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Beyond Content: Incorporating Social and Emotional Learning into the StriveTogether Framework

Volume I: Social and Emotional Competencies and their Relationship to Academic Achievement

August, 2013





Every child. Cradle to career.

A Letter from the StriveTogether Task Force on Measuring Social and Emotional Learning

Mainstream education has traditionally put an emphasis on mastery of core academic content, particularly since the inception of “No Child Left Behind.” However, emerging research is demonstrating that other, non-content competencies are important to success in school and career. The StriveTogether Network is focused on supporting this full range of competencies in our communities.

Recognizing a connection between building social emotional competencies and academic success, and hearing much interest in the subject within the Network, the StriveTogether Cradle to Career Network launched, early this year, the *Task Force on Measuring Social and Emotional Learning* comprised of representatives from the Network as well as experts in the field. Our charge was to:

- Determine a menu of social and emotional competencies that are well related to achievement, are malleable, and that cradle-to-career partnerships can track and measure as part of their work
- Identify a set of scalable measures / assessments of these competencies

To accomplish these goals, Philliber Research Associates was engaged to study this complex and emerging field, and identify competencies and measures that met criteria decided upon by the Task Force, which placed an emphasis on improvement of student achievement.

The Task Force on Measuring Social and Emotional Learning is very pleased to offer this report entitled ***Beyond Content: Incorporating Social and Emotional Learning into the StriveTogether Framework*** which fulfills the objectives identified above. This report has been developed to serve as a resource to the Network, helping guide its membership of cross-sector education partnerships as they identify competencies upon which to focus and to measure.

The Task Force’s approach to this research has taken into account the unique context of the Cradle to Career Network, specifically the nature of a *cross-sector* and *data-driven* method of improvement in which communities come together around an agreed-upon set of outcomes and data they want to improve. (see www.strivetgether.org for more information on the StriveTogether approach to improving student achievement.) Thus, throughout the research review, the emphasis was placed on identification of competencies and measurement of these competencies versus identifying best practice interventions. There is certainly value in understanding what is working in terms of building these social and emotional competencies, which lead to improved academics, but as cradle-to-career

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communities know, often the solutions exist in their own backyards. So, a critical first step is understanding what to measure and what the data are telling them before identifying solutions. Still, we have taken care to include competencies that are, in fact, malleable so that communities can find strategies to enhance these among their young people, should they choose to do so.

Organized into three volumes – Volume I identifying and defining competencies that are clearly related to academic achievement and are malleable, Volume II summarizing available measures in the context of the cradle-to-career continuum, and Volume III offering a compendium of assessment tools – this report serves as a foundational resource for cradle-to-career partnerships as they explore this emerging field. We hope that this report will also serve as a resource to the broader field, and that national organizations and foundations with an interest in “beyond content” learning will build upon this base as they seek to make advancements in academic achievement. We look forward to partnering in that endeavor as we know this is only the beginning of this important work.

Finally, the Task Force extends heartfelt thanks to Philliber Research Associates for their excellent work and, more importantly, their flexibility as we found our path on this part of our Roadmap. The Task Force also wishes to thank our working group who did the heavy lifting on reviewing materials and providing feedback – your dedication is much appreciated and has been invaluable to this report.

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Social-Emotional Learning: An Introduction

This is Volume I of the three volumes created to assist StriveTogether communities in understanding, choosing, and measuring social-emotional competencies along the cradle to career continuum.

These volumes are entitled:

Beyond Content: Incorporating Social and Emotional Learning into the StriveTogether Framework

Volume I: Social and Emotional Competencies and their Relationship to Academic Achievement

Volume II: A Summary of Measures by Competency and Stage of the Cradle to Career Continuum

Volume III: A Compendium of Social and Emotional Competency Measures

In the past two decades, a substantial literature has accumulated to show that there are other factors that affect academic achievement besides content learning and memorization of subject material. Alternatively called socio-emotional competencies, socio-emotional learning (SEL), noncognitive factors, or 21st Century skills, this cluster of attitudes, abilities, and skills has now been shown to be directly and in the case of some of them, strongly related to student academic achievement.

In StriveTogether communities, where there is an intense focus on student progress, there is high interest in using the most effective strategies to achieve this important goal. These volumes is the result of an extensive literature review linking SEL with a solid research base that shows them to be related to academic achievement and demonstrates that they are malleable. This volume includes:

1. Definitions and conceptual background information on five key competencies meeting these criteria.
2. A discussion of the research on these competencies and their relationship to various indicators of academic achievement.
3. Lists of studies linking these competencies to the StriveTogether benchmark indicators of achievement across the cradle to career continuum.
4. An extensive bibliography on these competencies and the research that supports their value in academic achievement so that communities can learn more about incorporating them into their strategies for assisting students.

The Appendix to this volume also includes some information on two other competencies that may be of interest: critical thinking and creativity. These were not included in the main body of Volume I because of their more tenuous relationship to academic achievement.

This work has revealed several important things about our knowledge of SEL. First, while it is now quite clear that these competencies are important to student success, the definitions and categorization of these competencies lack clarity. Writers and researchers use the same words for competencies with somewhat different definitions and the same definitions are used for different concepts. This, in turn, leads to a vast number of measurement approaches. While we would not expect completely consistent usage, definitions, or measures for SEL, this field of study would profit by more consistency so that we could begin to accumulate more secure knowledge about the utility of each.

Secondly, not all of the competencies included here are non-cognitive and indeed, a recent piece by Conley (2013), argues that this label should be abandoned since all of these competencies include at least some cognitive processes. Rotherham and Willingham (2010) have argued that the label “21st Century Skills” is also inappropriate because these competencies are hardly new and have long been required for academic achievement to be maximized.

It is also clear that the competencies are not equally well-related to achievement, as we discuss in our reviews of each of the five we have chosen, and we are only beginning to understand how they are related to one another. For example, if a student possesses a high degree of academic self-efficacy, or belief in his/her ability to succeed in school tasks, that student is also likely to display high perseverance or grit on such tasks, since he/she expects to succeed.

Finally, while all of the competencies chosen here are indeed malleable across the cradle to career continuum, they are not all equally malleable and some require more intensive and earlier intervention than others. We yet have much to learn about how to maximize their acquisition.

Still, this review is being shared because SEL is clearly an additional strategy for StriveTogether communities to use in enhancing student achievement. We are hopeful that the Compendium provides StriveTogether communities with a resource for understanding, enhancing, and measuring their success in increasing achievement-related competencies among their young people.

The Competencies

1. Academic Self-Efficacy

Definition and Background

Self-efficacy was first defined by Bandura in 1977 as a person's belief in his or her ability to succeed in specific situations. Bandura said it was "the conviction that one can successfully execute the behavior required to produce the outcomes"(p. 79). Examples of similar concepts in the literature are academic self-concept, outcome expectations, confidence, perceived ability, and perceived control or perceived academic control.

Since the introduction of the concept, researchers have recognized that while a person may feel self-efficacious in one endeavor, he or she may feel incompetent in another; hence the emergence of very specific kinds of self-efficacy, including academic self-efficacy, math self-efficacy, writing self-efficacy and so on. Even within a concept like math self-efficacy, researchers might try to measure very specific domains over which a student feels confident such as division, quadratic equations, or completion of math assignments.

Relationship to Academic Achievement

Lennon (2010) has recently reviewed 26 studies of self-efficacy and its relationship to academic outcomes of various kinds, and before him Multon et al., (1991) summarized research through 1988. The Multon study finds relatively large effects of self-efficacy on both academic performance and academic persistence. Yet a third review by Pajares (1996) argues:

"...the empirical connection between self-efficacy and academic performances and achievement has by now been reasonably secured."(p. 536)

There is also literature from studies of college students. Robbins et al., contributed a meta-analysis of the relationship of several psychosocial and study skill factors to college outcomes, including academic self-efficacy. Academic self-efficacy was found to be one of the strongest predictors of college retention and GPA. Also on the college level, Chemers, Hu and Garcia (2001) found academic self-efficacy strongly related to performance and adjustment to college and Vuong, Brown-Welty and Tracz (2010) found self-efficacy positively related to both GPA and college persistence.

A meta-analysis of 20 years of research on self-efficacy and work performance also showed a strong relationship between these two variables (Stajkovic and Luthans, 1998).

Other findings from this research include:

- Specific measures, tightly linked to the tasks to be performed, yield better relationships between self-efficacy and academic performance than more generalized measures (Pajares, 1996).
- Relationships are stronger for high school and college students than for elementary school students (Lennon, 2010). That is not to say that academic self-efficacy is not related to achievement among elementary students since there are studies supporting this relationship (e.g., Liew et al., 2008).
- Experimental studies yield higher effect sizes than correlational studies.
- Efficacy can be thought of as a collective construct as well, so that teachers, schools, and even school districts can develop a sense of collective efficacy.
- Self-efficacy also seems to predict greater perseverance among students (Bandura, 1986).

This latter finding caused authors to suggest that when a student believes he/she will eventually succeed at a task, the student is less likely to give up prematurely and is likely to expend more effort on the task.

Malleability

Self-efficacy is malleable. Schunk and Pajares (2001) have discussed strategies to be used in infancy through childhood and adolescence that will provide children with a sense of their ability to succeed. Persuasive information is also helpful in building self-efficacy, as are opportunities for a child to succeed and receive feedback that he has done so. Modeling, goal setting, and performance feedback to raise self-efficacy for such tasks as reading and writing have also been shown to be effective (Schunk, 1989; Schunk and Zimmerman, 2007).

Several analyses in the workplace likewise suggest that several strategies will enhance self-efficacy and thus performance, including making sure a worker understands a task, providing training to perform a task, and providing information that improves understanding of various strategies for completing a task (Gist and Mitchell, 1992). Modeling, feedback and persuasion have all been recommended. Frequent feedback on performance tends to produce accurate judgments of self-efficacy. Many writers suggest that believing that a task can be accomplished leads to greater persistence and thus greater success.

Overall, there is a vast amount of data to show that academic self-efficacy and various other more specific self-efficacy constructs, such as math self-efficacy, are strongly related to achievement. Self-efficacy is malleable at all stages of the cradle to career continuum.

Academic Self-Efficacy: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Kindergarten Readiness			
Lennon (2010)	24 Self-Efficacy measures identified (Preschool, Elementary, Middle, and High School)	Multiple (Lit Review)	Self-Efficacy has been found to have an impact on academic performance and the studies reviewed indicate that it can be improved.
3rd or 4th grade literacy			
Lennon (2010)	24 Self-Efficacy measures identified (Preschool, Elementary, Middle, and High School)	Multiple (Lit Review)	Self-Efficacy has been found to have an impact on academic performance and the studies reviewed indicate that it can be improved.
Liew, McTigue, Barrois & Hughes (2008)	Perceived Competence Scale for Children (cognitive competence subscale used)	Recommends Promoting Alternative Thinking Strategies (PATHS)	For 1st, 2nd and 3rd graders, academic self-efficacy beliefs were positively correlated with reading and math test scores. The results indicate that for meeting the critical 3rd grade benchmark in reading, early effortful control is one of the pre-cursors to academic self-efficacy beliefs and to literacy achievement.
Multon, Brown, & Lent (1991)	Multiple (meta-analysis)	None	The results of the 36 study meta-analyses (including elementary, high school, and college students) revealed a positive and statistically significant relationship between self-efficacy beliefs and academic performance. Self-efficacy beliefs account for approximately 14% of the variance of students' academic performance, and 12% of their academic persistence.
Schunk & Swartz (1993)	Writing Self-Efficacy (5-item measure created by authors)	Students were randomly assigned to one of four conditions: product goal, process goal, process goal plus feedback, general goal.	For 4th and 5th graders, writing self-efficacy was highly predictive of writing skill and strategy use. As hypothesized, the students in the process goal plus feedback group outperformed all other students on post self-efficacy, writing skill, and strategy use.

Academic Self-Efficacy: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
8th grade math			
Fast et al. (2010)	Math Self-Efficacy (4-item scale adapted from Patterns of Adaptive Learning Scales)	None	For 4th, 5th and 6th graders, higher levels of math self-efficacy positively predicted math performance.
Lennon (2010)	24 Self-Efficacy measures identified (Preschool, Elementary, Middle, and High School)	Multiple (Lit Review)	Self-Efficacy has been found to have an impact on academic performance and the studies reviewed indicate that it can be improved.
Ramdass & Zimmerman (2008)	How sure do you feel in your capacity to complete this decimal division problem? (based on Bandura)	Students were randomly assigned to training or control group. Training group learned self-correcting strategies.	For 5th and 6th graders, self-efficacy significantly predicted math performance. Training in the use of self-correction strategies improved students' self-efficacy and mathematics performance.
Skaalvik & Skaalvik (2011)	Mathematics Self-Efficacy (created by authors)	None	For middle school and high school students, mathematics self-efficacy predicted subsequent end of year school grades over and above the prediction that could be made by prior achievement.
High School Graduation			
Lennon (2010)	24 Self-Efficacy measures identified (Preschool, Elementary, Middle, and High School)	Multiple (Lit Review)	Self-Efficacy has been found to have an impact on academic performance and the studies reviewed indicate that it can be improved.
Multon, Brown, & Lent (1991)	Multiple (meta-analysis)	None	The results of the 36 study meta-analyses (including elementary, high school, and college students) revealed a positive and statistically significant relationship between self-efficacy beliefs and academic performance. Self-efficacy beliefs account for approximately 14% of the variance of students' academic performance, and 12% of their academic persistence.
Skaalvik & Skaalvik (2011)	Mathematics Self-Efficacy (created by authors)	None	For middle school and high school students, mathematics self-efficacy predicted subsequent end of year school grades over and above the prediction that could be made by prior achievement.

Academic Self-Efficacy: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
College enrollment and completion			
Chemers, Hu, & Garcia (2001)	8-item Academic Self-Efficacy measure developed by authors	None	Academic Self-Efficacy was strongly related to academic performance (instructors narrative evaluation, no grades given) and commitment to remain in school.
Multon, Brown, & Lent (1991)	Multiple (meta-analysis)	None	The results of the 36 study meta-analyses (including Elementary, high school, and college students) revealed a positive and statistically significant relationship between self-efficacy beliefs and academic performance. Self-efficacy beliefs account for approximately 14% of the variance of students' academic performance, and 12% of their academic persistence.
Robbins et al. (2004)	Identified 5 measures (meta-analysis)	None	A meta-analyses of 109 studies found a moderate relationship between academic self-efficacy and college retention. The best predictor for college GPA (out of 9 broad constructs) was academic self-efficacy.
Vuong, Brown-Welty & Tracz (2010)	Online College Self-Efficacy Inventory	None	Findings show that Self-Efficacy beliefs affect GPA and persistence rates.
Career/workforce			
Stajkovic & Luthans (1998)	Multiple (meta-analysis)	None	The results of the 114 study meta-analyses indicate a significant correlation ($d = .82$) between Self-Efficacy and work performance, which represents a 28% gain in performance.

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2. Growth Mindset or Mastery Orientation

Definition and Background

Academic mindset, growth mindset or mastery orientation (again, many names for similar concepts) have been defined most generally as “...student attitudes, beliefs, and dispositions about school and learning that are associated with positive academic outcomes and school success.” (Snipes, Fancsali and Stoker, 2012, p. 6). These authors offer a definition of academic mindset that is broad and includes a variety of concepts sometimes listed as correlated to acquiring a growth mindset rather than as part of this concept:

- Passion and purpose
Having a passion or purpose to learn, enjoyment of learning
- Grit and growth
Belief that intelligence grows by taking on challenges, recognition of power to shape own future, determination to persist in the face of difficulty and confidence in ability to learn
- Identity and community
Valuing the power of the mind, willingness to speak up to get what is needed to learn, pride in contribution to a learning community

Others offer a more limited definition, seeing the core concept to be the belief that intelligence and thus performance, can be developed (like a muscle), rather than being a fixed entity (Blackwell, Trzesniewski and Dweck, 2007). Chien et al. (2012) contrast a mastery orientation with a performance orientation:

“Children with a mastery orientation have learning goals—they are concerned with increasing their competence and abilities while mastering new tasks over time. Conversely, children with a performance orientation have performance goals—they are concerned with seeking positive judgments of their competence.” (p. 3)

While children with a mastery orientation seek out challenging tasks, those concerned only with performance seek to avoid failure by avoiding risk and challenge.

As part of its development of a “deeper learning” framework, the William and Flora Hewlett Foundation recently added “academic mindset” to its previous five components of this framework (master core academic content through critical thinking and complex problem solving, working collaboratively, communicating effectively, and learning how to learn (Farrington, 2013). They added this concept so that their framework would have a motivational component, in addition to the specific competencies and learning strategies they had already

embraced. The particular beliefs they cite as included in academic mindsets are, from the point of view of the learner:

- I belong in this academic community;
- I can succeed at this;
- My ability and competence grow with my effort, and
- This work has value for me.

Farrington writes that holding these attitudes facilitates engaging in the other learning strategies that are part of the Hewlett framework, encourages engagement, and supports persistence.

Relationship to Academic Achievement

There are now a multitude of studies documenting the relationship of academic or mastery mindset to positive academic achievement. For example, as in many other articles, Blackwell, Trzesniewski and Dweck (2007) have demonstrated that embracing the view that intelligence is malleable was related to an upward trajectory in grades in junior high school, a time when grades normally decline. Meece and Holt (1993) found higher science grades were associated with a mastery orientation and Stipek and Gralinski (1996) found higher grades and higher test scores at the end of the school year among children with such an orientation compared to children who believe intelligence is fixed. Yeager and Dweck (2012) built on the research showing academic performance as a correlate of an academic or mastery mindset to find that such views could also lower adolescents' aggression and stress—in turn resulting in higher academic performance.

Similar findings appear in Dweck (2008) working both with junior high school math students and with college pre-med classes. Flores, Lemons and McTernan (2011) showed that students with a growth mindset performed better on a physics exam than students with a fixed mindset. We have provided here only a small sample of the extensive research that exists. That research is remarkably in agreement that a growth or mastery orientation to learning leads to better academic performance.

Malleability

Many of the studies on growth mindset have deliberately manipulated subjects' beliefs about intelligence and whether it can be changed (e.g., Good, Aronson and Inzlicht, 2003; Wilson and Linville, 1985). Snipes, Fancsali and Stoker (2012) recently reviewed the strategies used by these studies and cited several important practices shown to be effective. These are:

- *“Instruction that teaches students that intelligence grows with effort*
- *Shifting students’ explanations for academic and social challenges from stable internal causes to temporary external causes*
- *Affirmation and visualization exercises*
- *Exercises that help students relate coursework to their lives*
- *Progress monitoring and support interventions*
- *Support to improve students’ learning strategies*
- *Programs that integrate content-specific instruction with mindset development” (p. 10).*

This same review cites numerous specific programs and curricula that use these strategies with success.

Delale-O’Connor et al., (2012) described three general strategies for developing a mastery orientation:

- *“Providing tasks that are meaningful to children, given their interests and environments.*
- *Presenting children with realistic but challenging tasks and placing the emphasis on mastery of the skill, rather than performance.*
- *Focusing on the value of learning (and what can be gained), in both adult-child interactions and in formal and informal evaluations.” (p. 5)*

Overall, we conclude that this is a well-researched competency, again with varying definitions, that is related to academic performance across a variety of indicators and it is malleable.

Growth Mindset or Mastery Orientation: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
3rd or 4th grade literacy			
Meece & Miller (2001)	Achievement Goal Orientation Scales (Task-Mastery Goal, Performance Goal, and Work-Avoidant Goal)	None	The sample consisted of 3rd-5th grade students. Task-mastery goals explained the degree to which students use learning strategies that improve their reading and writing competencies, while students with the lowest reading scores had significantly higher performance goals scores.
Stipek & Gralinski (1996)	Ability Performance Beliefs Scale, Effort-Related Beliefs Scale, Mastery Goal Orientation, Performance Goal Orientation, all created by authors	None	The sample consisted of students in grades 3-6. Beliefs in intelligence as fixed were negatively associated with math and social studies grades.
8th grade math			
Blackwell, Trzesniewski, & Dweck (2007)	Implicit Theories of Intelligence for Children	Both control and experimental group received eight 25-min workshops where they learned about the physiology of the brain, study skills, and antistereotypic thinking. Experimental group was also taught intelligence is malleable and can be developed.	Incremental theory predicted an upward trajectory in math grades over the two years of junior high school, while students in the control group experienced a downward trajectory in math grades.
Good, Aronson & Inzlicht (2003)	Did not measure growth mindset, measured academic outcomes only	7th grade (female and minority students) in the experimental condition were taught that "their mind is a muscle" while control students learned about drugs.	Females in the experimental condition earned higher math test scores and minority students earned higher reading test scores than students in the control condition.
Meece & Holt (1993)	Motivation Goals was measured by The Task-Mastery Scale, The Ego-Social Scale, and The Work-Avoidant Scale	None	For the 5th and 6th grade students, mastery goals orientation students had the most positive achievement profile (science grades, achievement test scores, effort ratings).
Snipes, Fancsali, & Stoker (2012)	Multiple (lit review)	Identifies 5 evidence based interventions	A review of the literature showed that interventions that taught that intelligence grows with effort (growth mindset) increased math and reading grades for middle school students and GPA for college students.

Growth Mindset or Mastery Orientation: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Stipek & Gralinski (1996)	Ability Performance Beliefs Scale, Effort-Related Beliefs Scale, Mastery Goal Orientation, Performance Goal Orientation, all created by authors	None	The sample consisted of students in grades 3-6. Beliefs in intelligence as fixed were negatively associated with math and social studies grades.
High School Graduation			
Agbuga (2011)	Authors modified Achievement Goals: Mastery, Performance-Approach, and Performance-Avoidant. Also modified Persistence/Effort Scale	None	Mastery and performance-approach goals were significant positive predictors of persistence/ effort for both gender groups.
Flores et al. (2011)	Personal Beliefs Survey	None	A student with the growth mindset will have a greater probability of achieving higher gains on the FCI (physics test) than a student with a fixed mindset.
College enrollment and completion			
Aronson, Fried & Good (2002)	"You have a certain amount of intelligence and you really can't do much to change it" and "You can learn new things but you can't really change your basic intelligence"	Participants in the experimental condition wrote a letter to a middle school student encouraging them to work hard and explaining intelligence is malleable (as they were just taught) while control participants wrote about intelligence being multi-faceted.	Black college students in the experimental condition reported greater enjoyment of the academic process, greater academic engagement, and obtained higher grade point averages than the control group.
Coutinho & Neuman (2008)	Achievement Goal Questionnaire (four scores for Mastery Approach, Mastery Avoidance, Performance Approach, Performance Avoidance)	None	For the undergraduate college students self-efficacy was the strongest predictor of performance. Mastery-approach goals were positive predictors of self-efficacy.
Snipes, Fancsali, & Stoker (2012)	Multiple (lit review)	Identifies 5 evidence based interventions	A review of the literature showed that interventions that taught that intelligence grows with effort (growth mindset) increased math and reading grades for middle school students and GPA for college students.

Growth Mindset or Mastery Orientation: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Wilson & Linville (1985)	Academic only	College freshman in the experimental condition were taught that the causes of low grades were temporary, the control group was taught nothing about grades	Students in the experimental condition had higher GRE practice test scores and increases in course grades.
Career/workforce			
Brett & VandeWalle (1999)	Goal Orientation Scale (three dimensions: Learning Goal Orientation, Performance Goal Orientation, Avoidance Goal Orientation)	None	Only the content goals with a skill improvement focus had a positive relationship with performance for MBA students making professional presentations.
VandeWalle, Brown, Cron & Slocum (1999)	Goal Orientation Scale (two dimensions: Learning Goal Orientation and Performance Goal Orientation)	None	A learning goal orientation had a positive relationship with sales performance while a performance goal orientation had no relationship.

Growth Mindset or Mastery Orientation Bibliography

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3. Grit or Perseverance

Definition and Background

Here is another concept that is dealt with in different conceptual ways. Persistence is conceived as part of self-management by Zins and Elias (2006), while Farrington et al., (2012) used the general concept of “academic perseverance” to describe this noncognitive factor and included under that heading, grit, tenacity, delayed gratification, self-discipline and self-control. Still, while definitions and categorizations vary, they center around a core idea:

“To persevere academically requires that students stay focused on a goal despite obstacles (grit or persistence) and forego distractions or temptations to prioritize higher pursuits over lower pleasures (delayed gratification, self-discipline, self-control).” (Farrington et al., 2012).

Persistence is the “voluntary continuation of a goal-directed action in spite of obstacles, difficulties, or discouragement.” (Peterson and Seligman, 2004).

Grit is a “perseverance and passion for long-term goals.” (Duckworth et al., 2007).

“Grit, persistence or perseverance can be thought of as a certain stick-with-it attitude and determination that is maintained over time despite failure or setbacks.” (Chien, et al., 2012).

While grit is often associated with persistence over the long term, delayed gratification or self-control seem more commonly described as shorter-term strategies. The similar concept—self management—seems to be a little broader but inclusive of perseverance or grit:

“Self-management: regulating one’s emotions to handle stress, controlling impulses, and persevering in addressing challenges; expressing emotions appropriately; and setting and monitoring progress toward personal and academic goals.” (Payton et al., 2008)

Relationship to Academic Achievement

Farrington et al., provide a substantial review of the research on the relationship of academic perseverance and academic performance. Angela Duckworth has been a primary contributor to this body of research and many studies have used her long- and short-version scales to measure grit. Tough (2012) also reviews Duckworth’s research in some detail and Farrington et al. go so far as to label grit as “essential” to high achievement.

In a study of college students at the University of Pennsylvania grit was related to college GPA ($r=.34$) after controlling for SAT scores (Duckworth et al., 2007). Duckworth and colleagues also found a significant relationship of grit and grades among West Point Cadets, although the magnitude of this effect was lower than that found among students in her previous study. Another prominent study in this literature is the experiment created by Walter Mischel and colleagues where preschool children were promised two marshmallows instead of the one visible marshmallow if they would wait to eat the first one when the experimenter returned to the room (Mischel and Mischel, 1983). Waiting for the second marshmallow was predictive of higher SAT scores many years later (Shoda, Mischel and Peake, 1990). The authors of this work believed that those who showed more self-control had greater cognitive skills that allowed them to dream up distraction strategies with greater efficiency.

Other research also links grit or persistence with academic achievement. Academic outcomes used in this work include faster growth in reading from kindergarten through third grade (Newman et al., 1998), faster growth in both reading and math from kindergarten to fifth grade (Li-Grining et al., 2010), and less anxiety and less tendency to blame others while trying to solve difficult problems (Lufi and Cohen, 1987)

Malleability

Evidence suggests that children may not exhibit grit, perseverance or self-control across all situations and that these characteristics may change over time (Farrington et al., 2012), but Duckworth and colleagues have argued that grit is a stable personality trait (2007). Other authors believe that while grit is related to academic achievement, it is like conscientiousness—one of the important “big five” personality traits that predicts performance but it is rather stable.

Farrington et al., argue however, that academic perseverance, as opposed to perseverance as a general trait, can be changed in spite of personality.

“The research suggests that, while there may be little return in trying to make students more gritty as a way of being...students can be influenced to demonstrate perseverant behaviors...in response to certain classroom contexts and under particular psychological conditions.” (p. 24).

Strategies to teach perseverance directly have been tried but the research is yet sparse on the success of these. Other research has tried to increase perseverance through changing students’ academic mindsets or increasing the degree of belongingness students have toward their schools and classrooms (Dweck, Walton and Cohen, 2011). We have already reviewed evidence above that academic self-efficacy (belief that a student can succeed at an academic task) is associated with greater perseverance. Farrington et al., argue that it is unclear whether a focus on grit or perseverance would contribute very much to narrowing race/ethnicity gaps in achievement.

Overall, we conclude that grit or perseverance is well related to academic achievement but there is some debate about its malleability since it may be a rather stable personality trait. A promising strategy to increase perseverance is through creation of a classroom context that gives students a sense of belonging, builds their mastery orientation, teaches concrete strategies for learning, and thus increases students' likelihood of persisting in the face of academic challenge.

Grit or Perseverance: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Kindergarten Readiness			
McDermott et al. (2012)	Preschool Learning Behavior Scale (tests competence motivation, attitude toward learning, attention/persistence, and learning strategy)	None	The sample consisted of Head Start students aged three to six. Three factors (competence motivation, attention/persistence, and learning strategy) predicted future grades, achievement test scores and learning behaviors, with attention/persistence being the most predictive.
Shoda, Mischel, & Peake (1990)	The Marshmallow Test (tests self-control and delayed gratification)	None	Correlations were found between seconds of delayed gratification in preschool and cognitive competence and SAT scores in adolescence.
3rd or 4th grade literacy			
Dweck, Walton, & Cohen (2011)	Multiple (meta-analysis)	Multiple (meta-analysis)	In a meta-analysis of strategies that promote student tenacity, helping students learn self-control strategies increased grades and test scores in reading and math.
Liew et al. (2008)	Adaptive and effortful control was measured by: Ego-resiliency subscale of the California Child Q-Set, and two tasks (Walk-a-Line and Star) designed by Kochanska	Recommends the program Promoting Alternative Thinking Strategies (PATHS)	Adaptive/effortful control at 1st grade contributed to reading achievement at 3rd grade. For meeting the critical 3rd grade benchmarks in reading, early adaptive/effortful control is one of the pre-cursors of literacy achievement.
Newman et al. (1998)	15-item set of temperament questions, based on Martin's Temperament Assessment Battery for Children (TABC)	None	Persistence measured in kindergarten was a significant predictor of the growth rate of reading ability for children from kindergarten through third grade.
Zins & Elias (2006)	Multiple (lit review)	Recommends 13 SEL evidence based programs	The evidence based outcomes for teaching SEL include greater effort to achieve and academic performance improvements such as improved math and language arts skills, higher test scores, and increases in achievement overtime (elementary to middle school).

Grit or Perseverance: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
8th grade math			
Duckworth and Quinn (2009)	Short Grit Scale	None	In middle school and high school students, grit scores were positively correlated with GPA.
Dweck, Walton, and Cohen, (2011)	Multiple (meta-analysis)	Multiple (meta-analysis)	In a meta-analysis of strategies that promote student tenacity, helping students learn self-control strategies increased grades and test scores in reading and math.
Li-Grining et al. (2010)	ECLS-K's Social Rating System (based on the SSRS) Approaches to Learning Scale and Self-Control Scale	Correlational study. Recommends programs like Head Start and Tools of the Mind	The sample consisted of 1st, 3rd, and 5th graders. Results indicate a positive correlation between early approaches to learning (persistence, emotion regulation, and attentiveness) and individual trajectories of reading and math performance.
High School Graduation			
Duckworth and Quinn (2009)	Short Grit Scale	None	In middle school and high school students, grit scores were positively correlated with GPA.
College enrollment and completion			
Duckworth et al. (2007)	Grit Scale	None	Grit scores were positively correlated with GPA among Ivy League undergraduates.
Duckworth and Quinn (2009)	Short Grit Scale	None	In adults, grit scores were positively correlated with levels of educational attainment and fewer career changes.
Yeager & Dweck (2012)	Multiple (lit review)	Teaching growth mindset	Students who believe (or are taught) that intellectual abilities are qualities that can be developed tend to show greater academic persistence and higher achievement across challenging school transitions and greater course completion rates in challenging math courses in community college.

Grit or Perseverance: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Career/workforce			
Duckworth et al. (2007)	Grit Scale	None	Grit scores were positively correlated with educational attainment and fewer career changes. Individuals who were a standard deviation higher in grit than average were 35% less likely to be frequent career changers.
Duckworth & Quinn (2009)	Short Grit Scale	None	In adults, grit scores were positively correlated with levels of educational attainment and fewer career changes.

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4. Emotional Competence

Definition and Background

We began our search in this literature using only “empathy” since it is sometimes listed as a stand-alone competency. We believe now, however, that empathy is but one skill that is part of a subset that might be called emotional competence or maybe even emotional intelligence (but the latter term makes it sound like a cognitive skill).

Empathy often appears in the literature along with emotion management, self-awareness, social awareness and other concepts that predict or reflect prosocial behavior. There seems no doubt from the evidence that children who are “well-behaved” toward others do better in school. The difficulty in this thicket of concepts, as with much of what we have already reviewed, is cleanly separating them from each other and from concepts like self-control. Here we offer some examples of these concepts in the emotional competence literature to illustrate both the range and overlap of these ideas:

“Empathy is a central aspect of emotional intelligence and emotional competence...Students learn that empathy means ‘the ability to feel and understand what someone else is feeling’ and develop skills for identifying emotions in themselves and others, labeling these emotions, and taking on others’ perspectives.” (Committee for Children, 2011, p. 4).

“SEL is the process through which we learn to recognize and manage emotions, care about others, make good decisions, behave ethically and responsibly, develop positive relationships and avoid negative behaviors.” (Zins et al., 2004, p. 192)

“Young children are more likely to succeed in the transition to school if they can:

- *Accurately identify emotions in themselves and others...*
- *Relate to teachers and peers in positive ways...*
- *Manage feelings of anger, frustration, and distress...*
- *Enjoy academic learning and approach it enthusiastically.*
- *Work attentively, independently, and cooperatively...” (Raver and Knitzer, 2002, p. 7)*

“Social and emotional development involves the acquisition of a set of skills. Key among them are the ability to:

- *Identify and understand one’s own feelings,*
- *Accurately read and comprehend emotional states in others,*
- *Manage strong emotions and their expression in a constructive manner,*
- *Regulate one’s own behavior,*
- *Develop empathy for others, and*
- *Establish and sustain relationships.” (Boyd et al., 2005, p. 3)*

This latter list perhaps best defines the cluster of emotional competencies intended in our label of this grouping. A similar concept—emotional intelligence—is said to include self-awareness, managing emotions, motivating oneself, empathy, and handling relationships (Saini, 2012).

Several classroom level programs have been developed for improving emotional competence, particularly in early childhood (e.g., the Second Step Programs, 2008 Committee for Children or Roots of Empathy, rootsofempathy.org), but attention has also been given to the relationship of empathy and related characteristics to business success (Boyers, 2013). Programs to increase affective and cognitive empathy among aggressive adolescent females in residential treatment centers have also seen emotional regulation as important (Pecukonis, 1990).

Relationship to Academic Achievement

There is substantial evidence that emotional competency (empathy, awareness and identification of one's own emotions, and skills to regulate one's own emotions) is related to academic achievement. We offer just a few examples here.

Miles and Stipek (2006) found a relationship between social skills and literacy achievement in the first, third and fifth grades. Among girls, Feshbach and Feshbach (1987) reported strong relationships between empathy at age 8 or 9 and achievement in reading and spelling at age 10-11. Summarizing a large body of research, as part of a review of the Second Step program, the Committee for Children (2008) writes:

"Research shows that young children with higher levels of empathy tend to be less aggressive, better liked, and more socially skilled, and to make greater academic gains than children with lower levels." (p. 4)

Linares et al., (2005) found that students exposed to the Unique Minds School Program, focusing on emotional competence, showed gains in self-efficacy, problem solving, and math grades. Another research review concluded that young children who display anti-social behaviors do more poorly on academic tasks and are more likely to be held back in later years (Raver and Knitzer, 2002).

At the older end of the cradle to career continuum, empathy among medical students has been positively related to their academic and clinical competence (Hojat et al., 2002). Boyers (2013) has argued that the key to business success is a well-developed sense of the needs and feelings of others and using those perceptions to guide decisions.

There is something of a causal conundrum in this research. While lack of empathy and poor emotional regulation seem to cause deficits in relationships and in academic achievement, consistent school failure seems iteratively related to poor emotional control, as well as

aggressive and anti-social behavior. That emotional competency is important seems not debatable, however.

Malleability

The Second Step, Roots of Empathy and other courses intended for young children have shown success in providing children as young as age three with increased emotional competency. At the other end of the cradle to career continuum, courses for business people have worked on teaching affective and cognitive skills that will produce empathy. Training on how to “read people” has also apparently been effective (Pecukonis, 1990).

The literature suggests that parents, caregivers, and preschool teachers can be effective in developing emotional competence. High quality preschool programs are apparently particularly effective. Peers too, play an important role and parents or teachers who see that children are having difficulty with peer relationships are advised to intervene and teach children how to resolve conflicts, regulate emotions, and respond to the emotions of others (Boyd, et al., 2005).

Overall, we conclude that the same conceptual challenges in naming, limiting and defining the other competencies are prevalent in the field of emotional competencies. Still, identifying one’s own emotions, empathizing with others, and social skills for interaction are important for children to learn and are related to academic achievement across the cradle to career continuum.

Emotional Competence: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Kindergarten Readiness			
Bierman et al. (2008)	Assessment of Children's Emotion Skills, the Emotion Recognition Questionnaire, and the Social Competence Scale	The Preschool PATHS (Promoting Alternative Thinking Strategies) curriculum	The sample consisted of 4-year old children in Head Start. Results revealed significant differences favoring children in the PATHS group on measures of vocabulary, emergent literacy, emotional understanding, and social behavior.
D'Angelo et al. (2007)	Devereux Early Childhood Assessment (DECA) and DIAL-3	None	All measures were correlated with kindergarten readiness with the DECA Total Protective Factors Scale (emotional and behavioral self control, initiative, and attachment) being the strongest predictor. The report concludes that the social and emotional characteristics of a child are <u>at least</u> as important to kindergarten readiness as the child's motor, language, and conceptual skills.
Miles & Stipek (2006)	Child Behavior Scale teacher report (two subscales: aggression and prosocial)	None	Sample consisted of 4 and 6-year olds. Results revealed consistent associations between social skills and literacy achievement in the first, third, and fifth grades.
Peterson & Weber (2011)	Ages and Stages Questionnaire and Devereux Early Childhood Assessment	Partners in Family Child Care (10-month home visiting program)	Children (birth to age 5) cared for by providers in the program demonstrated growth substantially above developmental expectations in both early literacy and social-emotional development.

Emotional Competence: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
3rd or 4th grade literacy			
Caprara et al. (2000)	Prosocial Behavior was rated by the child, peers, and teacher (created by authors)	None	Students were tested in 3rd grade and then again in 8th grade. Prosocialness had a strong positive impact on later GPA, accounting for 35% of the variance. Early academic achievement did <u>not</u> contribute to later academic achievement after controlling for effect of early prosocialness.
Feshbach & Feshbach (1987)	Feshbach and Roe Affect Situation Task, Emotional Responsiveness Measure, Feshbach Audiovisual Measure of Empathy, and the Children's Depression Inventory	None	For girls only, a strong relationship was found between empathy at age 8-9 and reading test scores at age 10-11.
Green, Forehand, Beck & Vosk (1980)	Conner's Teacher Questionnaire, Child self-report My Wishing Star, and peer social nominations	None	The sample consisted of 3rd graders. Results indicated that children with high reading and math achievement test scores were liked by and interacted positively with peers.
Malecki & Elliot (2002)	Social Skills Rating System	None	The sample consisted of 3rd and 4th graders, social skills were significantly related to reading and math skills test scores and predicted future reading and math scores.
Miles & Stipek (2006)	Child Behavior Scale teacher report (two subscales: aggression and prosocial)	None	Sample consisted of 4 and 6-year olds. Results revealed consistent associations between social skills and literacy achievement in the first, third, and fifth grades.

Emotional Competence: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
8th grade math			
Caprara et al. (2000)	Prosocial Behavior was rated by the child, peers, and teacher (created by authors)	None	Students were tested in 3rd grade and then again in 8th grade. Prosocialness had a strong positive impact on later GPA, accounting for 35% of the variance. Early academic achievement did <u>not</u> contribute to later academic achievement after controlling for effect of early prosocialness.
Linares et al. (2005)	Teacher Observation of Classroom Adaptation-Revised (assesses social-emotional functioning)	Unique Minds School Program (teaches cognitive-social-emotional skills)	The sample consisted of 4th and 5th graders, students in the UMSP group showed greater gains in social-emotional competencies and math grades than control group students.
Malecki & Elliot (2002)	Social Skills Rating System	None	The sample consisted of 3rd and 4th graders, social skills were significantly related to reading and math skills test scores and predicted future reading and math scores.
Wentzel (1991)	Socially Responsible Behavior (peer nominations), Relationships with Peers, Social Responsibility Goals, Interpersonal Problem Solving.	None	The sample consisted of 12 and 13-year olds, correlational findings indicate that each aspect of social competence is related significantly to Middle School GPA.

Emotional Competence: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
High School Graduation			
Hogan et al. (2010)	Bar-on Emotional Quotient Inventory: Youth Version and the Social Support Behaviors Scale (family and peer report)	None	Emotional Intelligence and peer social support predicted 10th grade GPA.
Pecukonis (1990)	Hogan Empathy Test and the Emotional Empathy measure by Mehrabian and Epstein	Affective/Cognitive Empathy Training Program (four 1.5-hour sessions twice weekly)	The sample consisted of aggressive adolescent females in a treatment center, posttests revealed significant positive relationships between ego development and empathy. Training significantly increased levels of affective empathy.
Vitaro, Brendgen, Larose & Trembaly (2005)	Preschool Behavior Questionnaire and the Prosocial Behavior Questionnaire	None	Results showed that kindergarten scores of hyperactivity-inattention predicted noncompletion of high school. However, prosociality played a compensatory role in this process.
College enrollment and completion			
Gerdes & Mallinckrodt (1994)	The Student Adaptation to College Questionnaire (four subscales: academic adjustment, social adjustment, personal/emotional adjustment, and institutional attachment) and the Anticipated Student Adaptation to College Questionnaire	None	Emotional and Social Adjustment items best predicted college attrition.
Lumley & Provenzano (2003)	12-item Somatization subscale of the Symptom Checklist-90-Revised, and Immediate Mood.	The treatment group did four days of Written Emotional Disclosure (writing stressful or traumatic events)	College students in the treatment group had significantly better GPAs the next semester. Improved mood predicted improved GPA.
Robbins et al. (2006)	Student Readiness Inventory (10 scales that measure psychosocial factors)	None	Social Activity and Emotional Control predicted college GPA and retention.

Emotional Competence: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Career/workforce			
Di Fabio & Palazzeschi (2009)	Career Decision Difficulty Questionnaire and the Bar-on Emotional Quotient Inventory: Short	None	Lower emotional intelligence (especially awareness of one's emotions and the ability to regulate and manage emotions) was related to greater lack of career readiness and greater difficulties in career decision-making.
Hojat et al. (2002)	Jefferson Scale of Physician Empathy	None	Empathy scores were associated with ratings of clinical competence but not with performance in objective examinations such as the Medical College Admissions Test.

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5. Self-Regulated Learning and Study Skills

Definition and Background

There are a variety of similar competencies to study skills, including self-management, self-evaluation, self-direction, time management, and self-control. There is a substantial amount of overlap in these concepts and the findings of studies that employ them. Self-management however, seems to be a broader concept which might include management of emotions, resources, or behaviors—not just academic self-management. Here we are going to use “self-regulated learning” to keep our focus on academics. We are going to also discuss study skills under this concept because these appear to be the concrete strategies and tools by which students engage in or actualize self-regulated learning.

Bandy and Moore (2010) state that self-regulation includes the unconscious and conscious processes that affect the ability to control responses. They claim it includes both cognitive self-regulation (self-reflection, planning and thinking ahead) and social-emotional self-regulation (ability to inhibit inappropriate responses, delayed gratification, and self-control). In a learning situation, self-regulation includes appropriate use of study strategies and methods and the ability to manage time and other resources effectively to meet academic demands (Crede & Kuncel, 2008). According to Pintrich (2000), it can be thought of as consisting of three stages:

- the planning stage (evaluation of task and goal setting);
- the monitoring stage (tracking progress), and
- the self-reflection stage (learning from outcomes).

In effect, students who exhibit self-regulated learning are able to manage the focus of their attention and utilize appropriate study skills, while simultaneously managing their emotions and behaviors.

A review of the research suggests that self-regulated learning is related to other competencies. For example, Farrington et al. (2012, p. 39) conclude that “learning strategies tend to increase students’ self-efficacy, which in turn is related to increased academic perseverance when school work gets challenging.” Grit or perseverance, emotional competence, self-efficacy, and responsible decision making all depend on student self-regulation to some degree. Examples of similar concepts examined in the literature include academic behaviors, learning strategies, metacognitive strategies, and problem solving.

Relationship to Academic Achievement

Numerous studies over the past 30 years strongly associate self-regulated learning with academic success. Indeed, it appears that self-regulated learning may be the category most closely correlated with overall success in school. The following examples illustrate these findings:

“Academic behaviors are the most proximal noncognitive factors to student academic performance. Virtually all other factors that affect school performance- including content knowledge, academic skills, student background characteristics, and the full range of noncognitive factors- exercise their effect through students’ academic behaviors.” (Farrington et al., 2012, p. 19)

“Student absences and study habits are the strongest predictors of high grades- above test scores or student background characteristics- and explain 61% of the variation in course failures.” (Farrington et al., 2012, p. 15)

“Self-regulation and self-efficacy best predict academic performance. Students with high self-efficacy use metacognitive strategies and self-regulation more. While self-regulated learning is interrelated with self-efficacy, it appears to be more directly related to academic performance.” (Pintrich & Groot, 1990, p. 37)

“Study habit and skill measures improve prediction of academic performance more than any other noncognitive individual difference variable examined to date and should be regarded as the third pillar of academic success [test scores and grades being the other two pillars].” (Crede & Kuncel, 2008, p. 425)

“[A meta-analysis found that] academic-related skills (study skills, problem solving, time management etc.) were shown to be the strongest predictors of college retention [and also predicted college GPA]. ” (Robbins et al., 2004, p. 274-275)

“For African American boys, learning-related skills predict math and literacy achievement above the effects of problem behaviors, SES, or home literacy environment.” (Matthews et al., 2010, p. 757)

“Self-control predicted changes in grades better than IQ, while IQ predicted standardized test scores better than self-control.” (Duckworth, Quinn, and Tsukayama, 2012, p. 439) This is important because high school GPA is a better predictor than SAT scores of college GPA and college graduation. (Geiser & Santelices, 2007; Bowen, Chingos, & McPherson, 2009)

There is other research with similar findings. Academic behaviors (e.g., attending class, doing homework, organization, etc.) have been shown to be related to improved course grades, credit accumulation, grade promotion, test scores, and graduation (Allensworth and Easton, 2007). A study of 538 children in K-6th grade showed a strong relationship between self-regulation and academic achievement in literacy and math (McClelland et al., 2006). Self-control in young children, as evaluated by the “marshmallow test” research, was also related to academic achievement later in adolescence, including high SAT scores (Mischel, Shoda and Rodriquez, 1989).

Malleability

Self-regulated learning both in terms of behavior and academic strategies is malleable. In a randomized control trial by Zimmerman et al. (2011), 496 college students in remedial math courses were assigned to either the self-reflection skills group or the control group which received math instruction as usual. For students in the treatment group, the self-regulated learning training increased their national math examination pass-rates by 25%. An additional study by Delale-O'Connor et al. (2012) suggests that the best method for increasing self-regulated learning is by utilizing a variety of strategies, such as goal setting, feedback loops, clarifying expectations, and encouraging children to use “self-talk.”

The teaching of metacognitive skills is best done in specific content areas since ability to monitor cognition is related to domain-specific knowledge (National Research Council, 1999).

A meta-analysis of 48 studies found that self-regulation training produced a large effect size (0.62) on academic performance, using a variety of tactics (Dignath et al, 2008).

According to Gettinger and Seibert (2002), study skills are malleable and are best taught using these four clusters of strategies:

- Repetition or rehearsal strategies
- Organization (e.g. time management, material organization, study habits)
- Cognitive (e.g. acquire background knowledge, connect new ideas to what is already known, develop new schemata)
- Meta-cognitive (e.g. ability to assess the need for studying, plan, implement, monitor, and evaluate their study approaches)

Overall, we conclude that this is a well-researched competency that is strongly related to academic performance and is malleable at all ages and stages.

Self-Regulated Learning: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Kindergarten Readiness			
Blair & Razza (2007)	Inhibitory Control (measured by Peg-tapping) and Effortful Control (used short form of Children's Behavior Questionnaire)	None	For the sample of 3-5 year olds, results indicated self-regulation accounted for unique variance in math and letter knowledge independent of IQ. Inhibitory control was a prominent correlate of both early math and reading ability.
Maier, Vitiello & Greenfield (2012)	Devereux Early Childhood Assessment (only used teacher version of Protective Factors Scale: measures initiative, self-control, and attachment)	None	For the sample of preschoolers, results indicated that Protective Factors predicted initial levels of language and literacy.
McClelland, Acock & Morrison (2006)	Cooper-Farran Behavioral Rating Scales (subscale Work-related Skills)	None	Learning related skills at kindergarten uniquely predicted reading and math skills between kindergarten and sixth grade even after controlling for IQ, age, ethnicity, and maternal education level.
McClelland et al. (2007)	Head-to-Toes Task (taps inhibitory control, attention, and working memory)	None	For the sample of preschoolers, behavioral regulation significantly and positively predicted literacy, vocabulary, and math skills. Growth in behavioral regulation predicted growth in literacy, vocabulary, and math skills even after controlling for site, gender, and background variables.
Shoda, Mischel & Peake (1990)	The Marshmallow Test (test preschoolers self-control and delayed gratification), The Adolescent Coping Questionnaire, and California Child Q-Set	Four conditions: marshmallow either exposed or obscured, and whether or not ideation instruction was provided	Correlations were found between seconds of delayed gratification in preschool and cognitive competence and SAT scores in adolescence.

Self-Regulated Learning: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
3rd or 4th grade literacy			
Dignath, Büttner & Langfeldt (2008)	Multiple (meta-analysis)	None	A meta-analysis of 48 studies of primary school students showed that self-regulated learning was significantly correlated with reading/writing performance.
Duckworth, Quinn & Tsukayama (2012)	19 self-control items from the Social Skills Rating System, and the Impulsivity Scale for Children	None	For 4th-8th graders, self-control predicted changes in report card grades over time better than did IQ.
Kitsantas, Steen, & Huie (2009)	Motivated Strategies for Learning Questionnaire (Learning Strategy Scale only)	None	For the 3rd and 5th graders, the results of the study revealed that only self-regulatory strategies consistently predicted GPA and achievement test scores in math and language arts.
Matthews, Kizzie, Rowley & Cortina (2010)	6-item Learning Approaches Scale (adapted from Social Skills Rating Scale)	None	Kindergarteners were followed through 5th grade, results showed that learning-related skills explained the literacy development of African American boys over and above the effects of problem behaviors, SES, and home literacy environment.
8th grade math			
Dignath, Büttner & Langfeldt (2008)	Multiple (meta-analysis)	None	A meta-analysis of 48 studies of primary school students showed that self-regulated learning was significantly correlated with math performance. Furthermore, the highest benefits from the analyzed interventions can be gained in mathematics performance.
Duckworth, Quinn & Tsukayama (2012)	19 self-control items from the Social Skills Rating System, and the Impulsivity Scale for Children	None	For 4th-8th graders, self-control predicted changes in report card grades over time better than did IQ.
Kitsantas, Steen, & Huie (2009)	Motivated Strategies for Learning Questionnaire (Learning Strategy Scale only)	None	For the 3rd and 5th graders, the results of the study revealed that only self-regulatory strategies consistently predicted GPA and achievement test scores in math and language arts.

Self-Regulated Learning: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
High School Graduation			
Cleary, Platten & Nelson (2008)	Self-Regulation Strategy Inventory Self-Report and Rating Student Self-Regulated Learning Outcomes teacher report	Self-regulation Empowerment Program (teaches task analysis, goal-setting, strategic planning, and self-reflection)	For the sample of high school students, those in the intervention group had enhanced science test scores and more frequent use of self-regulatory strategies.
Nota, Soresi & Zimmerman (2004)	Self-Regulated Learning Interview Schedule	None	For the sample of high school students, the cognitive self-regulation strategy of organizing and transforming proved to be a significant predictor of high school math grades and college examinations passed and average course grades.
College enrollment and completion			
Butler (1998)	Metacognitive Questionnaire and Strategy Interview	Strategic Content Learning (teaches students to use strategic approaches, analyze task demands, identify learning activities, and evaluate performance)	Results reveal consistent improvements in students' metacognitive knowledge about key self-regulated processes and college grades.
Crede & Kuncel (2008)	Multiple (meta-analysis)	None	Overall, study habit and study skill measures improve prediction of academic performance (college admission test scores and GPA) more than any other noncognitive individual variable examined to date.
Zimmerman, et al. (2011)	Self-Regulation Measures (Based on Bandura and Schunk)	College math students in the treatment condition learned how to detect math problem errors, adapt their strategy, use feedback, and self-reflect on quiz scores.	Students in the treatment group outperformed control group students on in-class math exams, on passage rates of the National Gateway Examination in Mathematics (by 25%), and passage of the math course.

Self-Regulated Learning: Articles

References to articles covering more than one age group are repeated.

Author	Measure	Intervention	Key Findings
Career/workforce			
Christian & Ellis (2011)	State Self-Control Capacity Scale	Sleep deprivation	Sleep deprivation decreases individuals' ability to self-regulate emotions and behaviors. Results from the field and lab showed that sleep deprivation can lead to decreased self-control while increasing hostility, resulting in increased workplace deviance.
Creed, King, Hood, & McKenzie (2009)	Motivation Control Scale, Emotion Control, and Employment Commitment Scale	None	All three self-regulation strategies were positively associated with job-seeking intensity, and job-seeking intensity was the best predictor of job offers.
De Stobbeleir, Ashford & Buyens (2011)	Frequency of Feedback Inquiry and Monitoring (created by authors)	None	Self-regulation skills (defined by feedback inquiry and monitoring) were positively correlated with supervisor ratings of employee performance.

Self-Regulated Learning and Study Skills Bibliography

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Appendix

6. Critical thinking

Definition and Background

Critical thinking has been a buzzword in education for over 40 years and there appears to be a widespread sense of its significance in developing aware and intelligent young adults who are prepared to face modern challenges. Yet there are many definitions and synonyms for this concept including self-regulated learning, communication skills, cognitive skills, metacognitive strategies and learning style.

Many contemporary researchers use the following definition for critical thinking: "Purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological or contextual considerations upon which judgment is based" (Facione, 1990, p. 2)

Tsui (2002, p. 743) defines critical thinking as "students' abilities to identify issues and assumptions, recognize important relationships, make correct inferences, evaluate evidence or authority, and deduce conclusion."

Erwin and Sebrell (2003) narrow critical thinking to "...analysis, inquiry, and communication." (p. 52)

In addition to the numerous definitions for critical thinking skills, there are a number of definitions for critical thinking dispositions, in other words, the characteristics of a critical thinker. The oft-cited APA Delphi Report prepared by Facione (1990), created by a panel of 46 critical thinking experts, describes the ideal critical thinker as: habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider views, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit.

Critical thinking is also sometimes grouped with self-regulated learning.

Relationship to Academic Achievement

The majority of the research on critical thinking is about whether these skills can be taught and how to do so. That research shows clearly that critical thinking can be taught and also points to numerous effective strategies. There is also evidence to support that time spent teaching critical thinking skills within a subject area (such as science or history) does not detract from student success within that subject area (Reed and Kromrey, 2001; Solon, 2007). What is not as

clear is whether teaching critical thinking skills actually improves student achievement through higher grades, graduation rates, or college attendance rates.

The National Research Council (2012) assigned the “21st century skills” into three domains: the Intrapersonal Domain, the Interpersonal Domain, and the Cognitive Domain (with the cognitive domain including critical thinking). *“The committee examined evidence of the importance of various types of competencies for success in education, work, health, and other life contexts and concluded: The available research evidence is limited and primarily correlational in nature; to date, only a few studies have demonstrated a causal relationship between one or more 21st century competencies and adult outcomes. The research has examined a wide range of different competencies that are not always clearly defined or distinguished from related competencies (p. Sum-3).”*

The extant research shows mixed results and that critical thinking might not be as valuable as good note taking or other more easily teachable skills.

“Self-regulated learning can be specifically translated to academic performance in that learning is basically the result of determination and attitude, effective information processing, and learning style and study skills (p. 596). It was predicted that students who earned A grades would be characterized by being more likely to be self-regulating in learning including (a) strategies to evaluate critically, organize conceptually, and compare information, (b) critical thinking skills to make inferences, deductions, and interpretations accurately from the information they studied, and (c) systematic study techniques which would enable them to process the information readily (p. 597). The analysis indicated that the students who earned A’s (compared with those who earned C’s) scored higher on (a) and (c) but not (b) (p. 601).” (Gadzella et al., 1997)

Williams et al. (2003) found that these skills are malleable and related to academic performance. “Students’ scores on a psychological critical thinking instrument...were significantly positively correlated with multiple-choice exam scores (p. 220). Perhaps the most important outcome of the study was the improvement in critical thinking during the course (p. 222).”

“Critical thinking, attendance, readings note taking, and in-class note taking all appear to predict selected performance measures. However, the most promising of these predictors is note taking, both readings and in-class note taking [both because it best predicts course grade and because instructors can most easily upgrade this ability in students.]” (Williams & Worth, 2003, p. 225)

Williams & Stockdale (2003) found that “Students with high entry-level critical thinking generally did better in course performance than students with low entry-level critical thinking. [However] the difference between the groups is more attributable to work habits [e.g. attendance, homework completion, note taking] than to ability (p. 220). What is especially impressive about the assumed work habits of the high-grade/low critical thinkers is that their GPA approached that of high-performing students with much higher critical thinking skills. The most pivotal work-habits difference between the high-performing low critical thinkers and the other two groups related to note taking (p. 221).”

Stupnisky et al. (2008) defined critical thinking disposition as a willingness to apply critical thinking skills. In their study of 1196 college students they found that “students’ perceived academic control predicted their subsequent critical thinking disposition, and students’ critical thinking disposition predicted their subsequent perceived academic control. Furthermore, after controlling for high school academic performance, perceived academic control was found to have a stronger impact on students’ GPAs than critical thinking disposition (p. 513). These results draw further attention to perceived academic control as a key psychosocial construct for college student’ academic development, and bring into question the direct impact of the disposition to think critically on students’ academic success (p. 524).”

We conclude that while valuable, critical thinking skills are not as predictive of academic success as other behavioral attributes such as self-regulated learning behaviors or the use of effective study skills.

Malleability

Critical thinking skills are indeed malleable, and most research indicates that the best way to develop critical thinking skills is through directly teaching these skills to students as opposed to having the skills be a by-product of instruction (Abrami et al., 2008). While the impact of critical thinking instruction appears greatest in elementary school and decreases as students progress through high school and college, substantial positive impacts are shown across school levels (Bangert-Drowns and Bankert, 1990).

Examples of ways to increase critical thinking include teaching students how to: analyze, interpret, and evaluate information, how to think creatively, how to predict, and how to communicate effectively both orally and in writing.

“After instruction, the Critical Thinking-infused Research Methods class showed significantly greater gains on the argument analysis test with large effect sizes. Contrary to common expectation, these results suggest that simply taking a Research Methods course emphasizing research study design and research report writing was not sufficient to improve Critical Thinking skills for argument analysis; instead, explicit instruction of Critical Thinking skills was required.” (Bensley et al., 2010, p. 94)

In a meta-analysis of 20 studies, Bangert-Drowns and Bankert (1990) found directly teaching critical thinking is critical for learning this skill. *“Results consistently favored programs that used explicit instruction methods. Intensive programs proved more effective than did programs providing only periodic training in critical thinking.”(p. 1)*

In a meta-analysis of 117 studies, Abrami et al. (2008) found overall positive effects of instruction on the development of critical thinking skills with an average effect size of 0.341.

“These findings make it clear that improvement in students’ CT skills and dispositions cannot be a matter of implicit expectation. As important as the development of CT skills is considered to be, educators must take steps to make CT objectives explicit in courses and also to include them in both preservice and in-service training and faculty development (p. 1102).” “The mixed method, where CT is taught as an independent track within a specific content course had the largest effect, whereas the immersion method, where CT is regarded as a by-product of instruction, had the smallest effect. Furthermore, when instructors received special advanced training in preparation for teaching CT skills or when extensive observations on course administration and instructors’ CT teaching practices were reported, the impacts of the interventions were greatest. By contrast, impacts of CT were smallest when the intention to improve students’ CT was only listed among the course objectives and there were no efforts at professional development or elaboration of course design and implementation (p. 1121).”

Communication skills such as writing and discussion are often pointed to as some of the most essential keys to developing critical thinking skills. Tsui’s (2002) extensive research on critical thinking in college students showed classes with more writing assignments (and rewriting) and in-depth class discussion were related to substantially higher critical thinking skills. Her findings also showed that more traditional instructional methods such as lecturing and multiple-choice tests corresponded to lower levels of critical thinking.

Overall, critical thinking skills are considered by many to be essential skills for academic and career success, although the research showing this relationship remains scarce and these skills do not seem as well related to such outcomes as practices such as self-regulated learning behaviors. Critical thinking skills appear to be malleable in elementary school through college, given a deliberate effort to teach them.

Critical Thinking Bibliography

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7. Creativity

Definition and Background

The creativity literature is replete with conceptual frameworks and definitions. Interest in creativity has a relatively long history and a presidential address at the American Psychological Association in 1950 is often credited with giving psychologists the challenge to take up research on this desirable attribute (Guilford, 1950). In more ancient times, creativity was often thought to be magical, a God-given gift, or even associated with madness (Isaksen, 2013).

There are a variety of labels for creativity, including creative problem solving and creative thinking. Here is a sampling of attempts to define these terms:

“A creative result is a result both original and appropriate. A creative person—a person with creativity—is a person who fairly routinely produces creative results.” (Perkins, 1988, p. 311).

“Creativity is a habit. ...That is, creativity becomes a way of life that one regularly utilizes so that one is hardly aware one is engaging in it.” (Sternberg, 2012, p. 3).

“Creative Problem Solving (CPS) is a framework which individuals or groups can use to: formulate problems, opportunities, or challenges; generate and analyze many, varied and novel options; and plan for effective implementation of new solutions or courses of action.” (Treffinger, 1995, p. 301).

Starko (2005) has argued that the emphasis on originality of products in connection with creativity is a very western concept but in Eastern or traditional cultures, creativity is a process of individual growth, evolution, or a spiritual journey in a community. On this theme, Kaufman and Beghetto (2009) have complained that “the exact question of what is creativity is often ignored or answered in too many different ways.” (p. 1).

Perhaps more numerous than definitions of this concept is the attempt to understand the underlying parts of creativity—the more theoretical dissection of what bolsters or is necessary for creativity. Isaksen (2013) has argued that studies of creativity have occurred across many disciplines, each of which employ a slightly different view, including education, psychology, science, and in managerial and industrial literature. This makes arrival at a single framework unlikely. Here are some examples of how researchers have tried to describe the underlying mechanisms of creativity:

From Rhodes, who summarized 56 definitions, emerged four “strands” of creativity, commonly called the four P’s of creativity (1961):

Person, including intellect, personality, traits, attitudes, values and behavior

Process, including stages of thinking people go through when overcoming an obstacle or achieving an outcome which is both novel and useful

Press or the relationship between people and their environment, the situation which is conducive to creativity, and

Product or the characteristics of artifacts of new thought and ideas, inventions, designs and systems.

Kaufman and Beghetto (2009) have argued that studies of creativity offer a dichotomy:

A focus on eminent creativity...studied by analyzing the lives of well-known creators or interviewing renowned individuals... These types of studies and theories are typically referred to as study “Big-C creativity.” (p. 1)

A focus on everyday creativity or the activities in which the average person may participate each day, such as arranging a scrapbook or creating new cuisine. They called this “little-c creativity.”

They later expanded this framework to the “Four C Model” adding:

Mini-c which is a part of the little-c process and includes the creative insights experienced by learners when they learn a new concept or “novel and personally meaningful interpretations of experiences, actions, and events.” (p. 3) and

Pro-c which represents “the developmental and effortful progression beyond little-c (but has not yet attained Big-C status).” (p. 5)

This latter category might include those who are professional actors, for example, who are creative but may never be thought of as creative geniuses for the ages.

Sternberg (2012) has suggested an “investment-based approach” to creativity, which he argues requires the confluence of six distinct but interrelated resources. He argues that creativity is not about one thing but about a system of things, including:

Intellectual abilities

Knowledge

Thinking styles

Personality

Motivation

Environment and

Confluence

Isaksen et al. (1993) have likewise proposed six stages to creative problem solving:

Mess-finding within experiences, roles and situations, exploring opportunities

Data-finding to examine a situation from many different viewpoints

- *Problem-finding to generate many possible statements of the problem and create a working problem statement*
- *Idea-finding to generate alternative solutions and choose those that are most promising*

- *Solution-finding to create criteria for evaluating ideas and then choosing one*
- *Acceptance-finding to consider sources of assistance and resistance and prepare specific plans for action*

Each of these stages has a “divergent phase” where many possibilities are considered, and a “convergent phase” where ideas are narrowed.

As might be imagined, these various attempts to describe and parse creativity lead to differing measurement strategies.

Relationship to Academic Achievement

The relationship between creativity and academic achievement is complex. Ai (1999) summarized a great deal of historical research as follows:

“The studies just cited can be divided into three groups according to their conclusions regarding the relation between creativity and academic achievement. Some studies found that creativity was related to academic achievement... Others found that creativity was not related to academic achievement... ...some researchers concluded that creativity was related to higher levels of academic achievement that required divergent and productive ability... (p. 330).

In trying to figure out why this literature is so mixed, researchers have generated several hypotheses for divergent findings across studies. Some have concluded that the effects of creativity on academic achievement are affected by intelligence so that high creativity can make up for somewhat lower intelligence (e.g., Yamamoto, 1964; Torrance, 1962). Others have found that the measure of creativity used in a study makes a difference in the findings (Ai, 1999) and still others find that some subscales of creativity are related to some kinds of academic achievement. For example, divergent thinking appears related to language fluency (Gras et al., 2010). Researchers have also detected gender differences in creativity and how it affects academic achievement (Baer, 1998; Furnham et al., 2006; Gras et al., 2010; Sethi, 2012).

Using a multilevel analysis of different kinds of classroom groupings (i.e., by ability), Freund and Holling (2008) were not the first to conclude that teachers value creativity differently. They argue that teachers often devalue creative behaviors exhibited by their students, even if they say they generally value creativity. They suggest that some teachers may be more intolerant of the independence or nonconformity exhibited by their most creative students. Beghetto (2010) points out that teachers often depict the ideal student as compliant and conforming—or convergent rather than divergent thinkers. This does not motivate them to try to enhance creativity. An empirical finding supporting this ambivalent attitude toward creativity is that conscientiousness—a much-valued characteristic by teachers—has been found negatively related to creativity (Furnham et al., 2006). They explain:

“...conscientiousness is positively associated with academic performance but negatively correlated with creativity. ...Indeed, there is an extensive literature to suggest that highly creative individuals are often poorly self-disciplined and indeed famous for the lack of conscientiousness.” (p. 142).

There is a great deal of writing from educators on how creativity can be enhanced in the classroom or how it is being destroyed by current educational practices, but in these works, creativity is often seen as a desirable outcome on its own, like math proficiency or high test scores, rather than as a social/emotional competency that will in turn, lead to these academic achievements.

There are also repeated assurances in this literature that when children are encouraged and offered opportunities to be creative, rather than being asked to learn responses to multiple-choice questions, they are more likely to be engaged in learning, which in turn, should lead to higher achievement. A historical study by Aikin (1942) tried to demonstrate that taking time from straight learning of facts in the classroom to do creative or inventive exercises did not damage students' achievement and in fact, led to slightly higher total grade averages, more awards, and higher grades in all subject fields.

Finally, there is also some discussion of the potential negative effects of creativity:

“...most studies of creativity seek to identify the causes of creativity examining thinking skills, motivations, dispositional characteristics, among other variables. One might, however, ask a different question: Exactly what are the effects of creativity on the individual, the people around him or her and the broader social system? ...creative work, by virtue of its intensity, may lead to a disrupted, rather shallow family life. ...rather than drinking causing creativity, creativity, as a result of the associated frustration and ambiguity, may cause alcohol abuse. Thus creativity, like most other human actions, may have good and bad outcomes.” (Mumford, 2003, p. 117)

Taken together, this literature paints a complex picture of the relationship of creativity to academic achievement. The relationship seems to be affected by how creativity is defined and measured and by what kind of academic behavior we are talking about. Further complications come from findings that both the characteristics of individuals and the contexts in which they learn may also affect this relationship. The literature also hypothesizes that the current stress on standardized testing in classrooms is not conducive to the development of creativity and in fact, may prevent development of this skill.

Malleability

There is a great deal of evidence, however, that creativity can be learned and there are publications on programs intended to enhance this skill (e.g., The Creative Education Foundation, The Creative Problem Solving Group, the Graduate Program of Critical and Creative Thinking at the University of Massachusetts, Boston and other sites; see Adams, 2005). Kaufman and Sternberg (2007) advise:

“Although one cannot directly teach creativity, one can teach for creativity. This involves, first and foremost, encouraging students to be creative and rewarding creative behavior. ...teaching for creativity requires the recognition that creativity is, in large part, an attitude toward life...”
(p. 58)

In fact, several authors have explored the use of rewards to encourage creativity, with mixed results. Eisenberger et al., (1998) found that offering explicit rewards increased the creativity of picture drawing among preadolescent children if they had previous training in divergent thinking or if instructions to children were explicit about the necessity for creative performance. But others argue that extrinsic rewards can produce negative effects on creativity if there is concern that one’s work will be evaluated. Some of these studies suggest that extrinsic rewards have negative impacts on girls but not boys (e.g., Baer, 1998; Amabile, 1996). Scott et al. (2004) have summarized the approaches to enhancing creativity as follows:

“...a number of approaches have been used to encourage creativity, including (a) provisioning of effective incentives... (b) acquisition of requisite expertise...(c) effective structuring of group interactions...(d) optimization of climate and culture...(e) identification of requisite career development experiences, and (f) training to enhance creativity.” (p. 361)

Their review of 70 studies on the effectiveness of these strategies finds generally positive effects on creativity. They recommend that creativity training should be based on a clear understanding of the particular skills required for creativity and should include opportunities to practice these skills with real world tasks.

Overall, we conclude that creativity is a complex concept that includes cognitive as well as non-cognitive elements, that it can be related to certain kinds of academic achievement, and that it is malleable. The complexity of the concept has given rise to a multitude of different approaches to its measurement and its secure relationship to academic performance—especially relative to concrete benchmarks like those StriveTogether uses—is not well established. Creativity is not always valued or encouraged in today’s test-focused classrooms and teachers may not readily warm to an emphasis on building this competency.

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