*			*F* (4, 246) = 10.07**			*F* (4, 231) = 4.42*		

Note. Age = chronological age. *a* = direct effect of age on motivation to learn. *b* = direct effect of motivation to learn on training outcomes. *c'* = direct effect of age on training outcomes. *$p < .05$. **$p \leq .01$.

Table 4. *Regression Results for the Estimated Coefficients of the Moderated Model*

	Motivation to Learn				
Predictors	B	SE	β	t	
H5					
Constant	4.49	.03		134.34**	
Sex	-.11	.09	-.07	-1.24	
Culture	.08	.07	.07	1.14	R^2=.25
Age	-.01	.00	-.12	-1.98*	F(5, 245) =
TSE(Pre)	.37	.06	.39	6.46**	16.72**
Age X TSE (Pre)	.01	.00	.15	2.54*	
H6					
Constant	4.49	.04		115.25**	
Sex	-.17	.10	-.11	-1.71†	
Culture	.11	.08	.09	1.33	R^2 = .08
Age	-.01	.00	-.21	-2.80**	F(5, 237) =
PRA	-.05	.06	-.06	-.90	4.32**
Age X PRA	-.01	.01	-.10	-1.44	
H7a					
Constant	4.50	0.03		132.58**	
Sex	-.15	0.09	-.10	-1.66	
Culture	-.02	0.07	-.02	-.30	R^2 = .24
Age	-.01	.00	-.11	-1.92†	F(5, 245) =
FoO	.30	0.04	0.43	6.85**	15.81**
Age X FoO	.00	.00	.03	.58	
H7b					
Constant	4.52	.04		115.37**	
Sex	-.16	.10	-.10	-1.62	
Culture	.10	.08	.08	1.23	R^2=.10
Age	-.01	.01	-.11	-1.19	F(5, 244) =
ROT	.09	.06	.13	1.48	5.39**
Age X ROT	.01	.00	.16	2.40*	

Note. Age = chronological age. TSE (pre) = pre-training task self-efficacy. PRA= perceived relative age. FoO = focus on occupational opportunities. ROT = remaining occupational time.
† p <.10. *p < .05. **$p \leq .01$.

Table 5. *Results for Test of Conditional Effects at Specific Values of Significant Moderators*

	B	SE	t	95% CI	
				Lower	Upper
Task Self-Efficacy (Pre)					
-1*SD* (-.54; 3.54 before centering)	-.013*	.004	-3.208	-.021	-.005
M (.00; 4.09 before centering)	-.006	.003	-1.981	-.013	.000
+1*SD* (.54; 4.63 before centering)	.000	.004	.014	-.008	.008
Remaining Occupational Time					
-1*SD* (-.73; 2.30 before centering)	-.013*	.005	-2.621	-.023	-.003
M (.00; 3.03 before centering)	-.006	.005	-1.199	-.015	.004
+1*SD* (.73; 3.76 before centering)	.001	.006	.203	-.011	.014

*$p < .05$.

Table 6. *Bootstrapping Results for Test of Moderated Mediation and Conditional Indirect Effects at Specific Values of Significant Moderators*

Dependent Variable	Value of Task Self-Efficacy (Pre)	Conditional Indirect Effect	*SE*	95% CI Lower	95% CI Upper
Training Evaluations	-1*SD* (-.54; 3.54 before centering)	-.002*	.001	-.0036	-.0005
	M (.00; 4.09 before centering)	-.001*	.001	-.0022	.0001
	+1*SD* (.54; 4.63 before centering)	.000	.001	-.0015	.0010
TSE (post)	-1*SD* (-.54; 3.54)	-.004*	.002	-.0065	-.0014
	M (.00; 4.09 before centering)	-.002*	.001	-.0038	-.0004
	+1*SD* (.54; 4.63 before centering)	.000	.002	-.0030	.0022
Performance	-1*SD* (-.54; 3.54)	-.036*	.028	-.1049	-.0031
	M (.00; 4.09 before centering)	-.012	.014	-.0466	.0015
	+1*SD* (.54; 4.63 before centering)	.011	.012	-.0076	.0595
	Value of Remaining Occupational Time				
Training Evaluations	-1*SD* (-.73; 2.30 before centering)	-.002*	.001	-.0041	-.0002
	M (0; 3.03 before centering)	-.001	.001	-.0032	.0002
	+1*SD* (.73; 3.36 before centering)	.000	.001	-.0023	.0022
TSE (post)	-1*SD* (-.73; 2.30 before centering)	-.004*	.002	-.0072	-.0012
	M (0; 3.03 before centering)	-.002*	.002	-.0056	-.0009
	+1*SD* (.73; 3.36 before centering)	.000	.003	-.0051	.0049

Note. $N = 251$. CI = confidence intervals were constructed from 5,000 bootstrap samples. *$p < .05$.

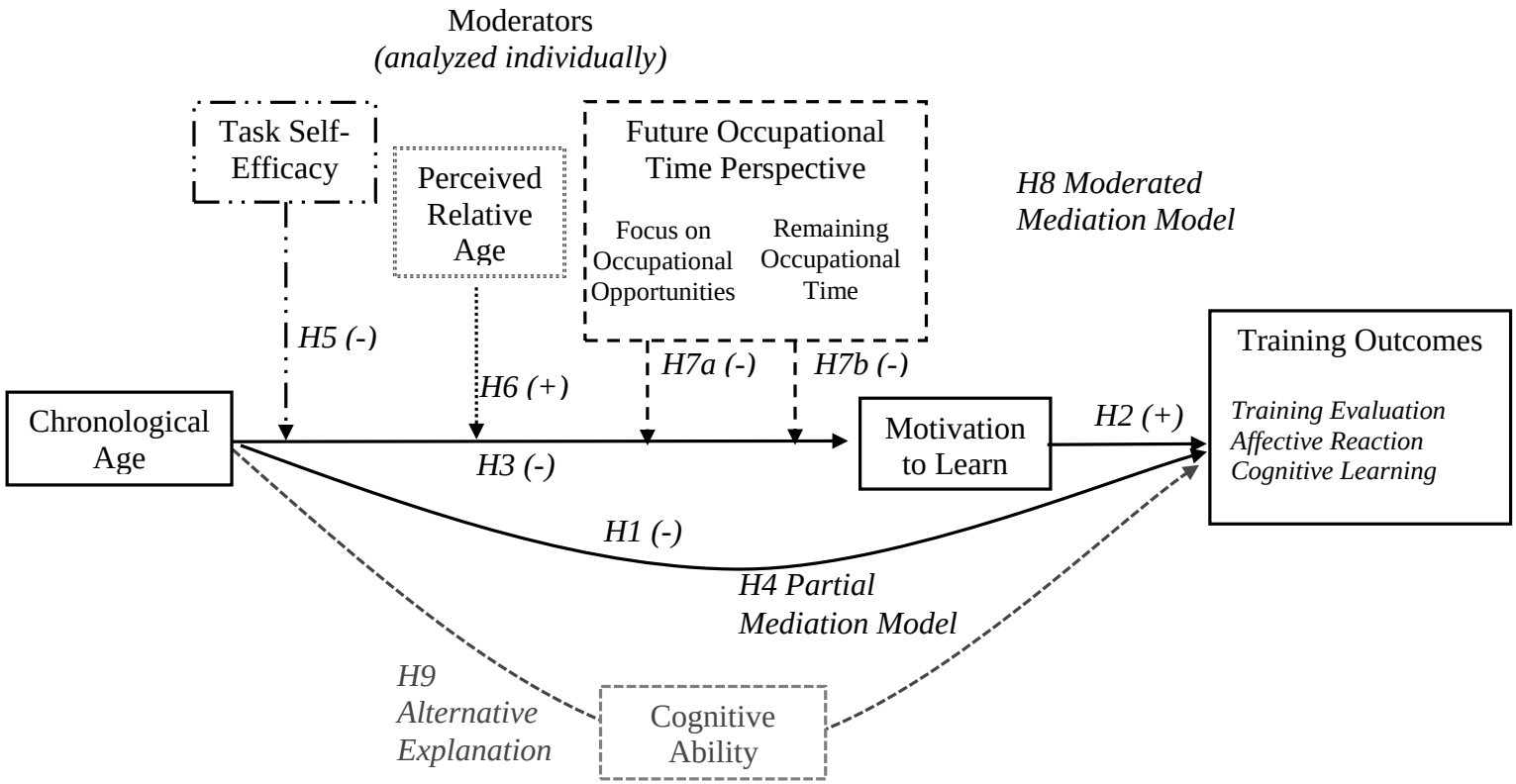

Figure 1. Hypothesized theoretical model.

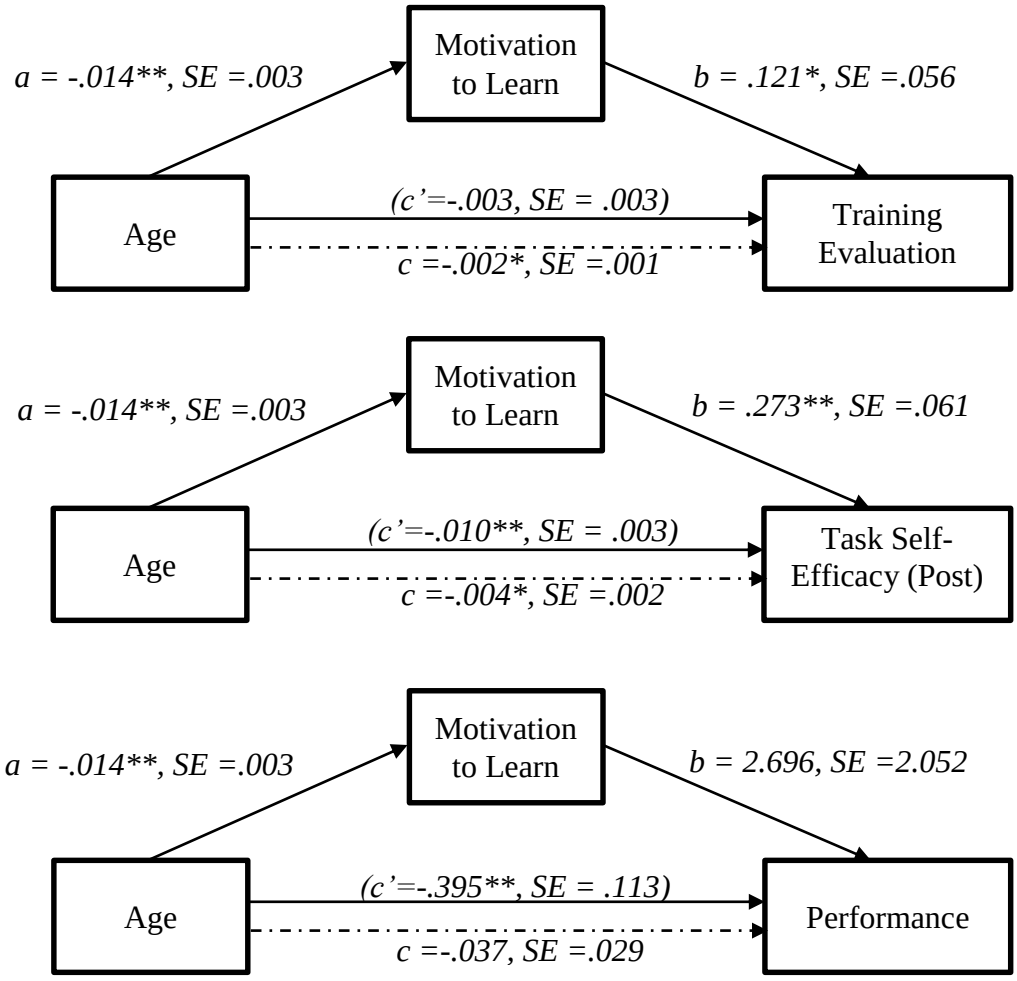

Figure 2. Path coefficients for simple mediation analysis of age on training outcomes (training evaluation, post-training self-efficacy, and performance) through motivation to learn.

Note. Dotted line denotes the indirect effect of chronological age on training outcomes. *a, b, c, and c'* are unstandardized OLS regression coefficients. Sex and culture were included as covariates, but are not represented here.
*p < .05. **p ≤ .01.

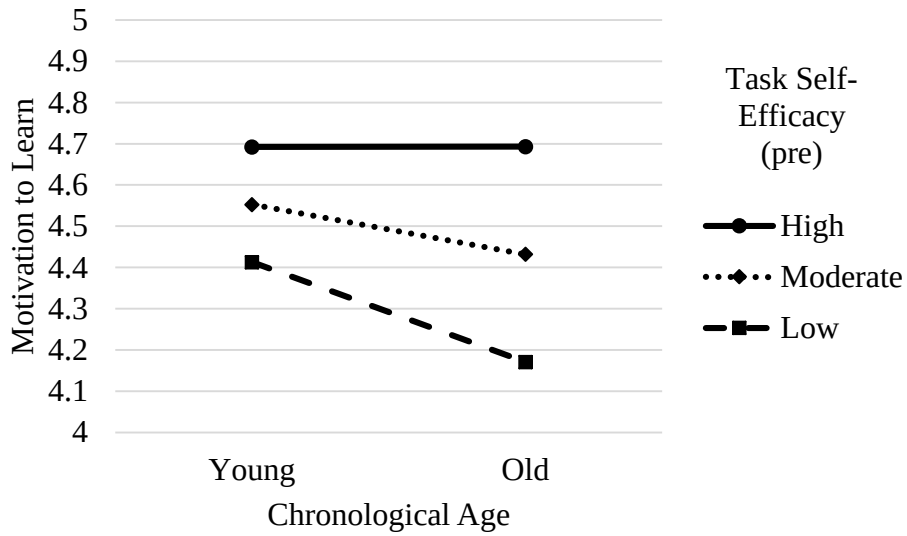

Figure 3. Line graph of the interaction between age and pre-training task self-efficacy on motivation to learn.

Note. Because the interaction is between two continuous variables, dichotomous values (e.g., young-old; high-low) were calculated using one standard deviation below and above the mean of its respective average.

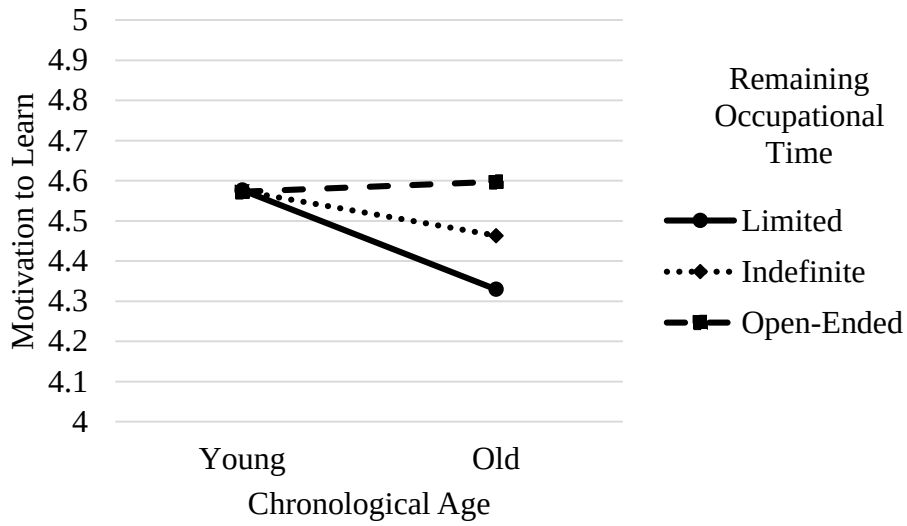

Figure 4. Line graph of the interaction between chronological age and remaining occupational time on motivation to learn.

Note. Because the interaction occurs between continuous variables, dichotomous values (e.g., young/old; limited/open-ended) were calculated using one standard deviation below and above the mean of its respective average.

APPENDIX A: EXPLANATION OF FEDERAL AVIATION ADMINISTRATION (FAA) REGULATIONS

Aircraft are made up of many sophisticated components (e.g., engines, landing gears, avionics, seats, galleys, wings, tails, actuators, pumps, pressurization systems). Furthermore, each component requires hundreds of mechanical parts. The Federal Aviation Administration (FAA) regulates all life-stages of aircraft parts including their design, manufacture, and maintenance. Nevertheless, black market parts infect the industry and vigilance must be maintained to keep them out. In this effort, unique serial numbers (in addition to part numbers) are required for approximately 3,000 parts on any given aircraft (e.g., Boeing 737). For each of these parts, numerous data elements must be tracked because they each have their own maintenance requirements that may be triggered by any number of elements (e.g., calendar time, operational units such as flight hours, landings or cycles, or on-condition inspections). These parts must be routinely serviced and replaced (i.e., routine maintenance), such that all necessary maintenance must be completed on or before the specified operating limit is reached. No overflying is allowed whatsoever.

To complicate matters, parts do not typically remain on the aircraft they were originally built in to. To more quickly repair reported defects, it is standard practice to remove and replace parts, components, and/or sub-components. In order to maintain compliance with FAA maintenance requirements, operators must closely track when a part is pulled and when a replacement part is placed on a given aircraft. To add even more complexity, components are constantly being improved by their respective original equipment manufacturers (OEMs) requiring airlines to track at what modification (mod) state each part is at. Parts of a new mod state are not always compatible with other parts. Simply put, upgrading the mod state of one part could dictate the upgrade of other parts on an aircraft. Finally, there are situations when an aircraft requires unscheduled maintenance due to mechanical malfunctions (i.e., non-routine maintenance).

All aircraft operations (e.g., flight hours, distance traveled) and maintenance (routine and non-routine) must be closely monitored and recorded to satisfy FAA regulations and ensure aircraft health so that planes stay in the air (rather than in the maintenance hangar). Thus far, I have only discussed maintenance management for a single aircraft; however, today's largest airlines boost a fleet size of over 700 planes. As such, comprehensive aircraft maintenance and integrated logistics software fulfills an essential role to monitor, maintain, and ensure a safely flying fleet.

APPENDIX B: SURVEY MEASURES

Task Self Efficacy (adapted from Bell & Kozlowski, 2008; scale α = .89 & .91 for pre and post-training, respectively)

Directions: Please indicate your agreement for each of the following items on the scale provided: *1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.*

1. I can meet the challenges of this training.
2. I am certain that I can manage the requirements of this software product.
3. I believe I can develop methods to handle challenging aspects of this software product.
4. I am sure I can learn how to utilize this software product effectively.
5. I am confident that I can cope with this software system if it becomes more complex.

Perceived Relative Age (Maurer et al., 2003; scale α = .80)

Directions: Please describe your perceptions for each of the following items. Indicate your responses of the scale provided: *1= much younger, 2 = younger, 3 = about the same age, 4 = older, 5 = much older.*

1. Compared to the average age of members in this training group, I FEEL…
2. Compared to the average age of members in this training group, I LOOK…
3. Compared to the average age of members in this training group, I ACT…

Focus on Occupational Opportunities (Zacher & Frese, 2011; scale α = .85)

Directions: Please describe your perceptions for each of the following items. Indicate your responses of the scale provided: *1 = does not apply; 2 = applies a little; 3= applies to some extent; 4= applies moderately; 5 =applies completely.*

1. Many opportunities await me in my occupational future.
2. I expect that I will set many new goals in my occupational future.
3. My occupational future is filled with possibilities.
4. I could do anything I want in my occupational future.

Remaining Occupational Time

Directions: Please rate each of the following items on the following scale: *1 = near retirement, 2 = late career, 3 = mid-career, 4 = early career, 5 = have not begun my career.*

1. Considering your current career, which career stage are you at?

Motivation to Learn (adapted from Noe & Schmitt, 1986; scale α = .93)

Directions: For each of the following items, please indicate your agreement on the scale provided: *1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.*

1. I am willing to exert considerable effort to improve my skills in the training program.
2. The skills I learn in this training program will be helpful to me.
3. I am motivated to learn the skills emphasized in the training program.
4. I will try to learn as much as I can from the training program.
5. I am motivated to pay careful attention to the training program.

Trainee Reactions (a combination of my Partner Company, 2012; Morgan & Casper, 2000; scale α = .93)

Directions: Please rate each of the following items on the following scale: *1 = very poor, 2 = poor, 3 = average, 4 = good, 5 = very satisfied.*

1. How do you rate the trainer's ability to explain the functionality?
2. How do you rate the trainer's ability to explain industry business processes related to this subject?
3. How do you rate the trainer's level of preparation for this course?
4. How do you rate the trainer's overall knowledge of the subject?
5. How do you rate the trainer's ability to keep the class interest?
6. How do you rate the trainer's use and presentation of the training materials during the training?
7. How do you rate the organization of topics in the course materials?
8. How satisfied are you with the level of detail contained in the training materials? (*1 = very unsatisfied, 2 = unsatisfied, 3 = neither, 4 = satisfied, 5 = very satisfied)*
9. How satisfied are you with the pace at which the course material was presented? (*1 = very unsatisfied, 2 = unsatisfied, 3 = neither, 4 = satisfied, 5 = very satisfied)*
10. Do you feel the course materials will be useful to you after this training session? *(1 = useless, 2 = poor, 3 = average, 4 = good, 5 = very useful)*

Training Material Importance

1. How important do you feel this subject was for your overall understanding? *(1 = very unimportant, 2 = somewhat unimportant, 3 = neither, 4 = somewhat important, 5 = very important)*

Computer Experience (Adapted from Czaja, Charness, Fisk … Sharit, 2006).

1. How long have you been using a computer?
   (1 = less than 6 months, 2 = between 6 months and 1 year, 3 = more than 1 year, but less than 3 years, 4 = more than 3 years, but less than 5 years, 5 = more than 5 years)

2. About how many hours a week do you use a computer?
   (1 = never, 2 = between 1 hour and 5 hours a week, 3 = between 6 hours and 10 hours a week, 4 = between 11 hours and 15 hours a week, 5 = more 15 hours a week)

Gender

1. What is your gender? *(1 = Male, 2 = Female)*

Country of Origin

1. What country are you from? *(194 options listed from Qualtrics)*

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FOOTNOTES

[1] Chronological age refers to years since birth. Without question, researchers predominately use this representation of age to evaluate the effects of age and aging. Throughout my literature review and critique, I make references to "younger" and "older" employees; however, all analyses treat age as a continuous variable. The intention of using this terminology is to convey that the current research is interested in investigating group-level differences between individuals at one age vs. individuals at another age rather than isolating the effects of the intraindividual aging process. Classic lifespan developmental literature (e.g., Erikson, 1979) suggests that younger, middle-aged, and older adults occupy qualitatively different stages of life (Erikson, 1979). To be sure, each stage is associated with unique challenges and milestones and assigning a concrete chronological age to entrance and/or exit of a certain period is ill-fated and not helpful. The Age Discrimination in Employment Act (ADEA) of 1967 defines age 40 or above as an older worker; the Association of Retired People (AARP) uses age 50 as the boundary for membership; and the ~~Job Training Partnership Act (1982) as well~~ as the Older Americans Act (1965) identifies age 55 for eligibility. Accordingly, as others have done (Goldberg, Finkelstein, Perry, & Konrad, 2004; Nair, Czaja, & Sharit, 2007; Niessen, Swarowsky, & Leiz, 2010), my discussion (and statistical analysis) will keep age as a continuous variable using language such as "younger" and "older" to describe individuals' standing on a given age dimension rather than relying on pre-defined groups (e.g., young and old employees).

CURRICULUM VITA

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