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Over the last several years, there has been a growing sense that we are not measuring what matters for children and their development. That is, by focusing assessment narrowly on academic growth, we may be missing the "something other" that seemingly lies below the surface of overt knowledge yet influences student results (Redding, 2014).

"Noncognitive variables" is the catch-all term often used to describe this "something other," capturing an array of constructs including "grit" (Duckworth, Peterson, Matthews, & Kelly, 2007), "mindset" (Dweck, Chiu, & Hong, 1995), "aspirations" (Quaglia, 1989), and now-classic terms such as "attitude" (Allport, 1935), "locus of control" (Rotter, 1954), "learned helplessness" (Seligman, 1972), and "self-efficacy" (Bandura, 1977). An unfortunate misnomer, the associated "noncognitive" constructs indeed represent cognitive (Borghans, Duckworth, Heckman, & ter Weel, 2008) and even metacognitive processes (Conley, 2013; Messick, 1979). The term is as inaccurate as it is vague.

Weak nomenclature aside, noncognitive variables seem to be having their day. They matter for their own sake, round out what is meant by an "educated" person, and contribute to successes we have in school, socially, and in our careers (Garcia, 2014). Philanthropists are investing millions of dollars to fund the development of measures for noncognitive variables (Blad, 2015a). The National Assessment of Educational Progress (NAEP), also known as the Nation's Report Card, is working to include measures of motivation, mindset, and grit in its background survey by 2017 (Sparks, 2015). The U.S. Department of Education's Skills for Success program awarded four 3-year grants nearing half a million dollars a year to school systems in 2015 for "implementing, evaluating, and refining tools and approaches for developing the noncognitive skills of middle-grades students in order to increase student success" (U.S. Government Printing Office, 2015, p. 32545). The recent renewal of the Elementary and Secondary Education Act (ESEA), now called the Every

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Student Succeeds Act (ESSA, 2015), allows states to use measures of social/emotional competency in their new accountability systems.

This growing awareness, understanding, and interest in noncognitive variables fuels motivation to make the elusive observable and transform the abstract into the concrete. Because they seem to matter in important ways to attainment and lifelong functioning, measuring these variables—and doing it well (i.e., accurately and consistently)—will provide the foundation to effectively cultivate them. So how do we do it?

A Series of Conundrums

The process of determining how to measure something involves preliminary steps that include agreeing upon what we are measuring, why we are measuring it, and for whom. Therein lies the measurement conundrum with these constructs (Dinsmore, Alexander, & Loughlin, 2008; Willingham, 2013). The challenge relates in part to the emerging discussion of just what these factors are, how they cluster and relate to each other, and how we collectively agree to define them.

Clarity in Concept: What Are We Measuring?

The idea that one must "define it before you size it" (Keohane, 2014) comes into play here. A strongly operationalized definition provides for construct validity, or "truth in labeling" (Trochim, 2006). This, in turn, can assist in the development of an array of measurement tools that, given the inherently varied assets and limitations of its parts, is, as a whole, securely tied to a consistently labeled, agreed-upon idea.

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In education, clarity and agreement can be elusive. The concept of learning, which at face value seems basic, generates an array of uncertainty. Are we capturing what a student knows at one point in time, or should we look at growth over time? Are we attending to the right learning standards that define what students should know and be able to do at various points in their educational journeys? Should these standards be consistent nationwide, or should states be allowed to define what is important in their own ways? Disagreement over these questions has stimulated pushback on attempts to measure learning, which relates not only to how we use assessment tools, but also what those assessments measure. Clear and agreed-upon definitions are critical to measurement, but achieving consensus is not always simple.

Redding (2014) has synthesized a range of these variables into four composite factors—cognitive, metacognitive, motivational, social/emotional—which he collectively terms the "personal competencies." These competencies represent many of the noncognitive factors as well as traditional "academic" learning and provide a categorical framework that can guide additional research, practice, and the development of metrics. Table 1 describes each of these competencies and represents some of the components within them.

Table 1. Personal Competencies Definitions and Components

Competency	Description	Components/Similar Concepts
Cognitive	Prior learning that organizes the mind and provides associations and understanding to facilitate new learning	• Cognitive content: Knowledge held in memory • Stored knowledge and understanding • Cultural knowledge • Cognitive structures (associational webs) • Curiosity: Cognition plus motivation • Vocabulary

Meta-cognitive	Self-regulation of learning and use of learning strategies	• Thinking about thinking
		• Self-regulation of learning; Self-appraisal and self-management:
		  ◊ Goal-setting and planning
		  ◊ Progress monitoring
		  ◊ Adaptation based on feedback
		• Problem-solving and analytical thinking
		• Learning strategies, such as mnemonics, distributed practice, practice testing
		• Logic, synthesis, evaluation
		• Divergent (creative) thinking

Motivational	Engagement and persistence in pursuit of learning goals	• Agency (locus of control; attribution) • Extrinsic and intrinsic • Incentives • Motivation to learn (mastery) • Self-efficacy perception • Expectancy value theory • Mindset (especially a growth mindset) • Flow • Aspiration

Social/Emotional	Sense of self-worth, regard for others, and emotional understanding and management to set positive goals and make responsible decisions	• Character traits, such as grit, resilience, generosity, independence, courage, optimism
		• Behaviors, such as attentiveness, impulse control, context-appropriate language
		• Learned skills, especially related to:
		  ◊ Understanding and managing emotions
		  ◊ Setting and achieving positive goals
		  ◊ Feeling and showing empathy for others
		  ◊ Establishing and maintaining positive relationships
		  ◊ Making responsible decisions

Note: This table was devised by Sam Redding and provided in a personal communication, March 4, 2015. Used by permission.

The University of Chicago Consortium on Chicago School Research (Farrington et al., 2012) has an alternative framework comprised of five composite factors related to academic performance, including:

a. **Academic behaviors:** Going to class, doing homework, organizing materials, participating, studying

b. **Academic perseverance:** Grit, tenacity, delayed gratification, self-discipline, self-control

   c. **Academic mindsets:** Psychosocial attitudes or beliefs one has about oneself in relation to academic work

   d. **Learning strategies:** Study skills, metacognitive strategies, self-regulated learning, goal-setting

   e. **Social skills:** Cooperation, assertion, responsibility, empathy

These frameworks, which conveniently and hypothetically cluster finer-grained noncognitive variables, may aid the sector by easing communication and leading to more consistent understanding and cohesive measurement approaches, particularly if a singular framework ultimately solidifies based on additional research. Currently, the nascent nature of the evidence about these frameworks precludes a decisive path forward. Frameworks can also introduce challenges by obscuring potentially valuable nuances within their factors or clusters. The degree to which overarching noncognitive constructs, such as Redding's motivational and social/emotional competencies, are interrelated or independent is unknown. Neither is it known if other components comprise these broader constructs, such as self-efficacy and mindset, and how they may overlap in practice. Finally, even with a reasonably consistent aversion to the "noncognitive" label among researchers and its portrayal in the educational media as a "big ambiguous category" (Blad, 2015b), the term continues in high rotation, necessitating its inclusion in any discussion about measuring this phenomenon.

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Socrates told us that the act of applying a common name is justified when we can account for the common nature behind that name. With noncognitive variables, we have work to do. Getting the categories and their components right, then agreeing upon their labels, is no small nor insignificant matter for the reliable understanding of these factors and, subsequently, our ability to measure them.

Clarity in Purpose: Why We Are Measuring

Studies factoring in the application of noncognitive variables in a variety of fields suggest the value they may add to long-term outcomes of elementary and secondary education. Economists have found that cognitive and noncognitive skills are equally important to an array of labor market (e.g., schooling, employment, wages) and behavioral outcomes (e.g., teenage pregnancy, smoking, drug use, participation in illegal activities; see Heckman, Stixrud, & Urzua, 2006). The military has identified that noncognitive factors such as grit predict the success of military officer candidates (Kelly, Matthews, & Bartone, 2014). Meta-analyses have shown that measures of noncognitive variables, such as integrity and conscientiousness, improve the ability to predict training success and job performance by 20% and 16%, respectively, over use of cognitive ability measures alone (Schmidt & Hunter, 1998). Sackett, Schmitt, Ellingson, and Kabin (2001), in examining employee selection and ethnic diversity, found that persistent gaps between ethnic groups on cognitive assessment scores were reduced or eliminated on measures of noncognitive skills. Similarly, noncognitive measures have been universally predictive of employment outcomes, regardless of education level.

In higher education, concentrating on noncognitive variables has proven valuable to the admissions process and to ultimate success in higher education (Sedlacek, 2003, 2005).

Namely, students representing strengths in the following areas have had more positive outcomes in postsecondary education, including retention, grade point average, involvement in extracurricular activities, and matriculation:

    a. Positive self-concept
    b. Realistic self-appraisal
    c. Successful leadership experience
    d. Ability to understand and cope with racism or the "system"
    e. Preference for long-range goals
    f. Access to a strong support person
    g. Participation in a community with which they can identify and from which they can receive support
    h. Ability to acquire nontraditional knowledge from outside the classroom

Evidence in the K–12 sector is slim but building and suggests a strong relationship between these kinds of noncognitive competencies, academic performance, and career success (Pellegrino & Hilton, 2012). Accessible and valid measures have the potential to help educators understand the baseline noncognitive tendencies of their students and bolster them as needed to enhance their learning experience. This brings us to back to the issue of "how."

Clarity in Process: How to Measure the Obscure

In the social sciences, constructs are called "latent" when they cannot be directly observed or measured. As with other latent variables, researchers and practitioners have drawn inferences about noncognitive variables both from other indicators, or "imperfect proxies" believed to represent them, and through statistical modeling (Bollen, 2002; Heckman et al., 2006). Herein lie additional issues related to the "measurement conundrum."

The "Doesn't-Add-Something" Issue

Many policymakers and scientists do not believe noncognitive variables can be accurately and consistently measured (Kyllonen, 2005). Behaviorists, in particular, suggest that it is useless to measure hypothetical constructs at all because they do not add value to pedagogy (i.e., tell us how to teach) and, in fact, may impede progress. Too often, the behaviorists argue, the constructs are used as "explanatory fictions" that serve to make instructional goals seem even more inaccessible and tend to provide new rationalizations for inadequate instruction (Greer, 1992, p. 27). Although they may acknowledge the presence of noncognitive variables, the inability to observe them directly prevents what behaviorists would consider the most rigorous method of measurement: the frequency and accuracy of desirable responses. This kind of measurement is not always familiar or valued by educators, who generally have little training in behavioral techniques, consider them difficult to accomplish, and, importantly, may find them objectionable for philosophical reasons.

The Flawed Measure Issue

Those attempting to tap into latent noncognitive variables are constrained to measure something else that is manifest or simpler to obtain, such as the opinions of students (self-report) or other knowledgeable sources, such as teachers or parents (other-report).

Surveys allow these opinions to be gathered at a relatively low cost across large groups and provide data that can be quantified. Interviews can probe more deeply into the perceptions of students or others but may not be feasible at a large scale due to cost, time requirements, and the difficulty of analyzing qualitative data.

Both self- and other-reports, no matter the method, have constraints. They lack standard benchmarks (e.g., how much "motivation" is enough, or necessary, or right?) to help researchers/practitioners interpret results. Research, in fact, suggests standards for noncognitive variables are context-sensitive, making ratings across educational systems susceptible to reference bias due to differences in school climate and the related standards to which students are held (West, 2014). Self-report methods, in particular, are notorious for their ability to be "faked" by respondents (i.e., have responses that are, either consciously or unconsciously, skewed to present the person advantageously). Even researchers engaged in this work lament that "unbiased, unfakeable, and error-free measures are an ideal, not a reality" (Duckworth & Yeager, 2015, p. 243).

The "Why Not?" Issue

Having deployed various strategies for gathering information and researching noncognitive variables for decades, William Sedlacek adds context to what could be perpetual hand-wringing about the limitations of measurement, saying: "Why wouldn't you try this? Maybe it won't work, but if you want to be innovative at all…why wouldn't you want to experiment?...Lead the way….don't wait for others…" (Sedlacek, as quoted by Martin, 2013).

Standardized tools may add value to the integrity of measurement but could homogenize what we attend to, value, and emphasize with a set of legitimately diverse characteristics. In relation to the purposes noncognitive measures are used for in higher education (e.g., student admissions), Sedlacek contends differentiated attempts to gather this information can align to the natural diversity of educational settings.

The Unintended Consequences Issue

To the degree measures do not capture what we intend to assess (i.e., they are invalid), or cannot do so consistently (i.e., they are unreliable), we risk drawing false conclusions and potentially allocating limited resources to ultimately ill-matched, poorly designed, or unnecessary interventions. These psychometric properties form the "evidential basis" for measurement. Yet the "consequential basis" matters too. Messick (1979) points out that noncognitive variables are entangled with value judgments, yet value judgments are subjective and socially influenced. At a time when the pursuit of "not trying" has become a matter of interest (Slingerland, 2014), the thought of making that which is unconscious and spontaneous (e.g., noncognitive variables) conscious, deliberate, and intervened-upon may, paradoxically, be counterproductive. Using noncognitive variables must be done with care and attention to potential drawbacks.

Existing Resources, Developing Work

Measurement challenges are not unique to noncognitive variables, and knowing the limitations does not need to contribute to paralysis for the education sector in its aim to capture information about them. Instead, the challenges highlight the importance of a balanced portfolio of measures representing multiple indicators of various kinds, yielding data captured at different points in time, and ideally assessing an array of noncognitive

factors to best understand the nuance and developmental changes of students (Dinsmore et al., 2008; West, 2014).

As with academic measures, so with multiple noncognitive measures: The inherent limitations of each individual tool or method may be mitigated and confidence in conclusions may be enhanced with findings that are consistent and/or complementary. Measurement portfolios may include tools capturing classroom climate and/or educational norms within a system that may contribute to and interact with self- and other-assessments of noncognitive variables. Ideally, a balanced portfolio would gather feedback from students and adults and about various learning settings, allowing us to consider the interaction between these factors.

Some measurement tools, both broader in noncognitive scope and more targeted to specific concepts and skills, have been developed for the K–12 sector. They are being deployed for research and practice purposes and are being enhanced over time. As more dollars have begun to flow to encourage researchers to develop valid and reliable metrics for this work, a more extensive collection of tools should begin to form.

Table 2 represents a sample of self- or teacher-report tools that show evidence of validity, are easily accessed, and are designed to be used with children, adolescents, and young adults. Not exhaustive, the list is intended to provide a sound starting point for educators and policymakers interested in investigating measurement options and has been aligned to Redding's four personal competencies. Several tools capture data across these competencies and are represented separately.

Table 2. Sample of Validated Self- and Other-Report Tools Developed for K–12 and Postsecondary Education

Personal Comp.	Instruments of Note	Examples/Sample Items
Cognitive	Existing tools within a balanced academic assessment framework.	• Large-scale, summative, standardized, annual • Formative, standardized • Diagnostic assessments • Classroom assessments • Behavioral indication of intellectual curiosity and cultural awareness

Personal Comp.	Instruments of Note	Examples/Sample Items
Metacognitive	**Self-Regulation Questionnaire (SRQ)** 63-item survey with 7 subscales related to planning behavior to reach goals. Scoring and psychometric information included (Brown, Miller, & Lawendowski, 1999). There is also an academic-specific self-regulation questionnaire (SRQ-A), including a standard version for elementary and middle school students (Ryan & Connell, 1989) and one specifically designed for students with learning disabilities (Deci, Hodges, Pierson, & Tomassone, 1992).	**SRQ** • *I usually keep track of my progress toward my goals.* • *My behavior is not that different from other people's.* • *Others tell me that I keep on with things too long.* • *I doubt I could change even if I wanted to.* • *I have trouble making up my mind about things.* • *I get easily distracted from my plans.* • *I reward myself for progress toward my goals.* **SRQ-A (Standard)** • *Why do I try to do well in school?* • *Because I enjoy doing my school work well.* • *Because I will get in trouble if I don't do well.* **SRQ-A (Learning Disabled)** • *I do my classwork because I want to learn new things.* • *I do my classwork because that's the rule.*
Motivational	**Theory of Intelligence** (Growth Mindset; Dweck, Chiu, & Hong, 1995), 16-item survey, available online with immediate feedback, with a focus on fixed vs. growth mindset in relation to intelligence and talent. **Harter Self-Perception Profile** (Harter, 2012), with versions for children, adolescents, learning disabled students, etc. The number of items on these multi-dimensional self-report questionnaires varies, but for each, the focus is on reporting self-concept domains that are sensitive to the relevant concerns at that developmental period. Each version is comprised of several scales (e.g., scholastic, social, athletic).	**Theory of Intelligence** • *You have a certain amount of intelligence and you really can't do much to change it.* • *You can learn new things, but you can't really change your basic intelligence.* **Self-Perception** • *Some kids feel that they are very good at their school work BUT* • *Other kids worry about whether they can do the school work assigned to them.* • *Some kids like the kind of person they are BUT* • *Other kids often wish they were someone else.*

Personal Comp.		Instruments of Note	Examples/Sample Items
Social/Emotional		**Grit Scale measure** (Duckworth, Peterson, Matthews, & Kelly, 2007), 12-item survey with two scales with focus on the specific concept of grit. Scoring information included. **Devereux Student Strengths Assessment (DESSA;** teacher report; LeBuffe, Shapiro, & Naglieri, 2009), 72 norm-referenced items across 8 scales assess social/emotional competencies for children in K–8th grade.	**Grit Scale** Consistency of Interest Scale: • *I often set a goal but later choose to pursue a different one.* • *New ideas and new projects sometimes distract me from previous ones.* Perseverance of Effort Scale: • *I have achieved a goal that took years of work.* • *Setbacks don't discourage me.* **DESSA (teacher report)** During the past four weeks, how often did the child… • Give an opinion when asked? • Stay calm when faced with a challenge? • Keep trying when unsuccessful? • Express concern for another person? • Handle his/her belongings with care? • Accept responsibility for what he/she did? • Say good things about herself/himself?
Multiple Competencies	K–12	**Character Report Card (KIPP)** Multiple teacher ratings pooled for students on factors such as zest, grit, self-control, optimism, gratitude, social intelligence, and curiosity.	• Actively participates • Finishes whatever he or she begins • Comes to class prepared • Keeps his/her temper in check • Gets over frustrations and setbacks quickly • Recognizes and shows appreciation for others • Is able to find solutions during conflicts with others • Is eager to explore new things
	Postsecondary	**Motivated Strategies for Learning Questionnaire** (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1991) **Noncognitive Questionnaire** (NCQ; Sedlacek, 1996) Designed to assess long-range goals, positive self-concept, realistic self-appraisal, racism, and availability of strong support. **Personal Potential Index** (PPI; Kyllonen, 2008) In 24 items, captures applicant-specific information from multiple raters on core personal attributes important for success in graduate study (knowledge and creativity, resilience, communication skills, planning and organization, teamwork, ethics, and integrity) **Taps** Motivation (31 items: goals and value beliefs); Learning strategies (31 items: cognitive & metacognitive strategies); Management of resources (19 items). Manual with scoring and psychometric data included (updated psychometric information from Rotgans & Schmidt, 2010).	**MSLQ** • *If I study in appropriate ways, then I will be able to learn the material in this course.* • *When I take a test, I think about how poorly I am doing compared with other students.* • *I think I will be able to use what I learn in this course in other courses.* • *I believe I will receive an excellent grade in this class.* **NCQ** • *These are three things that I am proud of having done.* • *Once I start something, I finish it.* • *When I believe strongly in something, I act on it.* • *If I run into problems concerning school, I have someone who would listen to me and help me.* **PPI** • Is intensely curious about the field • Works well in group settings • Can overcome challenges and setbacks • Organizes work and time effectively • Demonstrates sincerity

Another promising measure is a survey slated for imminent release by the California Office to Reform Education (CORE) and developed in collaboration with the organization Transforming Education (2014). Designed and piloted to assess four competencies, which are described as interpersonal and intrapersonal, the measure suggests consistency in thinking, if not clear alignment, to Redding's personal competencies, as indicated in Table 3. Sample items released in 2014, provide insight into what to expect (see Table 3).

Going beyond the limitations of self-report tools, KIPP (KIPP Foundation, 2016) has deployed a Character Growth Card (Character Lab, 2016) that pools multiple teacher ratings for students on factors such as zest, grit, self-control, optimism, gratitude, social intelligence, and curiosity, hitting cross-cutting elements of the personal competencies. Some sample indicators in the Character Growth Card include:

- Actively participated
- Finished whatever s/he began
- Came to class prepared
- Kept temper in check
- Recognized what other people did for them
- Was able to find solutions during conflicts with others
- Was eager to explore new things

Table 3. CORE's Four Competencies' Alignment to Redding's Competencies and Sample Survey Questions

CORE Competency	Description	Alignment to Redding's Personal Competencies	Sample Survey Questions
Growth Mindset	Belief that one can change as a result of effort, perseverance, and practice	**Motivational**	(reverse coded) • *My intelligence is something that I can't change very much.* • *Challenging myself won't make me any smarter.* • *There are some things I am not capable of learning.* • *If I am not naturally smart in a subject, I will never do well in it.*
Self-efficacy	Belief in one's ability to succeed in achieving an outcome or reaching a goal	**Motivational**	• *I can earn an A in my classes.* • *I can do well on all my tests, even when they're difficult.* • *I can master the hardest topics in my classes.* • *I can meet all the learning goals my teachers set.*

CORE Competency	Description	Alignment to Redding's Personal Competencies	Sample Survey Questions
Self-management	Also known as "self-control" or "self-regulation," this is the ability to regulate one's emotions, thoughts, and behaviors effectively in different situations	**Metacognitive and Social–Emotional**	• *I came to class prepared.* • *I remembered and followed directions.* • *I allowed others to speak without interruption.* • *I worked independently with focus.*
Social Awareness	Ability to take the perspective of and empathize with others from diverse backgrounds and cultures; to understand social and ethical norms for behavior; and to recognize family, school, and community resources and supports	**Social–Emotional**	• *When others disagree with you, how respectful are you of their views?* • *When people are already talking together, how easy is it for you to join the group?* • *When you have problems at school, how easily can you find ways to solve them?* • *To what extent are you able to stand up for yourself without putting others down?*

On the international K–12 scale, the Programme for International Student Assessment (PISA), developed and administered by the Organisation for Economic Co-operation and Development (OECD), has complemented the data it collects related to cognitive student achievement in reading, mathematics, and science literacy with information on noncognitive outcomes (e.g., students' learning motivation), individual conditions (e.g., students' cultural, ethnic, and socioeconomic background), and characteristics of the institutional context (e.g., instructional practices, opportunities to learn, professional development). Various stakeholders, namely students and school principals, participate. Although the tool is not designed for application in practice and represents a narrow band in the developmental continuum (i.e., participants are 15-year-old students), the longitudinal data it provides lends international context to understanding how these factors play out over time, in relation to educational outcomes and contextual variables, and on a comparative basis with 65 countries and world economies. Already, PISA data suggest that student self-efficacy on cognitive tasks correlates with student achievement within and across participating countries (OECD, 2015).

In the higher education sector, Sedlacek (n.d.) has developed many freely available resources for measuring noncognitive variables that, albeit developed in the context of student selection, may suggest modified versions or methods for the K–12 sector. Richardson, Abraham, and Bond (2012), in a meta-analysis focused on 13 years of research with university students, provide an exceptionally thorough inventory of noncognitive (or nonintellective, as they call it) measures used in hundreds of studies that the researchers align to distinct research domains:

- Personality traits
- Motivation factors
- Self-regulatory learning strategies
- Students' approach to learning
- Psychosocial contextual influences

Included in this resource is a definition for each noncognitive attribute and representative items from key measures. Although compiled for research purposes, this too may provide valuable guidance to K–12 educators and researchers eager to develop ways to measure, either formally or informally, these variables. They also provide an extension to the developmental context of noncognitive factors as they suggest what is valued and applicable beyond the K–12 experience.

Emerging rapidly, due to an assist from technology, are efficient ways to capture behavioral representations of noncognitive performance (Stecher & Hamilton, 2014). By mining data behind virtual learning programs, researchers are beginning to understand learner behavior in response to challenges in those environments—mapping interactive engagement to user frustration, perseverance, persistence, motivation, or attempts to "game" the system. These data, examined for specific tasks or aggregated over many tasks, are being used to understand the relationship they have with learning outcomes and to improve the design of the systems themselves. Baker's chapter in this book explores this topic in depth.

Finally, research and development agendas related to measuring these "hard-to-measure" but important noncognitive variables are underway and are likely to bear fruit in the years ahead. RAND Education has discussed the importance of an evidence-based, rigorous, outcomes-related effort focusing on those variables that are of greatest interest and may be most likely to be used in high-stakes situations (e.g., college admissions). This lengthy process, it indicates, should be managed by independent research-coordinating boards, funded by foundations and agencies, and done in collaboration with tool developers (Stecher & Hamilton, 2014).

Onward

What we measure affects what we attend to, how we think, and what we do (Hauser & Katz, 1998). Accordingly, we must measure what we believe matters, even if it is difficult. In education, it is undeniably necessary to measure academic learning, but such measurements are arguably insufficient due to our recognition that the "something other" does matter, even if it is dicey to measure (Shechtman, DeBarger, Dornsife, Rosier, & Yarnell, 2013; West, 2014). As the evidence builds that noncognitive variables are a critical component to human development, learning, and achievement, we may need to accept (for now) the value of measuring what is "vaguely right," which is arguably better than measuring what is "precisely wrong" (Hauser & Katz, 1998).

Over time, educators must strive to emphasize these factors with students in the pursuit of greater and more holistic learning, work to refine their understanding of these variables, arrive at consensus in their definitions, then determine how they are best measured. Effective measurement legitimizes concepts, allows us a method to understand their state in both static and dynamic ways, provides the opportunity to experiment and capitalize upon them, and helps us understand their value. Better measurement will help refine our work.

Important and meaningful research and development is likely to ensue over the years, and policymakers are providing incentives to do so. Eventually, with valid, reliable, and realistically attainable feedback on noncognitive variables, traditional accountability frameworks may be supplemented with additional practical information that can be integrated into program designs, instructional methodologies, student skillsets, and differentiated interventions. Other reasons for measuring these constructs include:

- Providing practical tools to guide educators in their work with learners
- Assisting with program design and evaluation
- Aiding further research
- Providing early warnings for vulnerable students who may benefit from special services

That said, now is not the time to embed these factors into formal accountability frameworks. It required decades to ready academic assessments for this purpose, and educators must allow the scientific method to unfold to support doing so with noncognitive variables. In the meantime, educators may proceed with caution. Because the act of measuring mirrors the act of attending to a matter, that may be a reasonable starting point for educators and their relationship with these individual noncognitives and/or their related composites, such as personal competencies. In the spirit of Sedlacek (2005), we may opt not to wait and to use existing measures or create new methods. Or we may take a cautious approach, given the various issues related to the "measurement conundrum." Either way, some recommendations may be in order as educators build awareness for themselves and the field.

Action Principles for States, Districts, and Schools

Action Principles for States

a. Start by understanding the value of noncognitive variables. Read the existing literature and keep tabs on progress, as new developments, both in terminology and metrics, are occurring rapidly.

b. Remember context. Emphasize that, as we measure students, we must also reflect on teachers, the environment, and the interaction among these, or at least keep those influences in mind as we draw inferences and act.

c. Encourage healthy pedagogical exploration but avoid embedding results into formal accountability systems, as the tools are not designed for that purpose and, psychometrically, have too many limitations at this time to do so.

Action Principles for Districts

a. Frame the work as complementary to whatever standards of learning are being embraced by the district. Using the research, help teachers understand how noncognitive skills are part of a whole for child development, not a different or unrelated strand of work happening. Reflect upon the values (and limitations) of the measurement tools and interventions.

b. Encourage the use of multiple formative measures to avoid "locking" students into a noncognitive performance level. Foster a culture that can respond dynamically to the predictable developmental changes of students as well as those that are cultivated intentionally by the learning climate.

Action Principles for Schools

a. Observe the learning process with fresh eyes. Build your awareness of how non-cognitive factors manifest themselves, not only in students, but also in yourselves and in other adults. Pay attention.

b. Hypothesize. In terms of practice, consider whether particular students are candidates for knowing more about their current status and/or may benefit from intervention/support.

c. Consider piloting some measures. Within a low-stakes environment, use some measures to gather evidence on targeted noncognitive variables; attempt a few complementary approaches such as self- and other-report (likely teacher). Work with perhaps a small group of interested educators to review findings and discuss how the learning environment or process may shift or adjust to help students harness or improve upon their noncognitive skills and learning performance.

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