MULTIMETHOD ANALYSIS OF INTEREST

BY

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DISSEPTION

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Abstract

Interest has been studied to understand its role in learning and achievement and its role in matching people to vocations or areas of study. This research examined whether trait interests as studied within the learning perspective are equivalent to trait interests as studied within the vocational perspective. One hundred seventy-nine undergraduate students completed multiple measures of trait interest, completed brief readings, indicated their interest and engagement in the readings, answered questions about the readings, and were allowed to choose whether to continue reading or read an alternative article. Results showed that trait interest measures converged and diverged as expected across the two perspectives. Vocational trait interest predicted situational variables such as state interest, task engagement, and task persistence. These findings support the idea that the two distinct literatures on interest psychology are studying the same construct.
For Tracy, who has never doubted. For Elspeth and Adwen, who remind me what to value
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Chapter 1

Introduction

The goal of the current research is to build a better understanding of the construct of ‘interest’ by connecting two psychological traditions that have separately defined and studied interest. One approach to studying interest focuses on its role in learning and achievement, and the other perspective examines how interests facilitate people’s satisfaction with their field of study or their vocation. Linking these approaches will address problematic gaps within each perspective as well as provide a much-needed foundation for a more unified theory of interest.

In this introduction, I begin with definitions of interest. I then describe the learning and the vocational approaches to studying interest, identifying four important aspects of the construct that can be used to both compare and bridge these perspectives. Finally, I describe my study that used these important aspects of interest to examine whether interest studied within the learning perspective is equivalent to interests as studied within the vocational perspective.

Interest Definitions

Interest is a fundamental human experience, representing an immediate person-object relationship that can have adaptive functions (Deci & Ryan, 2000; Fredrickson, 2001; Krapp, 2007; Krapp, Renninger, & Hidi, 1992). Interest includes qualities of persistence, enduring attention, and emotion (Hidi & Renninger, 2006; Silvia, 2006), and can be evoked by specific contextual or object characteristics such as conflict, complexity, novelty, uncertainty, or specific themes (Berlyne, 1960; Hidi, 1990). Further, the state of interest can be maintained or held over an extended episode when people find the object or activity to be personally meaningful or relevant (Hidi & Renninger, 2006; Mitchell, 1993). Interest motivates exploration and learning, encourages interaction with novel occurrences and objects, and facilitates the development of
competence when one’s interest is sustained or held (Alexander, 2003; Krapp, 2007; Silvia, 2006). Thus, the state of interest facilitates task engagement and learning, contributing to improved task performance and achievement.

Interest can also refer to an enduring, dispositional characteristic of an individual (Hidi & Renninger, 2006; Savickas, 1999; Silvia, 2006; Strong, 1943). In this sense, one’s interests reflect enduring patterns of preferences to engage with specific kinds of objects, activities, situations, and environments. These patterns of preferences have been identified in early adolescents and are increasingly stable in adolescence and early adulthood (Low, Yoon, Roberts, & Rounds, 2005). Further, these enduring patterns provide a number of paths by which persons and environments could be matched. For example, the study of vocational interests has provided insight into areas such as choice of college major and vocation, career development, and job satisfaction through the congruence of people’s vocational interests and environmental opportunities to exercise those interests (Holland, 1997; Low & Rounds, 2006). Thus, an interest is an enduring motive that provides insight into the nature of relationships between persons and their environments.

So there are two general kinds of interest – the experience or state of interest and people’s long-term, characteristic interests (Hidi, 1990; Savickas, 1999; Silvia, 2006). When discussing the experience of interest, a variety of terms have been used – situational interest, psychological state of interest, an operating interest, or even simply interest (Krapp, 2007; Silvia, 2006) – yet the essence of these terms is generally the same, referring to the experience of an immediate person-object relationship that captures or holds one’s attention, generally accompanied by positive affect. To maintain clarity and emphasize the shorter duration, I will use state interest to refer to this form of interest.
Dispositional interests have also been referred to by a variety of generic labels such as individual interests, personal interests, or simply interests (Pintrich & Schunk, 2002; Silvia, 2006). These terms refer to the same enduring form of interest, characterized by persistent person-object relationships (i.e., preferences for particular content domains or types of objects) as well as positive affect. These lasting preferences and positive affect for specific objects or classes of objects could also be described as enduring preferences for specific person-object relationships. In this sense, the connection between people and the focus of their interest is essential. I will refer to this form of interest as *trait interest* to maintain clarity and to acknowledge the role of trait interest as an important individual difference domain (Roberts, Harms, Smith, Wood, & Webb, 2006). Furthermore, I will continue to use *interest* when referring to the broad construct that includes both trait and state forms.

In general, the ‘situational interest’ and ‘individual interest’ terms used by educational researchers (e.g., Hidi & Renninger, 2006; Krapp, Renninger, & Hidi, 1992; Schraw & Lehman, 2001; Schiefele, 1991) are similar to the state interest and trait interest terms I use with an important exception. I assume that people with trait interests in a specific domain (e.g., math) can also experience state interest in the same domain (e.g., math). In contrast, the individual-situational framework generally assumes that people with enduring interests in a domain (e.g., in math) do not experience situational interest in the same domain (e.g., math); rather, these individuals experience a third form of interest referred to as the psychological state of interest (e.g., Hidi, 2001; Hidi & Renninger, 2006). However, there is no evidence suggesting that the psychological state of interest that is the essence of situational interest is any different than the psychological state of interest experienced by someone with an individual interest in any given domain (Silvia, 2006). Further, a framework of three interest subtypes complicates the situational
and individual interest dynamics and interactions proposed within interest development. When considering operational concerns, it is also apparent that individual interest is routinely measured by focusing on the enduring aspect or at least the existing levels of interest that participants have prior to an experiment. The terminology I propose stems from the interest/interests model proposed by Silvia (2001; 2006), although I use the state/trait distinction to clarify potential confusion (e.g., although *interests* refers to the enduring variety in Silvia’s model, how does one discuss a single, specific enduring *interest*?).

**Project Goals**

The broad goals of this research project are to clarify and strengthen what is known about the construct of interest by integrating two distinct perspectives or traditions of studying interest. One approach emphasizes interest’s role in learning and achievement, particularly academic achievement. Finding ways to get students to put more effort into tasks is a challenging yet critical task for teachers (Hidi & Harackiewicz, 2000), and it is assumed that students will be more likely to engage with tasks that catch and hold students’ interest or with tasks from domains of students’ existing trait interests. Thus, education is the major context for this perspective.

A second approach studies interest’s role in work/career choices and satisfaction. The study of vocational interests has resulted in a wealth of information regarding the structure or relationships among different trait interests (Armstrong, Day, McVay, & Rounds, 2008; Rounds, 1995). The impressive collection of correlational evidence for the ordered nature of interests provides a strong basis for predicting what a person likes and dislikes if we know other things this person tends to enjoy.
From this perspective, trait interests provide valuable insight into how to match people and jobs or work environments. In general, people will be satisfied with the match when their characteristics and enduring motives correspond with the opportunities and resources provided by the environment (Dawis, 2005). A successful fit between the person’s interests and the kinds of activities provided by the environment increases the likelihood of vocational satisfaction, job stability, and successful job performance (Allen & Robin, 2010; Holland, 1997). Thus, work–jobs, careers, and training – is the major context for this perspective.

Perhaps because the outcomes and their contexts examined are distinct, the two approaches to studying interest have focused on different aspects of the construct and yielded separate bodies of knowledge. Yet the absence of dialogue between these perspectives is perplexing given that each studies the same construct. It has been suggested that the psychology of interest could be furthered by using information from a variety of psychological disciplines (Dik & Hansen, 2008; Silvia, 2006). This project aspires to make such a contribution, focusing on trait and state interest as studied within the educational and vocational approaches to interest.

In the next section, I discuss how the learning perspective and the work perspective study interest in more detail. This review covers four important aspects of interest fundamental to any study or theory of the construct – the state and trait distinction, the elements or characteristics of interest, interest development, and how interest is operationalized. Although I am not explicitly examining interest development in the current project, this aspect is briefly outlined because operationalizing interest is dependent on the other aspects of interest. Comparing the educational and vocational perspectives shows that each addresses the aspects differently, resulting in unique strengths and weaknesses.
After this review, I describe how this project links the learning and work perspectives on interest in two steps. The first examines the convergence of trait interest measures across the two perspectives by using the multitrait-multimethod approach outlined by Campbell and Fiske (1959). The multiple traits are different trait interests (e.g., a science interest, a teaching interest). The multiple methods are different self-report measures of interest, each representing different assumptions of what comprises trait interests and how to best measure them. Using different measures as a representation of different methods is diverges from Campbell and Fiske’s original work. However, using different measures facilitates examining the convergence of trait interest measures, providing the first empirical evidence that studies from the learning perspective and studies from the vocational perspective are examining the same construct. In addition, this first step in the project will address the learning perspective’s lack of agreement regarding components or elements of trait interest (Hidi & Renninger, 2006).

The second step of this project focuses on the predictive validity of trait interest related to situational process variables such as state interest and task involvement as well as task persistence and task performance. These relationships have been demonstrated and are generally accepted within the learning perspective on interest (e.g., Ainley, Hidi, & Berndoff, 2002; Ainley, Hillman, & Hidi, 2002; Durik & Harackiewicz, 2007; Harackiewicz, Durik, Barron, Linnenbrink, & Tauer, 2008; Hidi, 2001; Schraw & Lehman, 2001). Yet there is no evidence linking trait interest to situational variables within the vocational perspective. State interest could be a useful variable in vocational research, linking interest-related findings from the educational context concerned with task engagement and learning. Further, these variables could be used in future studies to provide new insight into outcomes traditionally connected to vocational interests, such as performance, choices, and satisfaction. Therefore, the second step in this
project addresses this gap by using trait interest from vocational psychology and examining its role in predicting state interest in a reading task, task engagement, and assessment of learning-related outcomes as shown in Figure A1, the interest-persistence model and Figure A2, the interest-performance model.

**Four Aspects of Interest**

To compare the learning and vocational perspectives on interest, I discuss how four general aspects of interest are treated within each perspective – the distinction between state and trait interest, the components or elements of interest, the ontogeny of clearly defined trait interests, and the measurement of interest. Understanding how the learning and vocational perspectives treat these four aspects is an important step in creating a rich, integrative nomological net for the construct of interest.

**State interest and trait interest.** The learning and vocational perspectives agree that defining interest involves acknowledging a time component (Athanasou & Esbroek, 2007; Krapp, Hidi, & Renninger, 1992; Savickas, 1999). This aspect of interest can be understood with the state and trait types of interest. The learning perspective has explored both types while the vocational perspective has extensively examined trait interest and neglected the momentary form.

Within the learning and achievement perspective on interest, trait and state interest are related yet clearly distinguished constructs (Hidi & Renninger, 2006; Krapp, Hidi, & Renninger, 1992; Schiefele, 1991; Tobias, 1994). Both forms of interest involve a connection between a person and an object, class of objects, or topical domain (Hidi, 2001). Further, state and trait interests can affect learning (and subsequent achievement) through multiple paths: what one chooses to engage in (Ainley, Hidi, & Berndoff, 2002; Ainley, Hillman, & Hidi, 2002), how
deeply one engages in a task (Durik & Harackiewicz, 2007; Krapp, 1999; Pintrich, 1999; Pintrich & DeGroot, 1990; Sansone & Thoman, 2005; Schiefele & Krapp, 1996), how long one engages in a task (Ainley, Hidi, et al., 2002; Ainley, Hillman, et al., 2002), and how well one recalls aspects of tasks (Schiefele & Krapp, 1996; Schiefele, Krapp, & Winteler, 1992). Given the multiple ways that interest affects learning, it is not surprising that interest has been found to affect aggregated measures of achievement such as semester grade point average (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000), and overall college grade point average (Tracey & Robbins, 2006).

However, state interest has received greater attention within the educational context at least since the 1980s, perhaps for a very practical reason – although educators have no control over the pre-existing trait interests that students bring to the classroom, educators can alter details of lessons or the environment to encourage state interest (Bergin, 1999; Eccles, 2005; Mitchell, 1993). For example, an instructor could make an obscure and challenging poem more interesting by providing students with enough information to ascertain the meaning of the passage (Silvia, 2005), yet the teacher has no control over students’ preexisting level of trait interest in poetry. Thus, distinctions between state and trait forms of interest are made partly for very practical reasons.

Distinguishing between state and trait interests also facilitates the empirical study of interest’s role in learning. Trait interests are often associated with individual differences psychology, identifying enduring interests as an important, long-term psychological feature that could explain differences in learning and related outcomes (Hidi, 1990). State interest is studied to understand how interest functions in momentary situations, focusing on the role of interest for most people. Identifying the different interest types allows them to be studied alone or together.
Notably, educational studies including trait interest are typically linked to state interest in some way (e.g., Ainley, Hidi, & Berndoff, 2002; Barron & Harackiewicz, 2001; Durik & Harackiewicz, 2007), generally under the assumption that trait interest will indirectly influence learning and achievement through state interest (Krapp, 2007).

More generally, it is useful to understand relationships between trait interest and state interest in order to reveal interest dynamics and to better understand interest’s roles in outcomes such as learning and achievement. It has been suggested that each form of interest may be particularly critical when the other is absent (Hidi & Harackiewicz, 2000). An existing trait interest could compensate for the dismal presentation that does not catch or hold students’ interest by keeping students focused on the content. Alternatively, students with no initial trait interest in a lecture topic might be engaged when their state interest is triggered, perhaps by novel presentation methods or intriguing themes.

The vocational approach to interest, with its connections to individual differences psychology, has focused on trait interest as a characteristic psychological attribute. This emphasis on trait interest is intended to facilitate the match between individuals and their vocations, based on the premise that congruence between a person’s vocational interests and the range of activities and tasks in a specific vocation/work environment will improve vocational success and satisfaction (Holland, 1985). Thus, vocational interest research investigates features and uses of trait interest such as its internal structure (e.g., Armstrong, Smith, Donnay, & Rounds, 2004; Rounds & Day, 1999; Tracey & Rounds, 1995), stability (e.g., Low et al., 2005; Swanson, 1999), relations to other aspects of individual differences such as personality factors, self-efficacy, and abilities (e.g., Armstrong, Day, McVay, & Rounds, 2008; Betz & Rottinghaus, 2006; Lubinski, 2000; Mount, Barrick, Scullen, & Rounds, 2005; Sullivan & Hansen, 2004; ).
usefulness in predicting group membership and satisfaction with occupations or fields of study (Fouad, 1999), and career counseling applications (e.g., Prediger, 2002).

State interest is given little attention within the vocational perspective (Athanasou & Esbroek, 2007). At best, some reviews note that interest can be both an experience and a disposition (e.g., Low & Rounds, 2005; Low et al., 2005; Savickas, 1999; Su, Armstrong, & Rounds, 2009). Explanations of interest sometimes note that environmental or situational factors impact and can change trait interests (e.g., Low & Rounds, 2005; Savickas, 1999; Tracey, Robbins, & Hofsess, 2005), yet the environmental factors described are generally long-term factors such as parents encouraging some activities and discouraging others. Some sources suggest studying trait interest by examining how people respond to stimuli – for example, observing what a person chooses to pay attention to (Fryer, 1931) or how long a person views various museum exhibits (Bingham, 1937) – yet these ideas do not acknowledge the many other reasons persons attend to some stimuli and not others (Crites, 1999), including qualities that can trigger state interest, such as seductive details and vividness (Schraw & Lehman, 2001). Currently, there is no research linking trait and state interests within the vocational perspective.

The vocational and learning perspectives ostensibly agree that interest can be broken into trait and state types. However, the literatures associated with each perspective demonstrate the diverging opinions on how important the distinction truly is. The learning perspective has studied both forms of interest, though practical applications seem to place greater weight on the usefulness of state interest in the educational context. The participants in this context often appear unmotivated to achieve (Hidi & Harackiewicz, 2000); many do not seem to understand the importance of learning and how education can dramatically shape their future. It is
understandable why many from the learning perspective would focus on the form of interest that appears to be more easily changed by educators.

The vocational perspective has extensively examined trait interest, perhaps because the common applications apply to the job or work context. When compared with those in the educational context, participants in the work setting are assumed to have ample reasons to succeed. Workers are typically older than students and more aware of the consequences of failure on the job. In addition, workers could also have more autonomy than students in the educational context. Thus, workers are more likely to be invested in their job and motivated to achieve to some degree. Based on assumptions such as these, the vocational perspective has emphasized the individual factors such as trait interest that can predict aggregated patterns of behavior rather than state factors.

**Developmental Process.** Consistent with their different attention to state and trait interest, the learning and vocational perspectives address the development of interest differently. The learning perspective incorporates state and trait interest into models that show how enduring interests develop from the experiences of interest (Hidi & Renninger, 2006). The vocational perspective is more concerned with how much trait interests change. This focus on trait interest stability stems from the goal of matching people to environments in which they will perform and be satisfied—after all, matching a person to a job or job type is a futile task if individuals’ characteristics such as trait interests are not stable (Strong, 1931).

Educational researchers generally treat interest as a developmental, dynamic process in which people develop a trait interest when state interest with the object is repeatedly experienced. Hidi and Renninger (2006) outline a four-phase process in which state interest is first triggered or caught (i.e., phase 1) and then held or maintained (i.e., phase 2). An object’s
collative features, such as conflict, novelty, complexity, and uncertainty, tend to trigger state interest (Berlyne, 1960; Reeve, 1989; Silvia, 2005), as can instructional styles or environments surrounding the object (Mitchell, 1993). Perceiving an object as personally relevant, meaningful, or useful leads to maintaining or holding the state interest, and instructional styles or environments can support the continuation of state interest (Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000; Mitchell, 1993).

A trait interest develops from state interest in Hidi and Renninger’s interest development model (2006) when people continue to reengage with the object of interest. Phase 3, the emergence of an enduring trait interest, occurs when people continue to choose involvement with the object of interest. Past experience has demonstrated the personal value of engaging with the object. People have positive feelings for the object, and they think about it in increasingly sophisticated ways (e.g., asking ‘curiosity’ questions, Renninger, Ewan, & Lasher, 2002). The learning environment (e.g., instructional styles, teacher and peer encouragement) can support the emergence and continuation of phase 3 (Guthrie, Wigfield, Humenick, Perencevich, Taboada, Barbosa, 2006; Hidi & Renninger, 2006). Thus, phase 3 includes the beginning of a trait interest as well as continued experiences of state interest.

Phase 4, a well-developed and persisting interest, occurs if the tendency to choose involvement with the object of interest continues. The enhanced levels of background knowledge and personal value associated with the object distinguish this phase from phase 3 (Hidi & Renninger, 2006; Renninger et al., 2002). As in previous phases, the learning environment can support phase 4, although people with well-developed interests are more likely than others to exhibit self-regulated learning strategies and persist despite frustrations or set-backs (Hidi & Renninger, 2006; Pintrich, 1999). Phase 4, then, includes a well-defined trait interest and
continued experiences of state interest. Thus, the model describes interest development as a process in which momentary experiences of fascination with a specific object/domain evolve into enduring preferences for the object.

Hidi and Renninger’s (2006) model deals with how trait interest develops for everyone. This basic observation reflects the practical dilemmas within the educational context, requiring educators to teach all students regardless of the individual abilities and trait interests they have. However, the vocational interest perspective, with its roots in individual differences and person-environment fit, wants to understand the continuity and change associated with individuals’ trait interests.

From the vocational perspective, interest development is an issue of trait interest stability (Low & Rounds, 2007). Qualitative reviews have concluded that test-retest correlations are at least .5 – higher depending on age of subjects at first testing and retest intervals – indicating that trait interests are very stable (e.g., Dawis, 1991; Swanson, 1999). A recent meta-analysis of longitudinal studies that focused on ages from 12 to 40 year-olds (Low et al., 2005) provides more substantial support. Two forms of stability – rank-order and profile correlations – were examined. Results indicated trait interests were stable even for early adolescents (estimated population correlation of .55 for the youngest group). Further, trait interests were increasingly stable and surpassed estimated population correlations of personality at each age category. This meant that within specific trait interests, people were likely to maintain their relative position within the group in terms of the level of interest. In addition, individuals’ profiles of trait interests were likely to remain unchanged, indicating that people’s various trait interests were constant. In other words, someone who was highly interested in physics, moderately interested in
math, and only mildly interested in law maintained the same configuration of interests at a later time point.

Thus, the vocational perspective generally emphasizes the relative constancy, or dispositional nature of interests and the learning perspective emphasizes how interests develop over time from situational interests into lasting tendencies. There is merit to each approach. Research indicates that trait interests are in part genetically determined (Lykken, Bouchard, McGue, & Tellegen, 1993) and are stable dispositions, comparable to (and exceeding) the longitudinal stability of personality traits (Low et al., 2005). Yet interests are not immutable characteristics; just as personality traits exhibit some change over the lifespan (Roberts, Robins, Trzesniewski, & Caspi, 2006), interests continue to change and crystallize over the lifespan (Hidi & Renninger, 2006; Low & Rounds, 2006; Tracey, Robbins, & Hofsess, 2005).

Components of Interest. The vocational and learning perspectives diverge when considering whether interest can be understood in terms of multiple, constituent psychological components such as emotion, motivation, values, cognition, background knowledge, and behaviors. Vocational interest researchers may conceptually describe aspects of interest such as cognitive, emotional, and behavioral aspects of interest (e.g., Savickas, 1999; Dawis, 1991; Strong, 1955), but in general interests are assumed to be quantum in nature, unable to be divided into more elemental components without losing the essence of interest (Allport, 1946).

This view of interests stands in marked contrast to the study of interests from the learning perspective. From this point of view, interest is studied as the combination of its components – characteristics such as individuals’ familiarity with and affective response to the object of interest, as well as individuals’ appraisal of the worth or significance of the object. Thus, the learning perspective maintains that interest is best understood (and measured) by the emotional,
value-related, and cognitive aspects that comprise it (Eccles, 2005; Hidi & Renninger, 2006; Krapp, 2007; Schiefele, 1991).

The emotional component is pervasive in interest theories, and emphasizes the positive feelings associated with the object as well as engagement with the object. Positive emotion may be one of the fundamental characteristics of interest; it seems natural to feel good when we engage in something that fascinates us, perhaps because we are acting on the human tendency to explore and learn (Deci & Ryan, 2000). However, state interest may not be strictly limited to positive affect (Bergin, 1999; Hidi & Renninger, 2006; Turner & Silvia, 2006), as anyone who slows down to see a car accident can testify.

The value component of interest is the personal significance or relevance connected to an object (Krapp, Hidi, & Renninger, 1992; Schiefele, 1991). This aspect of interest is often linked to intrinsic value, one of the subjective task values in the expectancy-value model of achievement (Eccles, 2005; Hulleman, Durik, Schweigert, & Harackiewicz, 2008; Wigfield & Eccles, 1992). State interest could be triggered or held by perceiving an object to be useful, relevant, or personally meaningful (Hidi & Renninger, 2006; Hulleman et al., 2008). Trait interest is associated with stored value; in other words, previous experiences with the object have demonstrated the personal relevance of the object, leading one to appreciate the object and create a sense of meaning. A tendency to reengage emerges, and one will generally choose related tasks when possible (Hidi & Renninger, 2006). Further, the value aspect of a trait interest may come to influence the sense of identity a person has (Renninger et al., 2002; Schiefele, 1991).

The cognitive element of interest refers to attention to and background knowledge of the object and is related to the state-trait interest distinction. Trait interests are likely to have complex knowledge structures associated with the object. As knowledge grows, one may
increasingly feel a sense of ownership and identification with the object or domain of interest (Renninger, Ewan, & Lasher, 2002). However, not all interest researchers from the learning perspective accept that knowledge is a component of interest (Ackerman, 2003; Alexander, Kulikowich, & Jetton, 1995; Schiefele & Krapp, 1996; Tobias, 1994), preferring to treat knowledge as a related yet distinct variable (e.g., Harackiewicz et al., 2008). This seems a logical solution to an unsolved dispute, given findings that the relationship between interest and background knowledge appears to vary by domain, gender, and age (Reeve & Hakel, 2000).

**Operationalizing Interest.** The operationalization of interest is particularly important in understanding how the learning and vocational perspectives study interest. Research from the educational context flows from the theoretical approaches to interest, emphasizing the state-trait distinction as well as the identifiable components (e.g., value, affect). The vocational perspective, traditionally focusing on assessment and operational definitions (Dawis, 1991), stresses the structured content-specificity of interest. In this section, I discuss how these core considerations contribute to an integrated operationalization of interest.

Interest, as a relation between a person and an object, is always specific to the particular object or class of objects (Hidi & Renninger, 2006; Krapp, 2007; Savickas, 1999). Assessing an interest requires explicitly naming the object, because interests’ degree of specificity can range from the very abstract – (e.g., an interest in people or things) to the specific (e.g., an interest in stars or algebraic equations). State interests are very specific and are related to the object focused on in the situation. However, the scope of trait interests’ objects varies, ranging from general classes of objects, like ‘people’ or ‘things,’ to specific objects, such as solar flares or linear equations.
Both the learning and vocational perspectives on trait interest emphasize the importance of specifying the level of generality (e.g., Ainley, Hidi, & Berndoff, 2002; Dawis, 1991; Day & Rounds, 1997; Krapp, 2007; Tracey & Rounds, 1995). The learning perspective describes different levels of trait interest, such as the very broad (e.g., interest in learning), the domain-centered (e.g., interests in literature or math), and more focused varieties (e.g., interest in eighteenth century poetry, interest in trigonometry) (Ainley, Hidi, et al., 2002). Despite some findings demonstrating that broad trait interests predict more specific trait interests (Ainley, Hidi, et al., 2002; Ainley, Hillman, et al., 2002), relationships between various levels of trait interests have not been systematically studied within the educational context.

The vocational perspective clearly describes different levels of trait interest, with detailed relationships describing how the levels are structured (Dawis, 1992; Day & Rounds, 1997; Rounds, 1995; Tracey & Rounds, 1995). Three levels – general interests, occupational interests, and basic interest – are typically identified within this perspective. General interests are the widest in scope and are sometimes called occupational themes. Holland’s RIASEC model (1997), perhaps the most prevalent model of general interests, includes Realistic, Investigative, Artistic, Social, Enterprising, and Conventional traits. Each of these interests describes a particular category of general activities. For example, someone with realistic interests may like a job that emphasizes physical activity, working outdoors, and manipulating objects with their hands, while someone with strong enterprising interests would like a job in which organizing and persuading others are key elements.

At the most specific level is occupational interests, which include dissimilar work activities found within a particular occupation. For example, activities of a manufacturing engineer (occupational interest) could include analysis and redesign of an assembly process.
improve process efficiency and product quality; the engineer might also interact with the
customer affected by substandard product, providing an explanations and corrective action plans.
Or an elementary school teacher’s day could include comforting a distraught student, teaching
students to compose haikus and add fractions, managing a noisy cafeteria, and dealing with an
upset parent.

Basic interests fall in the range between general and occupational interests and are
identified by specific groupings of similar work activities. For example, a basic interest in math
could be recognized when a person likes activities such as manipulating a mathematical
equation, solving practical math applications, and learning about a new field in mathematics. A
basic interest describes a characteristic property such as context, setting, object, or process that
transcends specific occupations (Armstrong, Hubert, & Rounds, 2004; Day & Rounds, 1997).

Basic interests are a useful level to examine trait interest across the learning and
vocational perspectives. Basic interests are analogous to the domain or subject-centered interests
typically studied within the learning perspective. For example, Durik and Harackiewicz (2007)
assessed interest in math when studying relations among state interest, trait interest, and
performance on a math-based activity. In addition, vocational research has found that interests at
the basic level are better predictors of academic majors, academic satisfaction, careers, and job
satisfaction (Donnay & Borgen, 1996; Ralston, Borgen, Rottinghaus, & Donnay, 2004).

Anecdotal evidence suggests that basic interests are commonly used in important decisions such
as choice of major (e.g., “I chose teaching as a major because I want to work with children”) (Day & Rounds, 1997).

Even when studying a trait interest at the common level of basic interests, the learning
perspective and vocational perspective have different underlying philosophies on how to
measure trait interest. The learning perspective usually focuses on components; the vocational perspective prefers to focus on the range of activities or jobs that comprise the interest. For example, a study of trait interest in math from the learning perspective would typically assess the interest components (e.g., participants’ positive feelings for and valuing of math). The vocational perspective would assess the interest in math by participants’ positive feelings about a variety of math activities (e.g., equation manipulation, practical applications). Although both perspectives are measuring trait interest at the same level of specificity, it is unclear whether the two assessments are equivalent.

**Bridging the Interest Perspectives**

By examining how the learning and the vocational perspectives on interest deal with the trait-state interest distinction, developmental aspects of interest, whether interests should be treated as elemental or molecular constructs, and the operational levels of interest, the following conclusions can be made. Interest involves a time component, and can be examined as a state or trait. Trait interests are enduring, dispositional psychological attributes, and are presumed to be equivalent across the two perspectives (Hidi & Renninger, 2006; Krapp, 2007; Low et al., 2005; Silvia, 2006). Trait interests can predict a range of outcomes, such as task engagement, persistence, and performance (Ainley, Hidi, et al., 2002; Durik & Harackiewicz, 2007) as well as vocational choices, satisfaction and tenure (Fouad, 1999). Further, trait interests can be studied at different levels of content-specificity; the domain-level trait interests from educational research are analogous to the basic interest level from vocational research.

However, only the learning perspective has explicitly studied state interest. The connection between vocational trait interests and situational experiences of interest is untested. On the other hand, the learning perspective does not have a uniform approach to studying trait
interests (Hidi & Renninger, 2006) unlike the vocational perspective which consistently treats
trait interests as patterns of likes and dislikes for objects (e.g., activities, work environments,
associated outcomes) (Armstrong & Rounds, 2008; Rounds, 1995). Given the lack of
consistency within the learning perspective, it is not surprising that the two perspectives do not
agree on operational definitions of trait interest. Specifically, it is unclear whether trait interests
should be treated as elemental constructs, or if they have specific components, such as value and
affect. In other words, are the two perspectives examining the same construct?

I propose two steps to bridge the learning and vocational perspectives on interest. First,
trait interests are measured to examine the convergence of measures across the interest
perspectives. Using multiple measures would address the lack of consistency within the
educational literature. In addition, an important foundation would be established for applying the
findings of each body of literature across the educational and work contexts. Researchers
understanding of learning and achievement would be substantially enriched by empirical
findings in vocational research such as the stability of adolescents’ trait interests (Low et al.,
2005), the individual characteristics related to development of math and science expertise (e.g.,
Lubinski & Benbow, 2006), and predicting college success (e.g., Leuwerke, Robbins, Sawyer, &
Hovland, 2004). Our understanding of vocational choices, performance, and satisfaction, and
person-environment matches would benefit from educational research such as connections
between trait interest and attention (Ainley, Hidi, et al., 2002; Krapp, Hidi, & Renninger, 1992),
achievement goals (Harackiewicz et al., 2008), task involvement and recall (Durik &
Harackiewicz, 2007), and future class choices (Harackiewicz et al., 2008).

Structured self-report assessment of interest (e.g., How do you feel about teaching
Like/Dislike/Indifferent) is the most popular method of trait interest measurement (Dawis, 1991;
Spokane & Jacob, 1996), because it seems to the most direct, especially compared to methods than can obviously incorporate a variety of evaluative factors beyond simple liking (Crites, 1999; Silvia, 2006). There are a wide range of potential instruments, some proprietary (e.g., Strong Interest Inventory, Harmon, Hansen, Borgen, & Hammer, 1994) and some publicly available (e.g., Interest Item Pool, https://netfiles.uiuc.edu/jrounds/IIP/home.htm). In addition, there are several underlying theoretical perspectives driving the diversity of instruments, such as Holland’s RIASEC model of general interests (1985; 1997), individual interests (e.g., Ainley, 2006; Hidi, 2001; Renninger, 2000), basic interests (e.g., Rounds, 1995), and intrinsic motivation (e.g., Deci & Ryan, 1985; Ryan & Deci, 2000). Given this diversity, a multitrait-multimeasure examination – which is based on Campbell and Fiske’s multitrait-multimethod (MTMM) approach – will be used to elucidate the latent trait interest construct with evidence of convergent and discriminant validity among the different methods and the theories driving them.

To bridge the gap between the learning/achievement and vocational perspectives, I examine the extent to which different assessments of trait interest converge. More specific issues within each perspective can also be examined, such as the lack of consistent definition of trait interest within the learning perspective (i.e., what is the relationship between interest components of value and affect).

A natural step after building a more integrated approach to trait interest is addressing the state interest gap in the vocational perspective. Educational research has found relationships between trait, state interest, and learning (e.g., Ainley, Hidi, et al., 2002; Ainley, Hillman, et al., 2002; Durik & Harackiewicz, 2007), yet it is unclear whether similar relationships exist with vocational interests. Therefore, the second focus of this project addresses this by using
vocational trait interests in the interest-persistence and interest-performance models (Figure A1 and A2, respectively).

In summary, the present study examines these research questions:

1. What are the relationships between different approaches to measuring trait interests? This question focuses on the extent to which different measures trait interest converge, including the relationship between trait interest defined by different components.

2. To what extent does trait interest predict situational process variables such as state interest and task engagement? Prior research from the learning perspective (e.g., Durik & Harackiewicz, 2007; Harackiewicz et al., 2008) demonstrates that trait interest predicts state interest and task involvement, although no prior research has incorporated the variety (including vocational interest) of trait interest assessment.

3. To what extent does trait interest predict task persistence?

4. To what extent does trait interest predict task performance? To what extent do trait interest and state interest predict recall? Does task engagement explain the relationship between trait and state interest and recall?

A college student population is routinely used within the learning and vocational approaches to studying interest. Using a college student sample for this project allows for comparison with other findings within these literatures and provides a reasonable first step toward linking the vocational and learning interest perspectives.
Participants and Procedure

Participants were 179 college students (108 female, 71 male, mean age = 20.2) from an educational psychology research pool at a large, Midwestern university. Approximately half of the students were enrolled in an introductory educational psychology course, intended for students planning on majoring in education. Approximately half of the students were enrolled in a career development course. Students received class research credit in exchange for participating in the study. Average number of semesters students reported being at the university was 4.7 (standard deviation = 2.66). The sample was 61.5% White or European American, 16.2% Black or African-American, 11.2% Asian or Asian-American, 5% Latino/a, 5% Multiracial or others, and .6% Native American. One student declined to report a race or ethnicity. Students participated by attending one of 23 data collection sessions in spring 2009.

Participation involved completing a packet that included several measures of interest, reading two short passages, recalling main ideas of one passage, and finishing a demographic form. Specifically, trait interest measures were reported first; to allow comparison across domains, three trait interest domains (Finance, Life Science, and Teaching) were included. Next, participants indicated their interest in reading three different articles based on titles and one-sentence descriptions of each article. Participants then read the first half of an article about a specific teaching strategy. On the following pages, participants reported their engagement with and state interest in the excerpt. Then participants answered three questions assessing their comprehension of main ideas within the reading. Next, participants indicated their interest in reading the end of the article. Then a choice was provided, allowing participants to persist and
finish the article or to read something completely new. Participants also responded to the prompt “Very briefly, please explain why you have chosen your article.” Participants then completed the reading they chose and reported their engagement with and state interest in the reading. The last step in the study was to complete a demographic form.

**Measures**

Students completed a research packet that included measures of interest, short reading passages, and a demographic form. All measures are provided in Appendix C.

**Basic Interest Markers (Liao, Armstrong, & Rounds, 2008), scales 7, 11, and 30.** The Basic Interest Markers (BIMs) scales assess trait interest at the basic level of interest, focusing on a specific domain (e.g., Finance, Life Science, Teaching). The scales are introduced with the statements: “The activities listed below relate to different kinds of careers or occupations. Please indicate how much you would like to do each activity by circling the number that most closely represents how you feel about it.” Items refer to how respondents feel about activities within a given domain, and responses are on a five-point Likert-type scale (1 = Strongly dislike, 3 = Neutral, 5 = Strongly like). Means, standard deviations, and Cronbach coefficient alphas (ranging from .87 to .96) are presented in Appendix B, Table 1. Previous studies reported internal consistencies for these scales ranging from 0.90 to 0.94 (Liao et al., 2008). A complete list of all 31 BIM scales, scale items, and psychometric characteristics are available at http://netfiles.uiuc.edu/jrounds/IIP/home.htm.

Finance/BIM, Scale 7, focuses on the Finance domain, and includes 12 items. A sample activity is “Understand economics principles.” Life Science/BIM, Scale 11, has 10 activities within the Life Science domain. An example is “Learn about the life cycle of an animal species.” Teaching/BIM, Scale 30, has 10 items focusing on activities relevant to Teaching. A sample
activity is “Create an effective classroom atmosphere.” A complete list of items are in Appendix C.

**Basic Interest Markers – Value.** Using BIM scales 7, 11, and 30 as templates, I created three domain-specific scales – Finance, Life Science, and Teaching – that assessed the value respondents place on activities within each domain. The BIM-V scales are prefaced with the statements “The activities listed below relate to different kinds of careers or occupations. Please circle the number that most closely represents how much you value each topic or activity.” Participants respond on a five-point Likert-type scale (1=Not at all important, 5 = Extremely important). Means, standard deviations, and Cronbach coefficient alphas (ranging from .93 to .95) are presented in Appendix B, Table 1.

Finance/BIM-V addresses activities within the finance field. This scale has 12 items, and a sample activity is “Understand economics principles.” Life Science/BIM-V focuses on the life science domain, and has 10 items. An example is “Learn about the life cycle of an animal species.” Teaching/Bim-V, the teaching-focused scale, has 10 items. A sample activity is “Create an effective classroom atmosphere.” A complete list of items are in Appendix C.

**Individual Interest scales.** The Individual Interest scales measure trait interest from the learning perspective, focusing on how much one likes and values each domain. There are three domain specific scales – Finance, Physical Science, and Teaching scales. Each scale is based on items used by Harackiewicz et al. (2008), and represents the value and affect components of trait interest. Items are statements about the domain and participants evaluate how much the statements reflect their relationship with the domain (1 = Not at all true of me, 4 = Neither true nor untrue of me, 7 = Very true of me). Means, standard deviations, and Cronbach coefficient alphas (ranging from .94 to .96) are presented in Appendix B, Table 1.
Domain Knowledge scales. Participants evaluated their domain knowledge on three scales – Finance, Life Science, and Teaching. Each scale asked participants to evaluate their knowledge of the domain as well their knowledge of specific domain activities. Only the teaching domain knowledge measure was used in further analyses to answer this project’s research questions. The Knowledge/Teaching scale mean, standard deviation, and Cronbach coefficient alpha (.83) are presented in Appendix C.

State Interest scale. Based on Harackiewicz et al. (2008), the nine-item scale (see Appendix) measures the participants’ situational interest related to the reading excerpts. Consistent with the learning and achievement perspective on interest, participants responded to items about their feelings and valuing of the reading.

Participants indicate their level of agreement with the statements a Likert-type scale (1 = Strongly disagree, 4 = Neutral, 7 = Strongly agree). Sample items are “I don’t like the excerpt very much” (reversed) and “I think what I read is important.” The complete measure is presented in Appendix C. Scale mean, standard deviation, and Cronbach coefficient alpha (.92) are presented in Appendix B, Table 3. A complete list of items are in Appendix C.

Task Involvement scale. Based on items from Durik and Harackiewicz (2007), this four-item self-report scale assesses how absorbed participants are in reading excerpts from the Salinger and Fleischman (2005) article. Responses are on a Likert-type scale (1 = Strongly disagree, 4 = Neutral, 7 = Strongly agree). A sample item is “I was thinking about other things
while reading the article.” Scale mean, standard deviation, and Cronbach coefficient alpha (.85) are available in Appendix B, Table 3. The items are presented in Appendix C.

Recall. This three item multiple-choice test examines participants’ comprehension and recall of the main ideas of the first half of the Salinger and Fleischman (2005) article. Testing comprehension and recall is a common way of examining task performance in interest research involving text reading (e.g., Ainley, Hidi, et al., 2002; Schiefele & Krapp, 1996). Given that interest is likely to affect learning through depth of processing (Silvia, 2006), I created items that tested participants understanding of the main ideas of the article. The test is presented in Appendix C.

Demographic data. Additional data to be collected will include major and year in school (if undeclared, what majors are you considering), age, sex, race/ethnicity, SES. .
Chapter 3

Results

Preliminary Analyses

Before addressing the research questions, I examined gender differences in the trait interest scales given findings demonstrating sizeable effects (e.g., Su et. al, 2009). Effect sizes using Cohen’s $d$ were calculated (see Table 1). Measures of trait interest in Finance had the highest average effect size ($d = -.51$), reflecting the greater trait interest in finance reported by male participants. Measures of trait interest in Teaching had a medium average effect size ($d = .35$), with female participants reporting greater trait interest in teaching. Measures of trait interest in Life Science had a small average effect size ($d = -.13$).

Given the presence of large gender effects for finance and medium effects for teaching, further calculations were performed to establish the appropriateness of using the combined male/female sample to answer the research questions. First, the correlations among all trait interest measures were calculated for male participants and for female participants. These correlations were then compared using Fisher $r$ to $Z$ transformations; the only correlation found to be significantly different for male and female participants was the relationship between Finance/BIM-V and Finance/II. Although this correlation was statistically significantly different ($p < .05$), the actual correlations ($r = .67$ for females, $r = .83$ for males) do not indicate a difference in overall relationship between the measures for male and female participants.

In addition to comparing trait interest correlations, gender was controlled for when addressing the remaining research questions focusing on trait and state interest in teaching, task engagement, task persistence, and recall. As noted in following sections, gender had no significant effect in these analyses.
Research Questions – Overview

The underlying question driving my research project is whether trait interests as studied within the learning perspective are equivalent to trait interests as studied within the vocational perspective. To address this, I first examined relationships between three trait interests – finance, life science, and teaching. Each trait interest was measured by three measures – an Individual Interest (II) scale, a Basic Interest Marker (BIM) scale, and a modified Basic Interest Marker scale (BIM-V). The II scales, measuring affect for and value of the interest, are representative of trait interests as measured within the learning perspective (e.g., Harackiewicz et al., 2008). The BIM scales, measuring affect for the interest, are representative of trait interest measurement within the vocational perspective (Liao et al., 2008). I created the BIM-V scales as an alternative interest assessment that combines aspects of the learning and the vocational perspectives; the BIM-V scales measure value for the trait interest. Thus, three trait interests were each measured by three measurements; the relationships among the resulting nine trait/method units were examined using correlations (multitrait-multimethod matrix) and multidimensional scaling.

After analyzing relationships among the trait interests, I then examined the predictive validity of trait interest. As already noted in previous sections of this paper, research in the learning/achievement approach has linked trait interest to state interest, task involvement, task persistence, and task performance. In this study, I examined whether trait interest from the vocational perspective would predict the same variables. The following sections describe these results, and are organized by research question.

Research question 1: What are the Relationships Between Different Approaches to Measuring Trait Interests?

I expected to find that different measures of the same trait interest would be strongly related. Results supported this hypothesis. Correlation tables arranged per Fiske and Campbell’s
multitrait-multimethod matrix showed that measures of trait interest in finance were strongly correlated across learning/achievement and vocational psychology approaches. Similar results were found with trait interest in life science and in teaching. Further analyses clearly demonstrated graphically that trait interest measures organized into three groups (i.e., trait interest domains), suggesting that different measures and their underlying assumptions are still tapping into the same underlying construct.

**Multitrait-Multimeasure analysis.** To address research question 1, I began with Campbell and Fiske’s (1959) multitrait-multimethod (MTMM) approach to evaluating construct validity. MTMM uses multiple methods to measure several traits, with each trait being measured by the same methods. Trait-method units are compared using correlations, allowing the evaluation of convergent and divergent validity trends. In this study, the domain trait interests were Finance, Life Science, and Teaching interests. The ‘methods’ are the different approaches to measuring trait interests – affect and value for a trait interest (Individual Interest scales; II), affect for the interest domain (BIM, Basic Interest Marker scales), and valuing the interest domain (BIM-V, Basic Interest Marker – Value scales). I generally use the scale names when referring to specific methods. In my study, there are nine trait/method units (e.g., Finance/BIM scale, Teaching/II scale, Life Science/BIM-V scale).

One of Campbell and Fiske’s (1959) criteria to evaluate construct validity is that the correlations between different methodological approaches to measure the same trait should be strong. These correlations, called monotrait-heteromethod correlations or ‘validities’ by Campbell and Fiske, are the diagonal values underlined in each heteromethod block (see Table 2). As shown in Table 2, these validity correlations ranged from .63 to .85 with mean $r = .74$. These correlations are greater than both heterotrait-monomethod correlations, which range from -
.33 to .30 with mean = .01, and heterotrait-heteromethod correlations, which range from -.33 to .17 with mean r = -.04. The heterotrait-monomethod correlations indicate the relationship between different trait interests, with each assessed by the same measurement approach (e.g., the correlation between Life Science/II scale and Teaching/II scale). The heterotrait-heteromethod correlations represent the association between two different trait interests, with each assessed by a different measure. (e.g., the correlation between Finance/BIM scale and Life Science/II scale).

Trait interest measurements converged, indicating that the different measurement approaches are assessing the same underlying traits. As expected, different ways of measuring a trait interest had stronger relationships than the correlations between different traits measured by either a single method/approach or by different methods/approaches. This also indicates that trait interest measurements diverged appropriately, providing support that the interest domains signify separate traits.

Campbell and Fiske (1959) also noted that similar patterns of trait relationships should be found in all monomethod and heteromethod blocks. As shown in Table 2, consistent patterns were found in almost all monomethod and heteromethod blocks. These patterns included insignificant correlations between Finance and Life Science trait interests, negative correlations between Finance and Teaching trait interests, and insignificant relationships between Life Science and Teaching trait interests. The BIM-V monomethod block is where the exceptions to these patterns are found. In this block the Finance and Life Science correlation (r = .20, p < .01) was positive, the Finance and Teaching correlation was not significantly different from zero (r = .08), and the Life Science and Teaching correlation was positive (r = .30, p < .01).

Examining the relationships between trait interest measurements by domain revealed that for trait interest in finance, the relationship (r = .85) between Finance/BIM and Finance/II was
significantly greater than the Finance/BIM and Finance/BIM-V correlation $r = .75$ ($t(176) = 3.92, p < .001$) and the Finance/BIM-V and Finance/II correlation $r = .73$ ($t(176) = 4.59, p < .001$). For trait interest in life science, however, correlations between different measurements were too close to differentiate with $r$’s ranging from 0.63 to 0.71. Trait interest in teaching had yet a slightly different pattern; the highest correlation of $r = .82$ between Teaching/BIM and Teaching/BIM-V was significantly greater ($t(176) = 3.27, p < .01$) than the lowest correlation of $r = .73$, between Teaching/BIM-V and Teaching/II.

In summary, it is clear that there were general patterns across trait interests yet specific differences remained between the interest domains. General patterns across trait interests included relatively weaker correlations between the BIM-V measures and the II scales. Furthermore, the clearest evidence for trait convergence appeared in relationships with the BIM scales. Trait interest domains exhibited differences as well; for example, trait interest in life science converged to a somewhat lesser degree ($M r = .67$) than the other domains ($M r = .78$ for finance, and $M r = .78$ for teaching).

The multitrait-multimeasure matrix showed that different methods of trait measurement are tapping three underlying trait interests. Therefore, this analysis indicated that when dealing with trait interest in the same object or domain, the learning perspective and vocational perspectives are measuring the same construct. To visually examine the trait interest relationships, I followed this analysis with a spatial analysis of the same trait interest data. Multidimensional scaling (MDS) provides a graphical representation of relations between objects by locating each trait/method unit in a dimensional space. Thus, the results from the MDS facilitate an examination of underlying structures and allow comparison of the trait/method units.
**Multidimensional scaling analysis.** Multidimensional scaling (MDS) involves calculating distances between variables, based on similarities or dissimilarities between variables, and fitting these distances to dimensional solutions. MDS results must be examined to evaluate the most appropriate number of spatial dimensions. Then the graphical results can be interpreted to understand the underlying dimensions as well as the relationships between variables.

Using correlations as a measure of similarity, dimensional fit was examined. A scree plot (i.e., normalized raw stress versus number of dimensions) showed that a two-dimensional solution was the most appropriate fit. The normalized raw stress for this solution was .012. Figure 2 shows the two-dimensional solution.

As seen in Figure 2, the nine trait/method units separated into three groups, matching the three trait interests. Each trait interest group included the three methods (i.e., II scale, BIM scale, BIM-V scale). Within the Finance group, Finance/BIM-V and Finance/II were the farthest apart; among the three measures, Finance/BIM was closest to the average location. For the Life Science group, Life Science/BIM and Life Science/BIM-V were the closest together of the three measures, and Life Science/BIM-V was closest to the average location. The measures within the Teaching group were closely grouped, and Teaching/BIM and Teaching/BIM-V were slightly closer to the average location than Teaching/II. When comparing the three trait interest groups, the Finance scales were the closest to being linear and the Teaching scales were grouped closest together.

The multidimensional scaling (MDS) analysis results echoed the multitrait-multimethod (MTMM) analysis results. The graphic MDS output displayed three groups of three scales, with each group representing a trait interest. This was similar to the convergent validity demonstrated
by the strong monotrait-heteromethod correlations and the divergent validity demonstrated by the relatively low heterotrait-monomethod and heterotrait-heteromethod correlations in the MTMM matrix.

**Cluster analysis.** A complete linkage cluster analysis was conducted to examine the hierarchical structure of the nine scales. Using correlations as similarities, this analysis method grouped interest measures in a series of steps. In initial steps, the most similar scales were clustered together. In later steps, scales similar to the existing clusters were added to create larger clusters. Eventually clusters combined into one inclusive group. Figure A3 shows the resulting hierarchical structure; correlations among clusters were converted to distances from 0 to 2.

Consistent with results from the multitrait-multimethod matrix as well as multidimensional scaling, three clusters of scales emerged with distances less than .4. Distances for remaining clusters were greater than 1. The three emerging clusters were consistent with interest domains, reflecting trait interests in finance, in life science, and in teaching. Each trait interest cluster included an individual interest scale, a basic interest marker scale, and a basic interest marker-value scale.

**Research question 2: To What Extent Does Trait Interest Predict Situational Process Variables Such as State Interest and Task Engagement?**

Prior research within the learning and achievement perspective on trait interest demonstrates that trait interest predicts situational factors such as state interest (e.g., Ainley, Hidi, et al., 2002; Ainley, Hillman, et al., 2002; Durik and Harackiewicz, 2007; Harackiewicz et al., 2008) and task engagement (Durik and Harackiewicz, 2007). Therefore, I expected to find that trait interest from a vocational psychology perspective would also predict situational, process variables related to a task within the same interest domain.
I tested this hypothesis by examining trait interest in teaching, state interest in reading an
article that explicitly addresses a topic in teaching (i.e., student comprehension of text readings),
and participants’ self-reported engagement or involvement in the task. Means, standard
deviations, validities, and bivariate correlations are presented in Table 3. Consistent with
findings from research question one, bivariate relationships indicated that measures of trait
interest in Teaching had very similar relationships with situational variables such as state interest
(M \( r = .58 \)) and task engagement (M \( r = .32 \)).

Multiple regression analyses indicated that trait interest in teaching, as measured using a
vocational psychology measure (BIM-Teach), predicted situational factors of state interest and
task involvement. Gender and domain knowledge were controlled for in these regression
analyses.

**State interest.** A three-term model was analyzed using multiple regression. Predictors of
state interest included trait interest in teaching (Teaching/BIM), gender, and domain knowledge
in teaching. As shown in Table 4, the model was significant (adjusted \( R^2 = .34 \)) and trait interest
was a significant predictor: \( \beta = .53, t(178) = 6.75, p < .001 \). No other effects emerged.

**Task involvement.** Hierarchical regression was used to examine first how well the three-
term model predicted task involvement. (Preliminary analyses indicated no significant effect of a
trait interest-state interest interaction.) Consistent with interest theories (e.g, Krapp, 2007;
Schiefele, 1991; Strong, 1955), prior research indicates that trait interest predicts task
involvement (Durik and Harackiewicz, 2007). Similarly, I expected trait interest in teaching
(Teaching/BIM) to predict task involvement. I also expected that state interest would mediate
this trait interest-task involvement relationship; in other words, trait interest predicts the
activation of state interest and state interest influences how much one becomes involved in a
task. Therefore I added a second step to the regression, in which state interest is included in the equation and the relative change in the weight (i.e., beta) of trait interest is examined to evaluate the presence of mediation.

As shown in Table 5, the three-term model predicted task involvement (adjusted $R^2 = .12$). Trait interest was the only significant predictor of task involvement ($\beta = .41$, $t(178) = 4.36$, $p < .001$). Adding state interest to the regression increased the task involvement variance accounted for by the predictors, with the adjusted $R^2 = .45$. In this four-term model (i.e., predictors include state interest, trait interest, knowledge, gender), trait interest was no longer a significant predictor ($\beta = .03$). State interest was the only significant predictor of task involvement in this model: $\beta = .71$, $t(178) = 10.39$, $p < .001$).

Four requirements of mediation (Baron & Kenny, 1986) were met as noted above. Trait interest significantly predicted both state interest and task involvement, while state interest significantly predicted task involvement. When state interest is added to equations predicting task involvement, the effect of trait interest on task involvement is completely mediated (from $\beta = .41$ to $\beta = .03$). Conducting a Sobel test confirmed that trait interest influences task involvement through state interest ($z = 5.56$, $p < .001$).

**Research question 3: To What Extent Does Trait Interest Predict Task Persistence?**

A common assumption of interest is that its presence promotes continued engagement in a task or topic (e.g., Dawis, 1991; Hidi & Renninger, 2006; Savickas, 1997; Silvia, 2006). In this study, I expected that trait interest, as an enduring preference for a domain or class of objects, would have a significant effect on task persistence. Similar to my expectations regarding task involvement, I expected that the state interest would have a stronger effect on task persistence. I also expected task involvement to have a strong effect on task persistence.
I first examined the effects of trait interest (BIM scale), state interest, and task involvement by comparing means of the 87 participants who persisted (i.e., chose to read the second half of the teaching article) with the 92 participants who changed tasks (i.e., chose to read something new rather than the second half of the teaching article). Participants who chose to persist reported greater trait interest in teaching \( (F = 40.34, p < .001, d = 0.95) \), higher levels of state interest \( (F = 120.73, p < .001, d = 1.64) \), and greater task involvement \( (F = 69.38, p < .001, d = 1.25) \). Participants who completed the teaching article also reported greater knowledge of teaching \( (F = 11.22, p < .01, d = 0.53) \).

After examining means, I ran logistic regressions to evaluate the individual contributions of trait interest, state interest, and task involvement while controlling for domain knowledge and gender. Predictors were entered in steps so that three, four, and five-term models could be examined. The three-term model included gender, domain knowledge, and trait interest in teaching. The four-term model added state interest; the five-term model added task involvement.

Examination of hit rates and likelihood ratios of the models indicated that the five-term model provided the best fit. The four- and five-term models had the same hit rate of 82.7%, which was greater than the initial model’s (i.e., constant only) hit rate of 51.4% and the three-term model’s hit rate of 67.6%. Likelihood ratios indicated that the five term model fit the data well \( (\chi^2(5) = 100.1, p < .001; \text{ Hosmer and Lemeshow chi-square } = 7.663, p = .467; \text{ Nagelkerke R-square } = .571) \) and increased model fit \( (\chi^2(1) = 5.760, p < .05) \) over the four-term model. Table 6 shows that within the five-term model, state interest and task involvement significantly increased the odds that participants would persist with reading the Teaching article. The odds increased by a factor of 1.16 with each one point increase in the summed total of the state
interest scale as well as a factor of 1.13 with each one point increase in the summed total of the task involvement scale.

To better understand the reasons for task persistence, participants were asked to briefly report the reasons for their choice to complete the teaching article or read something different. These were open responses to the prompt “Very briefly, please explain why you have chosen your article.” The responses were categorized in terms of positive, negative, or neutral reactions to both the first teaching article and an alternative article (of unknown topic).

Of the 87 participants who persisted in the task, 79 (i.e., 91%) had a positive reaction to the teaching article, seven had a neutral reaction, and one had a negative reaction. The 79 positive-reaction participants expressed a desire to finish the article because of interest in or relevance of the article’s topic (i.e., improving students’ reading skills). Sample responses included: “I was interested in the topic, and I am interested in finishing reading the article,” “curious to see if it will provide new insights,” “I would like to know what else the article says,” “at first the article seemed boring, but I got more into it as I read, so I'd like to continue.” The seven neutral-reaction participants persisting in the task expressed no strong preferences for the first teaching article and reported choosing to persist because of a desire to complete something they start or because they did not want to start something new. A sample response is “I feel as if the other article may have to do with finance or life sciences. I don't want to read that.” One person reported low interest in the first article but chose to finish because of the utility value of the article topic, stating “even though I found this boring, I feel that I need to know the results of the students because I do want to teach.”

Four categories or subgroups emerged from the 92 participants who chose to read an alternative article. One subgroup consisted of 46 participants who had a negative reaction to the
teaching article and neutral (or no) reaction to the possibility of reading something new. Sample explanations from this group include “this one was dull and boring,” “the previous one I read was not so interesting. Pretty much, I am familiar with what was discussed,” and “I found the article very boring and I don't feel that it relates to me at all.” The second subgroup included 29 members; these participants had both a negative reaction to the teaching article and a positive reaction to the possibility of reading something different. Sample responses include “based on what we've answered questions about it (the other article) may be life-science based and more interesting,” “I'd rather learn about something else,” and “I am curious to see if other article is more interesting.” The third sub-group had 12 participants; these participants had a neutral (or no) reaction to the teaching article but a positive reaction to the possibility of reading something new. Responses from this group focused on curiosity about an unknown topic; for example, participants explained their choice with statements such as “just curiosity!” and “simply to mix it up.” The final category or subgroup had no reaction to either the teaching article or the possibility of a new article. There were five participants in this category, and most did not respond to the prompt for this question. In summary, two subgroups of those 92 participants choosing something new to read indicated that their decision was based on interest in the first article on teaching. These two subgroups included a total of 75 participants, or 81% of those choosing the alternate article for their second reading. Of the entire sample of 179 participants, 86% reported that interest in the first article on teaching was influential in their choice to persist.

**Research question 4: To What Extent Does Trait Interest Predict Task Performance?**

Research from the learning and achievement perspective has shown that performance is clearly related to a variety of achievement-related emotions such as anxiety, hope, pride, and boredom (Pekrun, Elliot, Maier, 2009). But prior research from the learning and achievement context...
perspective is mixed regarding the importance of trait interest in predicting performance. Recent studies show that when trait interest affects performance, it is through situational process variables such as state interest and task persistence (Ainley, Hidi et al., 2002) as well as reasons for task engagement (Harackiewicz et al., 2008). In the present study, I used recall of the article’s main ideas to represent task performance. I expected that trait interest would contribute to recall of important information but that this effect would be accounted for by situational variables such as state interest and task engagement.

Examination of the data showed that the recall variable was subject to a ceiling effect. On a three-question scale, most participants correctly answered at least two questions correctly ($M = 2.26, SD = 0.84$). Therefore, I created two categories; one category included participants who answered all three questions correctly (High Recall; 84 participants, 46.9% of sample) while the second category included participants who answered two or fewer questions correctly (Low Recall; 95 participants, 53.1% of sample).

After creating the high and low recall categories, I examined the effects of trait interest (BIM scale), state interest, and task involvement by comparing means of participants from each group. High recall participants reported higher levels of state interest ($F = 7.56, p < .01, d = 0.41$), and greater task involvement ($F = 11.80, p < .001, d = 0.51$). Although high recall participants reported greater trait interest and greater background knowledge in teaching than low recall participants, the means were not significantly different for trait interest ($F = 2.20, d = 0.22$) or knowledge ($F = 2.05, d = 0.21$).

After examining means, I ran logistic regressions to evaluate the individual contributions of trait interest, state interest, and task involvement while controlling for domain knowledge and gender. Predictors were entered in steps so that three, four, and five-term models could be
examined. The three-term model included gender, domain knowledge, and trait interest in teaching. The four-term model added state interest; the five-term model added task involvement.

Examination of hit rates and likelihood ratios of the models indicated mixed success; likelihood ratios showed that the five-term model alone fit the data although the hit rate did not increase satisfactorily beyond the initial model’s hit rate. The hit rates of the three-term model (55.3%), four-term model (57.5%), and five-term model (58.1%) did not substantially increase beyond the initial model’s (i.e., constant only) hit rate of 53.1%. Likelihood ratio tests show that the five term model fit the data ($\chi^2(5) = 12.9$, $p < .05$; Hosmer and Lemeshow chi-square = 7.369, $p = .497$; Nagelkerke R-square = .093). As shown in Table 8, the odds increased by a factor of 1.09 with each one point increase in the summed total of the task involvement scale.
Chapter 4
Discussion

The results of this research study supported the idea that the two distinct literatures on interest psychology are studying the same construct. The findings demonstrated the convergence of multiple approaches to measuring interest as well as the impact that trait interest can have on situational outcomes such as state interest, task involvement, and task persistence. The study results did not show that trait interest influenced information recall, although there is some indication that trait interest could exert a distal influence through variables such as state interest and task involvement. The convergence of multiple ways of measuring interest was demonstrated across measurement methods common to the learning/achievement and vocational perspectives on interest. First, measures of the same trait interest were highly correlated despite the different theoretical assumptions inherent in each measure. The different measures of trait interest in Finance were highly correlated with each other; similarly, the different measures of trait interest in Life Science were highly correlated, as were the different measures of trait interest in Teaching. Relationships across domains were low as expected. The second form of support was provided in the multidimensional scaling. The spatial results from this analysis showed three groups (Finance, Life Science, Teaching trait interests) with three measures within each group. The three groups are organized in a manner consistent with findings from vocational psychology – the three groups fit well in a two-dimensional space and relative locations of the three groups are consistent with expectations from Holland’s RIASEC vocational interest theory. The third form of support came from the complete linkage cluster analysis, in which three clusters (Finance, Life Science, Teaching) emerged.
Interest measures used in this study are representative of the common assumptions and quirks within the vocational approach and within the learning/achievement approach to interest psychology. Thus, finding that the measures converged and diverged as expected suggests that some conflicting assumptions about the nature of interest – such as whether interest is best conceptualized as having components (e.g., value and affect for a domain) or being more unitary in nature (e.g., preference for a domain), or whether measuring interest is best accomplished by focusing on aspects of the domain (e.g., designing learning activities, interacting with students) or the overall domain (e.g., Teaching) – should not discourage the cross-germination of the interest literatures. Instead, other features of interest should be relied upon to link interest literatures.

These important features include the person/object (or class of objects such as a domain) relationship, the level of the object generality (e.g., a specific object, a narrow domain of objects, a more general domain of objects), and the time component of interest allowing distinction between trait and state forms of interest. Findings from this study support the idea that the object (i.e., task, activity) is the organizing principle for interest, demonstrated visually in Figure A3. Further, clustering the trait interest measures in a step-by-step analysis method (see Figure A4) resulted in clearly defined objects/domains of Finance, Life Science, and Teaching. Further, the compositions of clusters were similar; each cluster contained a measure of value for domain activities, a measure of preference for domain activities, and a measure of affect for and valuing of the overall domain. There were no clustering patterns suggesting that other aspects of interest (e.g., interest components such as affect, value) were as important in defining the interests.

To further explore opportunities to link the interest literatures, this study examined whether interest as measured by one approach could predict the outcomes found within the
second approach. In the present study, trait interest (Teaching) measured by the vocational perspective predicted the same situational process variables of state interest and task engagement (in reading a teaching-related article) that trait interests measured by the learning/achievement perspective predict. Further, choosing to persist in the reading task was significantly related to trait interest in Teaching. The reasons for persisting further indicated that for most participants, interest was influential in their decision to finish the first reading task or begin a new one.

Finding that vocational trait interests predict situational outcomes is important for two reasons. First, vocational interest research that examines outcomes tends to focus on aggregated outcome measures, such as successful matches between persons and environments (e.g., college major, job, etc.) and overall performance (e.g., GPA, job performance). Prior to this study, there has been no clear examination within the vocational approach of trait interests predicting situational variables such as motivation, task engagement, and task performance. Secondly, findings within this study illustrated some of the mechanisms by which trait interests from the vocational perspective impact the degree of engagement in tasks. Trait interest in Teaching predicted both the experience of interest as well as how engaged participants became in the reading task. However, the state interest variable mediated the affect of trait interest on task engagement. The enduring, characteristic nature of trait interest acted on the situational process variable of task involvement by affecting the expression of the state form of interest. This finding is consistent with other state-trait research. For example, people with high trait anxiety are predisposed to experience anxiety when compared to their peers which influences how they engage in tasks when their anxiety is aroused (Spielberger, 1999). People high in trait anxiety are also likely to have greater state anxiety when state anxiety is evoked. Similarly, research investigating road rage has found that people high in trait anger are more likely to experience
state anger (and at greater intensities), which leads to increased engagement in risky behaviors and aggression (Deffenbacher, Lynch, Oetting, & Yingling, 2001). In another research example, the quality of interpersonal exchanges was predicted by the state form of interpersonal trust, and the state form was predicted by the trait forms of interpersonal trust (Fleeson & Leicht, 2006).

Similarly, people with high trait interest in a particular domain are predisposed to experience state interest in the domain and to experience greater state interest than people with low trait interest. The higher frequency of and intensity in state interest affects how people engage in tasks, resulting in greater task engagement.

In this study, trait interest in Teaching and persisting in the reading task were related; this finding is consistent with prior research (e.g., Ainley, Hidi, et al., 2002) and theory (e.g., Hidi & Renninger, 2006; Silvia, 2006). However, the relationship demonstrated in this study showed something new by linking a vocational trait interest measure with persistence measured within a situation; prior studies have linked vocational interests (or congruence between vocational interests and environment) with persistence measured over a longer period, such as persisting with a college major or graduating from college (e.g., Tracey & Robbins, 2006). The large effect size of the trait interest – task persistence relationship found in this study provided an indication of the importance of this relationship. Moreover, trait interest continued to predicted persistence when controlling for gender and domain knowledge.

The situational process variables of state interest and task involvement were also related to persisting in the reading task. Including these situational process variables into the prediction of task persistence – so that the full model of state interest, task involvement, trait interest, domain knowledge, and gender was used – increased the hit rate and explained significantly more variability in the model. Furthermore, examining the relative contributions of trait interest,
state interest, and task involvement within the full model revealed that the trait interest variable no longer significantly added to the odds of task persistence. This demonstrated that the impact of trait interest on task persistence is explained through the process variables, especially state interest.

Somewhat unexpected was the small effect between trait interest in Teaching and recall of main ideas of the article, given that recent research has found links between trait interest and task performance (Durik & Harackiewicz, 2007). However, some interest researchers suggest that the influence interest has on task performance is indirect, acting through variables such as task involvement, task persistence, and depth of processing (e.g., Schiefele, 1999; Silva, 2006). Consistent with this understanding of the interest-performance relationship, this study found that task involvement significantly increased the odds that participants would recall all ideas from the reading. Furthermore, the relationship, albeit complex, found in this study between trait interest and task involvement – i.e., trait interest predicts task involvement through state interest – supports this explanation of the interest-performance relationship.

In addition to theoretical explanations for the small trait interest-recall effect size, the measurement of recall in this study was limited. The relationship between trait interest and recall is likely to be impacted by a wide range of individual and situational variables, so to better assess the effect of trait interest it would be necessary to develop a more sensitive and fully developed measure of information recall. But even with the limitations in this study, the results linking trait interest to task involvement suggest that trait interest is likely to have some role in information recall and task performance more generally.

Of note are the characteristics specific to this sample. Consistent with a large percentage of research in both vocational and learning perspectives on interest, this study examined interest
in college students. In addition, approximately half of the college students in this sample were likely to be enrolled in an education major or minor, so would likely have had at least moderate levels of trait interest in teaching as well as some prior experience with teaching or tutoring. Thus, the mean levels of trait interest in teaching may have been somewhat elevated if compared to a broader sample of college students. While slightly elevated Teaching trait interests could conceivably affect the correlations between trait interests, this does not appear to be the case. The pattern of correlations is largely consistent with relationships expected between teaching, life science, and finance (e.g., Liao et al., 2008). In addition, it is unlikely that slight elevations in Teaching trait interest would impact analyses and conclusions related to the impact of trait interest on outcomes (e.g., state interest, task persistence, etc.) given that the function of this trait interest was of primary importance in the study. By controlling for domain knowledge in teaching in regressions, I also accounted for differing levels of background experience that may have been present.

Findings showed that within this sample, trait interests are trait interests whether measured from a vocational perspective or learning and achievement perspective. This statement is based on the assumption that the fundamental features of trait interest (e.g., object, level of generality, and temporal status) are clearly established. To appropriately compare interest findings, these fundamental features of interest must first be established; in other words, one must explicitly note the object and its level of generality as well as the relative duration of the interest (e.g., state, trait). Unless comparisons of interest research first confirm that these fundamental features are established, conclusions are unlikely to benefit from the substantial knowledge of interest structure and outcomes within the two traditions of studying interest.
Results of this study suggest that the vocational and learning/achievement perspectives are indeed studying the same underlying variables and that findings from each study can be extended to the other. In this sense, this research provides an important milestone in creating a more cohesive psychology of interest. It remains for future studies to establish additional markers to extend these findings to other important populations.
References


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Footnotes

1 Reviews of interest theory (e.g., Krapp, Hidi, & Renninger, 1992; Pintrich & Schunk, 2002; Savickas, 1999; Schraw & Lehman, 2001; Silvia, 2006) note that interest has also been described with three or more subtypes. For example, interest could refer to an individual’s disposition regarding some object, specific characteristics of an object or context, as a situational experience, as an individual’s attention to some object, or as someone’s evaluation of the importance of some object. However, all reviews emphasize the state/trait distinctions of interest as fundamental – other proposed subtypes generally divide one (or both) of these categories (e.g., Schraw & Lehman, 2001) or neglect the interaction between a person and an object. Therefore, it seems reasonable and consistent with the bulk of previous discussion of interest to use state and trait interest as the basic division.

2 Low and Rounds (2007) stress the role of the person-environment fit, suggesting that interest development is “an iterative process of increasing fit between the person and environment” as people select social groups and types of tasks that are consistent with their dispositions and preferences (p. 32).

3 Although the developmental process is affected by “individual experience, temperament, and genetic predisposition” (Hidi & Renninger, 2006, p. 112), the theoretical and empirical focus within educational research is on how interest is learned and encouraged.

4 Interest development, as explained by the four-phase theory of interest development, is a dynamic process. The four phase process implies the progression toward increasingly defined trait interests, but it is also hypothesizes that any form of interest can regress or even become inoperative if there is no external support (Hidi & Renninger, 2006).
Appendix A

Figures

Figure A1. Interest- persistence model, showing hypothesized model of relations between domain-specific variables trait interest, state interest, task engagement, and task persistence.
Figure A2. Interest-performance model, showing hypothesized model of relations between domain-specific variables trait interest, state interest, task engagement, and task performance.
Figure A3. Multidimensional scaling analysis results.
Figure A4. Complete linkage cluster analysis results.
Appendix B

Tables

Table B1

*Means, Standard Deviations, Reliabilities, and Gender Effect Size*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Alpha</th>
<th>Gender effect $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait interest (BIM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>35.50</td>
<td>11.64</td>
<td>.96</td>
<td>-.65</td>
</tr>
<tr>
<td>Life Science</td>
<td>24.82</td>
<td>7.96</td>
<td>.90</td>
<td>-.23</td>
</tr>
<tr>
<td>Teaching</td>
<td>35.52</td>
<td>7.01</td>
<td>.87</td>
<td>.41</td>
</tr>
<tr>
<td>Trait interest (BIM-V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>40.98</td>
<td>10.88</td>
<td>.95</td>
<td>-.31</td>
</tr>
<tr>
<td>Life Science</td>
<td>23.76</td>
<td>8.26</td>
<td>.93</td>
<td>-.12</td>
</tr>
<tr>
<td>Teaching</td>
<td>36.17</td>
<td>8.39</td>
<td>.93</td>
<td>.31</td>
</tr>
<tr>
<td>Trait interest (II)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finance</td>
<td>34.69</td>
<td>14.78</td>
<td>.96</td>
<td>-.56</td>
</tr>
<tr>
<td>Life Science</td>
<td>42.95</td>
<td>14.53</td>
<td>.95</td>
<td>-.04</td>
</tr>
<tr>
<td>Teaching</td>
<td>53.35</td>
<td>13.88</td>
<td>.94</td>
<td>.33</td>
</tr>
</tbody>
</table>

Note. Negative $d$ values indicate higher mean score for male participants, positive $d$ values indicate higher mean score for female participants.
Table B2

*MTMM Correlation Matrix*

<table>
<thead>
<tr>
<th>BIM scales</th>
<th>BIM-V scales</th>
<th>II scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance</td>
<td>Life science</td>
<td>Teaching</td>
</tr>
<tr>
<td>Life science</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>-.21</td>
<td>.06</td>
</tr>
<tr>
<td>Finance</td>
<td>.75</td>
<td>.13</td>
</tr>
<tr>
<td>Life science</td>
<td>.00</td>
<td>.71</td>
</tr>
<tr>
<td>Teaching</td>
<td>-.23</td>
<td>.10</td>
</tr>
<tr>
<td>Finance</td>
<td>.85</td>
<td>.04</td>
</tr>
<tr>
<td>Life science</td>
<td>-.11</td>
<td>.66</td>
</tr>
<tr>
<td>Teaching</td>
<td>-.33</td>
<td>-.02</td>
</tr>
</tbody>
</table>

Note. Validity/Monotrait-heteromethod correlations are underlined. Correlations ≥ .15 are significant at the .05 level. Correlations ≥ .19 are significant at the .01 level.
### Table B3

*Trait Interest in Teaching and Situational Variables: Means, Standard Deviations, Reliabilities, and Correlations*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Alpha</th>
<th>Knowledge</th>
<th>Gender</th>
<th>Trait interest/BIM</th>
<th>Trait interest/BIM-V</th>
<th>Trait interest/II</th>
<th>State interest</th>
<th>Task involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain Knowledge</td>
<td>42.37</td>
<td>10.90</td>
<td>.88</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Gender</td>
<td>0.60</td>
<td>0.49</td>
<td>.21</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Trait interest/BIM</td>
<td>35.52</td>
<td>7.01</td>
<td>.87</td>
<td>.65</td>
<td>.20</td>
<td>1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Trait interest/BIM-V</td>
<td>36.17</td>
<td>8.39</td>
<td>.93</td>
<td>.69</td>
<td>.15</td>
<td>.82</td>
<td>1</td>
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<tr>
<td>Trait interest/II</td>
<td>53.35</td>
<td>13.88</td>
<td>.94</td>
<td>.68</td>
<td>.17</td>
<td>.79</td>
<td>.73</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>State interest</td>
<td>41.64</td>
<td>9.98</td>
<td>.92</td>
<td>.43</td>
<td>.12</td>
<td>.59</td>
<td>.56</td>
<td>.59</td>
<td>.59</td>
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<tr>
<td>Task involvement</td>
<td>15.75</td>
<td>5.37</td>
<td>.85</td>
<td>.18</td>
<td>-.02</td>
<td>.35</td>
<td>.29</td>
<td>.31</td>
<td>.66</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note.* Correlations ≥ .15 are significant at the .05 level. Correlations ≥ .19 are significant at the .01 level. Gender: Males, 0; Females, 1.
Table B4

*State Interest Regression*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>11.52</td>
<td>3.19</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.02</td>
<td>1.28</td>
<td>0.00</td>
</tr>
<tr>
<td>Domain knowledge</td>
<td>0.08</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Teaching/BIM</td>
<td>0.76</td>
<td>0.12</td>
<td>0.53*</td>
</tr>
</tbody>
</table>

Note. $R^2 = .34$.

* $p < .001$

Gender: Males, 0; Females, 1.
Table B5

*Task Involvement Hierarchical Regression*

<table>
<thead>
<tr>
<th>Variable</th>
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<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
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<td></td>
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<tr>
<td>(Constant)</td>
<td>6.65</td>
<td>1.98</td>
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<tr>
<td>Gender</td>
<td>-0.99</td>
<td>0.79</td>
<td>-0.09</td>
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<tr>
<td>Domain knowledge</td>
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<td>0.05</td>
<td>-0.07</td>
</tr>
<tr>
<td>Teaching/BIM</td>
<td>0.31</td>
<td>0.07</td>
<td>0.41*</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.22</td>
<td>1.62</td>
<td></td>
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<tr>
<td>Gender</td>
<td>-1.00</td>
<td>0.62</td>
<td>-0.09</td>
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<tr>
<td>Domain knowledge</td>
<td>-0.06</td>
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<td>-0.13</td>
</tr>
<tr>
<td>Teaching/BIM</td>
<td>0.02</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>State interest</td>
<td>0.38</td>
<td>0.04</td>
<td>0.71*</td>
</tr>
</tbody>
</table>

Note. Step 1 $R^2 = .12$. $\Delta R^2$ for Step 2 = .33 ($p < .001$).
* $p < .001$

Gender: Males, 0; Females, 1.
Table B6

*Task Persistence Logistic Regression, 5 Term Model*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
<th>p</th>
<th>$e^\beta$ (odds ratio)</th>
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<tbody>
<tr>
<td>(Constant)</td>
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<td>1.686</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-.534</td>
<td>.438</td>
<td>1.489</td>
<td>1</td>
<td>.222</td>
<td>.586</td>
</tr>
<tr>
<td>Domain knowledge</td>
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<td>.024</td>
<td>1.013</td>
<td>1</td>
<td>.314</td>
<td>.976</td>
</tr>
<tr>
<td>Teaching/BIM</td>
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<td>.047</td>
<td>2.675</td>
<td>1</td>
<td>.102</td>
<td>1.079</td>
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<tr>
<td>State interest</td>
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<td>.037</td>
<td>16.488</td>
<td>1</td>
<td>.000</td>
<td>1.164</td>
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<tr>
<td>Task involvement</td>
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<td>.053</td>
<td>5.625</td>
<td>1</td>
<td>.018</td>
<td>1.134</td>
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</tbody>
</table>

Note. Reference category of criterion: Stopping article (i.e., not persisting). 
Reference category of gender variable: Males. 
Background knowledge, Teaching/BIM, State Interest, and Task involvement scales are based on total scale score. 
Model evaluation: fit: $\chi^2(5) = 100.1$, $p < .001$; Hosmer and Lemeshow chi-square = 7.663, $p = .467$. 
$R^2$ analogies: Cox and Snell $R^2 = .428$. Nagelkerke $R^2 = .571$. 

**Table B7**

*Recall Logistic Regression, 5 Term Model*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>$e^\hat{B}$ (odds ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-2.290</td>
<td>.932</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.213</td>
<td>.329</td>
<td>.419</td>
<td>1</td>
<td>.518</td>
<td>1.237</td>
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<tr>
<td>Domain knowledge</td>
<td>.014</td>
<td>.017</td>
<td>.647</td>
<td>1</td>
<td>.421</td>
<td>1.014</td>
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<tr>
<td>Teaching/BIM</td>
<td>-.011</td>
<td>.033</td>
<td>.113</td>
<td>1</td>
<td>.737</td>
<td>.989</td>
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<tr>
<td>State interest</td>
<td>.012</td>
<td>.025</td>
<td>.248</td>
<td>1</td>
<td>.619</td>
<td>1.012</td>
</tr>
<tr>
<td>Task involvement</td>
<td>.082</td>
<td>.040</td>
<td>4.252</td>
<td>1</td>
<td>.039</td>
<td>1.086</td>
</tr>
</tbody>
</table>

Note. Reference category of criterion: Stopping article (i.e., not persisting).
Reference category of gender variable: Males.
Background knowledge, Teaching/BIM, State Interest, and Task involvement scales are based on total scale score.
Model evaluation: fit: $\chi^2(5) = 12.9$, $p < .05$. Hosmer and Lemeshow chi-square = 369, $p = .497$.
$R^2$ analogies: Cox and Snell $R^2 = .069$. Nagelkerke $R^2 = .093$. 
Appendix C

Scale Directions and Items

**BIM scales: Directions and items**

The activities listed below relate to different kinds of careers or occupations. Please indicate how much you would like to do each activity by circling the number that most closely represents how you feel about it.

**Finance/BIM Items**

Evaluate the quality of an investment

Arrange business loans

Provide advice about investments

Understand economics principles

Analyze financial information

Project future expenditure

Understand the role of finance in business

Work with financial data

Study how to generate business profits

Create a budget

Analyze a person’s credit history

Learn about money management

**Life Science/BIM**

Dissect an animal

Study the diet of an animal species
Collect plant samples
Identify and classify bacteria
Investigate human gene structure
Study how plants grow
Track the migratory patterns of birds
Conduct research with growing bacteria
Learn about the life cycle of an animal species
Breed animals in a laboratory

**Teaching/BIM**

Create an effective classroom atmosphere
Interact with students in a classroom setting
Supervise high school students’ research projects
Develop a lecture
Conduct seminars
Design tests to evaluate students' learning
Design an active learning activity
Offer feedback on student papers
Facilitate students’ discussions
Take a teacher development workshop
BIM-Value scales: Directions and items

The activities listed below relate to different kinds of careers or occupations. Please circle the number that most closely represents how much you value each topic or activity.

Finance/BIM-V

Generating business profits
Creating a budget
Analyzing financial information
Arranging business loans
Money management
Projecting/estimating future expenditure
Evaluating the quality of an investment
Economic principles
Working with financial data
The role of finance in business
Investing
Analyzing a person’s credit history

Life Science/BIM-V

Breeding animals in a laboratory
Research with growing bacteria
How plants grow
Dissecting an animal
Migratory patterns of birds
Human gene structure
Identifying or classifying bacteria
The diet of an animal species
Identifying plant samples
The life cycle of an animal species

**Teaching/BIM-V**

Conducting seminars
Facilitating students’ discussions
Designing an active learning activity
Evaluating student papers
Developing a lecture
How to interact with younger students in a classroom setting
Designing tests to evaluate students' learning
Supervising high school students’ research projects
Creating an effective classroom atmosphere
Teacher development
Individual interest scales: Directions and items

The following statements represent how some people might feel about activities, fields of study, or kinds of jobs. Please indicate how true each statement is for you by circling the appropriate number.

Finance/II

The field of Finance is interesting to me.

Finance just doesn't appeal to me.

I've always been bored by the field of Finance.

I'm interested in taking finance courses.

I would probably enjoy majoring in Finance.

I would like to learn more about the field of Finance.

I like reading or discussing topics related to Finance.

It would be worthwhile to know about financial principles.

I think the field of Finance is an important discipline.

Life Science/II

Life science (e.g., biology, zoology, botany, microbiology, entomology, genetics) has always intrigued me.

In general, life science doesn't appeal to me.

Overall, I'm interested in life science.

I would like to take life science courses.

It is fun to discuss life science.

I would like to know more about the life sciences.

Science experiments are cool.
It is worthwhile to study the life sciences.
The life sciences are valuable fields.
I think life sciences are important fields.

**Teaching/II**

I think Teaching would be boring.
Teaching does not appeal to me.
I think Teaching would be enjoyable.
I've always been interested in Teaching.
I would like helping people to learn new things.
I would be really excited to take a class on Teaching.
I like discussions about effective Teaching.
I think Teaching is an important profession.
Teaching is a meaningful field.
I would appreciate a class on Teaching.
Domain knowledge – teaching: Directions and items

The activities listed below relate to different kinds of careers or occupations. Please circle the number that most closely represents how much you know about each activity/topic.

Designing tests to evaluate students' learning
Facilitating students’ discussions
Creating an effective classroom atmosphere
Teacher development
How to interact with younger students in a classroom setting
Conducting seminars
Supervising high school students’ research projects
Developing a lecture
Evaluating student papers
Designing an active learning activity

Please rate your overall knowledge about the topics below by circling the appropriate number.

I know ___ about Teaching.
State interest: Directions and items

Please read each statement below and circle the number that is closest to how you feel about the paragraphs you just read. DO NOT TURN BACK TO THE READING.

I like what I read.

The excerpt really seemed to drag on.

I don’t like the excerpt very much.

I enjoyed the article excerpt.

The excerpt wasn't very interesting.

I think what I read is important.

I think the article has useful information for me to know.

I found the content of the article personally meaningful.

I see how I could apply what I read.
Task involvement: Directions and items

Please read each statement below and circle the number that is closest to what you experienced while reading the first half of the article.

I got really caught up in the article.

I was distracted while reading the article.

I was focused on the article while I was reading it.

I was thinking about other things while reading the article.
Recall: Directions and items

Without turning back to the article, read each item below and circle the choice that best completes or answers the item based on what you remember. Please do NOT check your answers with the reading.

1. According to the research cited in the article, many students begin middle school and even high school lacking:
   (a) exposure to technological advances and academic environments that enhance comprehension skills.
   (b) the learning strategies needed for studying social studies and language arts.
   (c) the background knowledge, personal motivation, and ability to understand written material.

2. In the article, “Qatar” stands for:
   (a) Questioning, Analyzing, and Reflecting
   (b) Questioning the Author
   (c) Question, Test, Report

3. Choose the option that best completes this quote from the article you just read. "One way teachers can support improved reading comprehension is to introduce and model approaches that…"
   (a) "encourage interaction with the text."
   (b) "emphasize the practical value of strong reading skills."
   (c) "create a positive self-image in students."