



Impact of Cognitive, Psychosocial, and Career Factors on Educational and Workplace Success

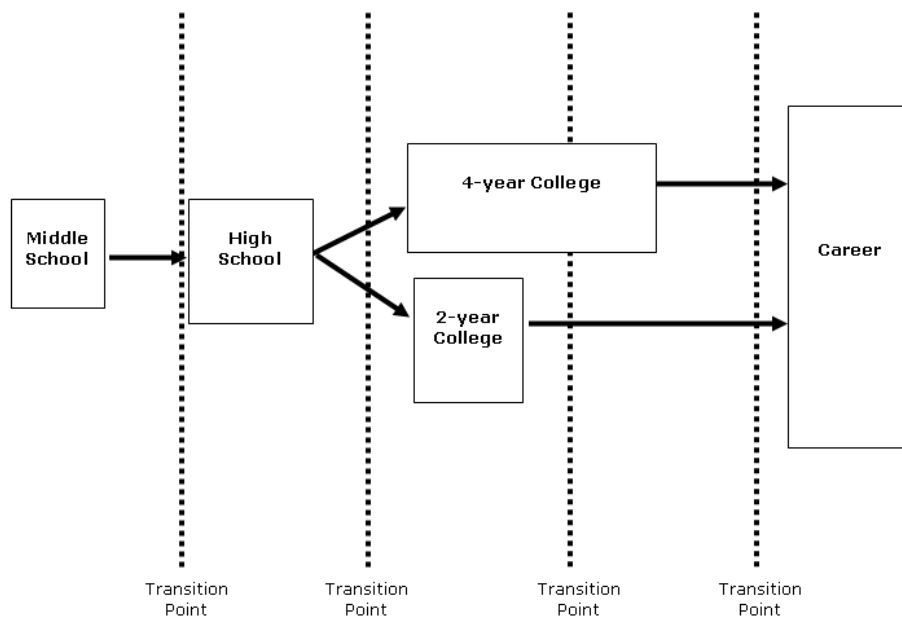
Postsecondary and work success is central to the economic and social well-being of our country. Fundamentally, college success is measured by persistence to degree attainment. Analogously, work success refers to effective performance of a job's required tasks. To succeed in college, one must be ready for college. A student who is ready for college is prepared to enter a credit-bearing college course with a high likelihood of obtaining a grade of C or better in the course. Similarly, a student who is ready for workforce training is prepared to learn from training program materials and complete training and/or certification requirements.

Of course, college and work success require more than task mastery. For example, the low retention and degree attainment rates we observe at U.S. postsecondary institutions affirm the importance of persistence and commitment. Likewise, general work attitudes and conduct, such as diligence on the job, persistence to task completion, cooperation, teamwork, and rule compliance, are frequently noted as critical behaviors expected by employers.

How we educate and train our youth to be successful postsecondary students and workers is one of the most critical questions of our time. We cannot compete globally without a high percentage of our citizens succeeding in college and in the workplace. What are the key factors of college and work readiness?

Figure 1 depicts some of the critical transition points across grades 6 through 16 and work.

Figure 1: Critical Transition Points across Grades 6–16 and Work



The key underlying constructs associated with readiness and success are: *cognitive development*, as measured by academic learning and achievement; *psychosocial development*, as measured by motivation, and self-regulatory and social engagement constructs; and *career development*, as reflected in an ability to engage in exploration and crystallization and make effective choices. We believe that these three constructs are essential to readiness and success as they reflect subject-matter mastery, general work attitude, and effective career-decisionmaking, respectively.

This tripartite distinction is common in the psychological research literature. Industrial-Organizational (I/O) psychologists have examined how cognitive, psychosocial, and career-interest fit factors incrementally predict work and work-training success:

- Most I/O psychologists believe that cognitive abilities provide most of the explanation for understanding work-task or performance and training outcomes (Schmidt & Hunter, 1998).
- They also believe that psychosocial factors influence work-task and organizational-citizenship behaviors in different ways, whereas the degree of career-interest fit influences work commitment and satisfaction.
- In the psychosocial research literature, Ackerman and Heggstad (1997) addressed the degree to which intellectual ability, psychosocial factors, and career interests overlap.

Scholars may disagree about the extent of overlap among the three factors. The important point, though, is that they have been shown to be conceptually and empirically distinct.

The traits associated with each construct vary by developmental milestone and criterion:

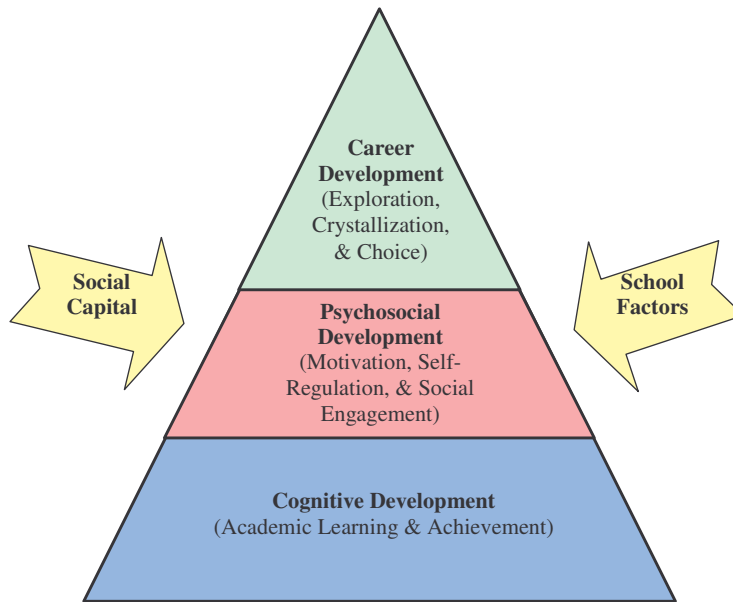
- In the cognitive domain, we know that there is a linear progression to reaching the ACT College Readiness Benchmarks in core subject matter. Numerous studies highlight the progression to college success when students take a rigorous core curriculum (cf. ACT, 2006).
- In the psychosocial domain, the relevant indicators vary with age. Conduct and homework compliance are important for understanding academic performance and mastery as students transition to high school. Motivational factors, such as academic discipline and commitment to college, are important for predicting college success.
- As with psychosocial factors, the relevant career factors vary with age. We know that career-interest exploration is critical in middle school, whereas interest-crystallization is critical during the transition from high school to college. Furthermore, we know that the greater the congruence between a person's college major and career on the one hand, and their measured values and interests on the other, the more likely that person is to persist in college and achieve work success and satisfaction (cf. Neumann, Olitsky, & Robbins, 2007).

We believe that the cognitive skills acquired through academic learning and achievement are foundational and required for success throughout one's school and work career. Some general attitudes and behaviors can help. Likewise, thoughtful postsecondary and work-based choices that match a person's career interests and values help contribute to sustained effort and satisfaction.

We highlight this model in the ACT Pyramid for Success (Figure 2). The pyramid exists within two influential contexts: social capital and school factors. Social capital is defined as the resources gained from relationships with individuals (such as parents or significant role models) or institutions (such as clubs, religious groups, or after-school programs) (Eatwell, Milgate, & Newman, 1990). These relationships help students to develop norms and values and to create and take advantage of opportunities (Wimberly, 2000). Without exposure to positive role models and to ideas about what it means to be successful in school and work, students are at a significant disadvantage in forming and executing plans.

School factors here refer to rigorous curricula, high expectations for college readiness, and contacts with colleges and businesses (McDonough, 1997). Together, the two contexts represent the availability of outside resources that promote learning, set appropriate expectations for success, and provide informal and formal exposure to postsecondary and work settings. Wimberly (2002) found that disadvantaged students exposed to formal and informal role models aspired to and achieved higher career and college goals, suggesting that the top section of the pyramid is especially relevant to students at risk.

Figure 2: ACT Pyramid for Success



Personality and Career Development

The prevailing taxonomy of personality- and behavior-based attributes in the psychological literature is called the Big 5 Theory, derived from a combination of empirical and experimental biopsychology research. The theory is based on five underlying constructs that are constant across culture and time. The Big 5 traits consistently emerge from research regardless of the test battery used or the age or culture of the subjects. Table 1 lists the Big 5 constructs along with their definitions, and shows multiple indicators for each underlying trait. These indicators are observable and are amenable to change.

Table 1: Salient Personality Constructs, by Developmental Milestone

Big 5 Construct	Middle & High School	College	Work
Conscientiousness Ability to conduct task- and goal-directed behavior, including following norms and rules, planning, organizing, and prioritizing tasks	Academic discipline ^a Thinking before acting ^b Commitment to school ^a Orderly conduct ^b	Academic discipline ^a General determination ^a Commitment to college ^a Study skills Goal striving ^{a,b}	Discipline ^a Carefulness ^a Order ^a Striving ^{a,b} Attitude toward work ^{a,b,c} Safety ^{a,b}
Extraversion An energetic approach to the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality	Optimism ^b	Social connection ^c Social activity ^c Relating w/ School Personnel ^c	Sociability ^c Influence ^c
Emotional Stability Ability to problem solve and manage stress without seeing the world as threatening	Anger management ^b Orderly conduct ^b Optimism ^b	Emotional control ^b Academic self-confidence ^b	Stability ^b Optimism ^b Attitude toward work ^{a,b,c} Safety ^{a,b}
Agreeableness Pro-social and communal orientation toward others including trust and modesty		Communication skills ^c	Goodwill ^c Cooperation ^c Attitude toward work ^{a,b, c}
Openness The breadth, depth, originality and complexity of an individual's mental and experiential life			Creativity Savvy

^a Taps a broad Motivation Construct; ^b Taps a broad Self-Regulation construct; ^c Taps a broad Social Engagement construct

Interestingly, personality attributes have little relationship with measures of cognitive achievement, and their effects are mostly independent of one another. Hence, they can be combined with measures of cognitive achievement when predicting college and work outcomes, resulting in improved prediction. This point is highlighted in Table 2, which reports the correlations among general mental ability and emotional stability and conscientiousness. We see the same small associations with more specific cognitive measures of reading and mathematics ability. Although these constructs are independent, a large body of research in educational psychology clearly demonstrates a connection between motivation and academic performance. However, little research has examined their causal linkage or their mutual association with the underlying trait of conscientiousness.

Table 2: Relative Importance of Cognitive and Psychosocial Tests on Training and Work Outcomes

	Training Outcomes	Work Performance
General Mental Ability	.54*	.62**
Math	.48*	.52**
Reading	.44*	.35**
Conscientiousness	.17***	.22***
Emotional Stability	.10***	.11***

* Brown, Le, & Schmidt (2006). **Salgado et al. (2003). *** From Schmidt et al. (2007) using indirect range restriction.

An alternative model to the Big 5 was developed by ACT researchers (cf. Robbins et al., 2004; Le et al., 2005), who identified three broad psychosocial factors associated with some combination of academic performance and persistence. Using both meta-analytic and scale development and validation strategies, they found that specific psychosocial and behavioral attributes in what they labeled the *motivational*, *self-regulation*, and *social engagement* constructs were most predictive of postsecondary success. Several of the scales developed to measure these three constructs are included in Table 1: conscientiousness (e.g., academic discipline, general determination), self-regulation (e.g., emotional control, academic self-confidence, and orderly conduct), and social engagement or extraversion (e.g., social connection, social activity, and sociability).

We view vocational interests and career development as separate from personality or psychosocial development, though Ackerman and Heggstad (1997) suggest that there is some overlap in constructs. John Holland (1959), who was vice president of research at ACT in the 1960s, created a hexagonal model of career interests and argued that the degree to which an individual’s interest profile “fit” their environment (i.e., career or field of study) influenced the person’s level of satisfaction and productivity at work or school. This notion of “person-by-environment fit” was also detailed extensively by Dawes and his colleagues (1984) in *A Psychological Theory of Work Adjustment*, which argues that a combination of ability and personality are required for work satisfaction from both the individual’s and the employer’s perspective.

Within a career-development context, we assume that younger students will explore their career interests and values throughout their school career so that they will crystallize by 12th grade. The goal, then, is to maximize person-by-environment fit by encouraging students to choose college majors and occupational paths that are commensurate with their interests and academic strengths.

Our ability to track the academic and career development of students into college and work

ACT assesses academic achievement across English, Mathematics, Reading, and Science. As part of the ACT Educational Planning and Assessment System

