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Workshop to Examine Current and Potential Uses of
NCES Longitudinal Surveys
by the Education Research Community

Improving Outcome Measures Other Than Achievement

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INTRODUCTION

Educational success is critical in a modern industrial economy. Academic outcomes, such as degree attainment or academic test scores, are often assessed because they are widely known to predict occupation, income, health, and other outcomes. However, noncognitive outcomes, such as social competence and health-related behaviors, are important as well (Heckman & Kautz, 2013; Levin, 2012). Noncognitive outcomes or character skills also contribute to, or undermine, educational attainment, labor market success, health, behavior, and earnings (Durlak et al., 2011; Lippman et al., 2014b; Heckman & Kautz, 2013; Steinberg, 2005). In addition, nonacademic outcomes, or competencies, are also intrinsically important to child and youth development in their own right (Bornstein et al., 2003; Peterson and Seligman, 2004).

Many noncognitive outcomes are already included in National Center for Education Statistics (NCES) surveys, for varied ages (see Table 1). In this paper, we suggest several constructs that have not been included in previous NCES surveys that research suggests would be valuable additions to surveys assessing educational and life success. The noncognitive constructs that we consider most critical are

- Self-regulation,
- Agency/motivation,
- Persistence/diligence/coping skills, and
- Executive functioning.

In addition, a number of important noncognitive constructs have already been included in educational surveys, and we highlight several that research suggests are particularly important to retain. These include

- Social skills/social competence;
- Positive relationships with family and peers;
- Physical health and special health care needs;
- Activities, such as sports, art, and music;
- Positive behaviors, such as volunteering and environmental stewardship;
- Academic self-efficacy;
- Educational engagement; and
- Internalizing/emotional well-being.

DEFINING A NONACADEMIC OUTCOME

Nonacademic "outcomes" have been defined as "the personal attributes not thought to be measured by IQ tests or achievement tests" (Heckman & Kautz, 2013, p. 10). They go by many labels, including noncognitive outcomes and socioemotional skills, and character. They include health, emotional development, behavior, and social development. These "outcomes" are not, of course, outcomes in any final sense. Rather, they represent well-being at a point in time, which reflects influences experienced up to that time; moreover, they will, in turn, affect future outcomes.

TABLE 1 Constructs for Consideration in NCES Longitudinal Surveys

0–5 Years (before Kindergarten)	6–11 Years (including Kindergarten)	12-17 Years
Health and Safety		
Health status (physical, dental)	Health status (*physical*, dental)	Health status (physical, dental)
Chronic health conditions	*Chronic health conditions*	*Chronic health conditions*
Time watching TV, videos, YouTube	*Time watching TV, videos, YouTube*	*Time watching TV, videos, YouTube*
Time playing games, using electronic devices	*Time playing games, using electronic devices (out of school)*	*Time playing games, using electronic devices (out of school)*
Exercise	*Exercise*	*Exercise*
Diet	*Diet* (soda, salty snacks, vegetables)	*Diet* (soda, salty snacks, vegetables)
	Eating breakfast	Eating breakfast
Sleep (adequate, hours)	Sleep (adequate, hours)	Sleep (adequate, hours)
Safe from injury (wearing bicycle helmets, seatbelts, etc.)	Safe from injury (wearing bicycle helmets, seatbelts, etc.)	Safe from injury (wearing bicycle helmets, seatbelts, etc.)
		Sexual harassment in school
Victim of violence and bullying	Victim of violence and bullying (staying home from school because felt unsafe)	Victim of violence and *bullying* (staying home from school because felt unsafe)
	Risk management skills (avoiding risky behaviors)	Risk management skills (avoiding risky sex, substance use, distracted driving, following driver's license requirements, etc.)
Psychological and Emotional Development		
Internalizing (sad, blue)	Internalizing (*depressed, anxious*)	Internalizing (*depressed*, *anxious*, suicidal)
Mental health	Mental health	Mental health
Externalizing emotions (anger, tantrums)	Externalizing emotions (anger, frustration)	*Externalizing emotions* (anger, frustration)
Motivation	Locus of control, motivation, agency	Initiative taking *Internal locus of control*, motivation, agency
Persistence, grit, tenacity, diligence, and reliability	Persistence, grit, tenacity, diligence, and reliability	Persistence, grit, tenacity, diligence, and reliability
Emotional competence	Emotional competence	Emotional competence
Creativity	Creativity	Creativity
Life satisfaction	Life satisfaction	*Life satisfaction*
Self-management (autonomy, *self-regulation*)	Self-management (*autonomy*, *self-regulation*, constructive time use, self-efficacy, growth mindset)	Self-management (autonomy, self-regulation, constructive time use, self-efficacy, *growth mindset*)
	Goal setting, high expectations, purpose, optimism, hope	Goal setting, *high expectations*, purpose, optimism, hope
Honesty	Honesty and integrity	Honesty, integrity, ethical standards
Bouncing back from challenges	Bouncing back from challenges	Bouncing back from challenges

TABLE 1 Continued

0–5 Years (before Kindergarten)	6–11 Years (including Kindergarten)	12-17 Years
Social Development and Behaviors		
Social skills/social competence	Social skills/social competence	Social skills/social competence
Cooperation	Cooperation	Cooperation
	Cross-cultural competence	Cross-cultural competence
Externalizing behavior problems	Externalizing behavior problems (conduct disorder, *fighting*, bullying, delinquency, being suspended/expelled, classroom and nonclassroom misbehaviors)	Externalizing behaviors problems (conduct disorder, *fighting*, *bullying*, delinquency, *being suspended/expelled*, classroom and nonclassroom misbehaviors, crime)
		Carrying a weapon
		Dating, sex, and *birth history*
		Dating violence, sexual harassment
Activities	*Activities*	*Activities*
Play group	Sports	Sports
Preschool enrollment		
Religious participation	Religious participation	Religious participation
	Arts, music, drama	Arts, music, drama
	Volunteering (giving back)	Volunteering (giving back)
		Teamwork, working in diverse groups
		Civic knowledge and *engagement*
	Prosocial orientation, moral character	Prosocial orientation, moral character
	Environmental stewardship	Environmental stewardship
		Effective written communication
Cognitive Development and Education		
	Educational engagement: Cognitive, emotional (including school connectedness), behavioral	*Educational engagement:* Cognitive, emotional (including school connectedness), behavioral
	Academic self-concept	*Academic self-concept*
Approaches to learning	*Approaches to learning, attentiveness*	Approaches to learning, attentiveness
Curiosity	Curiosity	Curiosity
Executive functioning	Executive functioning	Executive functioning
		Knowledge of essential life skills (financial management, decision making, etc.)
		Knowledge of careers and work requisites

continued

TABLE 1 Continued

0–5 Years (before Kindergarten)	6–11 Years (including Kindergarten)	12-17 Years
		Rigorous coursetaking
		Analysis, evaluative, and *critical thinking, problem solving*
	Lifelong learning skills and interactive use of technology	Lifelong learning skills and interactive use of technology
Relationships (quality)		
Parents	Parents	Parents
Attachment	*Closeness*	*Closeness*
	Communication	Communication
Siblings	Siblings	Siblings
Peers	*Peers*	*Peers*
Other adults	Other adults	*Other* adults

NOTE: Constructs in *italics* have been included in NCES longitudinal surveys in the past in some format.

Nonacademic outcomes can encompass behaviors, competencies, subjective feelings, attitudes, and values. Moreover, well-being comprises both positive and negative elements (Lippman et al., 2014b; Moore & Lippman, 2005; National Research Council & Institute of Medicine, 2002). Federal surveys and indicator systems have a history of measuring and reporting on negative child and youth outcomes, such as mortality, crime, violence, and adolescent childbearing, though NCES and the National Institute of Child Health and Human Development (NICHD) have been exceptions to this pattern. While recognizing the importance of negative outcomes (Baumeister et al., 2001), a balanced portrait of childhood requires positive measures as well as negative measures (Moore & Lippman, 2005).

Priority is given to those characteristics of a child or adolescent which have been found to have a strong influence on educational success, though additional factors which are intrinsically important for children's development and well-being are also discussed in this chapter. Although they represent a primary domain of child well-being, discussion of academic outcomes such as educational attainment and cognitive or achievement test scores is excluded from this paper, as they are examined extensively in other papers.

Another important contributor to educational success, children's contexts and environments (e.g., family processes, school practices, and neighborhood characteristics), is also excluded from this paper. While much research confirms the effects of family structure, economic factors, school characteristics, and climate, neighborhood, and family processes on educational outcomes (Ainsworth, 2002; Crosnoe et al., 2004; Ginther & Pollak, 2004; Lippman et al., 2013; Ripski & Gregory, 2009), the focus in this paper is on measures that are needed in NCES surveys to assess outcomes at the level of the individual child. Measures of children's contexts and environment are inputs which affect children's development and would generally be considered independent variables in analyses of children's development.

On the other hand, this paper will consider children's relationships. The relationships between children and youth and family members, peers, and other adults in their environments have not been uniquely identified as a primary domain of child well-being historically. However, two of the current authors identify relationships as a domain of child and adolescent well-being in our work (Lippman et al., 2009, 2011), since they represent the interaction of individual children and adolescents with others, and reflect the individual qualities, behaviors, and attitudes of those individuals. Unfortunately, the importance of children's relationship quality is often overlooked in national surveys. The quality of relationships is an extremely important aspect of well-being. In fact, children and adolescents often identify them as the most important aspect of their well-being (National Economic and Social Council, 2009). Moreover, positive relationships have a powerful influence on educational outcomes and child development more generally (Blum & Rinehart, 1997; Catalano et al., 2002; Klem & Connell, 2004; National Scientific Council on the Developing Child, 2004). In addition, positive relationships are a primary predictor of life satisfaction (Dew & Huebner, 1994; Heubner et al., 1999; Oberle et al., 2011). This category can include relationships with parents, teachers, siblings, peers, and others, such as a coach or mentor. Like other outcomes and competencies, relationships function both as independent variables and as dependent variables.

The Importance of Nonacademic Outcomes

Research that incorporates nonacademic outcomes serves a variety of purposes for researchers, practitioners, and policy makers.

Providing an Accurate Understanding of Child Development and Educational Progress

When a rich array of variables is available for analysis, a more complete understanding of the etiology of development is possible. For example, when all we know about a student is his or her grades, it is likely that tutoring programs will represent the most obvious approach to improving educational success. Understanding the rich array of factors that affect educational progress (Princiotta et al., 2014b) makes it more clear that there are a myriad of factors that affect educational outcomes. Thus, a broader and likely more effective approach to education is suggested (Moore et al., 2014b).

Avoiding Omitted Variable Bias

Another way to view the importance of noncognitive outcomes is through the lens of omitted variable bias. This bias occurs when researchers leave out independent variables that are related to outcomes of interest. This omission can lead to incorrect estimates of the magnitude of the effects of academic predictors or misattribution of causality (Angrist & Pischke, 2009; Barreto & Howland, 2005). For example, given research indicating that physical and mental health problems increase the risk of dropout, failing to include a measure of physical and mental health in a multivariate analysis of longitudinal survey data is likely to produce estimates of the magnitude of other variables that are larger than they would be if variables measuring physical and

mental health were included in the model. Thus, policy makers might get a false sense of the magnitude of those variables that are included in an equation.

Assessing Workforce Readiness

Also, to fully describe the readiness of youth in the United States for workforce participation and success, it is not enough to measure whether youth have a degree or a certificate (Gutman & Schoon, 2013; Heckman & Kautz, 2013; Levin, 2012). Beyond degrees, it is necessary to have various character strengths (e.g., diligence, empathy, self-control, tolerance, and openness to new experiences) and soft skills (e.g., timeliness and attentiveness) to be successful in the labor market (America's Promise Alliance, 2006, 2007; Guerra & Modecki, n.d.; Heckman & Kautz, 2013; Levin, 2012; Lippman et al., 2008).

Informing Intervention Approaches

To develop effective intervention efforts, it is valuable to identify potential core components from basic research studies (Child Trends, 2013; Embry et al., 2013). Specifically, with longitudinal data that include a rich array of variables, cognitive and noncognitive, researchers can assess whether and how health, emotional and psychological, and behavioral outcomes affect educational success. For example, nonacademic factors, such as school climate, externalizing, and bullying behavior, have been found related to lower educational engagement and thus academic attainment (Becker & Luthar, 2002; Bridgeland et al., 2006; Davis & Jordan, 1994; Lau & Roeser, 2002; Wentzel, 1998). This suggests that school climate, externalizing, and bullying behavior might be targets for intervention programs that seek to improve educational outcomes. Including other such noncognitive constructs in surveys could further inform development of future interventions.

New research can also inform improvement of existing intervention approaches. For example, Child Trends recently completed analyses of the National Education Longitudinal Survey (NELS) to identify predictors of high school dropout for a study of integrated student services. In a multivariate analysis, the most powerful predictor of dropout—with a larger odds ratio than eighth-grade math scores—is being a teen parent or expecting a child in tenth grade (Moore et al., 2014b). This information highlights a noncognitive risk factor—teen parenthood—that is a recognized risk factor for school dropout. This understanding has informed the development of programs to address adolescent pregnancy and parenting. Future efforts to improve educational outcomes will need the next generation of this kind of information to identify the as yet unmeasured malleable factors (such as 21st-century communication, information, and media skills for using new and evolving technologies) that will need to be targeted.

Analyses of Subgroups, Interaction Effects, and Mediators

Data on nonacademic outcomes can also allow program providers and policy makers to identify particular subgroups in need of assistance or intervention. For example, adolescents with health conditions, substance abuse problems, and behavior

problems likely represent subgroups for whom the predictors of educational success differ from the findings based on all students.

A comparable argument can be made for the value of data on nonacademic outcomes to assess the mediators or pathways by which various programs, experiences, and policies affect well-being. For example, mental and physical health might mediate the effect of curriculum interventions on educational outcomes (Boccanfuso et al., 2010). In addition, interaction effects may occur, such that school characteristics matter most or only for students with particular character or emotional characteristics. Research on such complex effects requires rich data to identify subgroups, mediating variables, and interaction effects.

The Intrinsic Importance of Child Well-Being

Thirty years ago, the notion that children's well-being, broadly construed, was intrinsically important was just beginning to gain currency, with the publication of the State of the Child report by UNICEF in 1979 and other child well-being monitoring efforts (Lippman, 2007). Today, the value of nonacademic competencies, including measures of subjective well-being and social and emotional learning, is accepted (Deke & Haimson, 2006; Lippman et al., 2008; Lotkowski et al., 2004; Rosen et al., 2010).

CONCEPTUAL FRAMEWORKS THAT UNDERLIE THE IDENTIFICATION AND SELECTION OF CONSTRUCTS

Three perspectives inform this paper: the life-course model, the whole-child perspective, and approaches to learning. A database that will be relevant for multiple disciplines and understanding complex processes will reflect these perspectives, at the least.

Life-Course Model

The life-course model posits that an outcome at any one stage of development is generally an input at the next stage of development. Researchers seek to examine how development unfolds over time (ideally, in fact, before birth, beginning with the circumstances of pregnancy). Interestingly, Cunha et al. (2010) found that noncognitive skills are malleable throughout childhood whereas cognitive skills are more malleable in early childhood. They argue that fostering noncognitive skills during adolescence is more effective than fostering cognitive skills.

Also, many policy makers, taxpayers, and parents also care about how children negotiate the transitions into and through school and from high school into postsecondary education and training, emerging adulthood, and entry into the workforce. Accordingly, we need to consider noncognitive measures from early childhood through high school, recognizing that these noncognitive skills are crucial to educational and workforce outcomes (Dweck et al., 2011; Duckworth et al., n.d.; Gutman & Schoon, 2013; Levin, 2012). This line of research is important because it highlights the malleability of noncognitive outcomes throughout the school years (Cunha et al., 2010).

Whole-Child Perspective

The whole-child perspective posits that research and monitoring studies need to encompass physical development and safety, psychological and emotional development, social development and behavior, and also cognitive development and approaches to learning (Weissman & Hendrick, 2013; Zaff et al., 2003; Zigler & Bishop-Josef, 2006). Analyses based on this widely accepted perspective will include variables from multiple domains, as independent variables or as control variables, in order to understand development.

Child Trends has assessed a variety of perspectives where researchers and practitioners focus on varied outcomes (Moore et al., 2008b). The particular categories and labels vary, but similar broad domains tend to be widely employed (Bornstein et al., 2003; Federal Interagency Forum on Child and Family Statistics, 2013; Lippman et al., 2009, 2011; Moore & Theokas, 2008; Moore et al., 2008; Zigler & Bishop-Josef, 2006). As noted, we are also adding a fifth category, relationships, because relationships have been identified as a critical element of child well-being and a critical antecedent of educational and life success (Bornstein et al., 2003; Lippman et al., 2009). These domains are

- Educational achievement and cognitive attainment,
- Health and safety,
- Emotional and psychological well-being,
- Social behavior, and
- Social relationships.

Approaches-to-Learning Perspective

The approaches-to-learning perspective is a point of view that is not as universally used among researchers studying child and youth development. However, this viewpoint, which highlights a number of noncognitive skills, is important in fleshing out studies of education, to ensure that educational variables go beyond measures of achievement and grade progression and include *how* students learn. Examples of relevant constructs include initiative and curiosity, persistence and attentiveness, and cooperation (Biggs, 1987).

POTENTIAL CONSTRUCTS FOR INCLUSION

Drawing on these perspectives, potential constructs can be identified. Specifically, based on the life-course perspective, we have identified constructs across the stages of childhood: preschool (ages 0–5), childhood (ages 6–11), and adolescence (ages 12–17). Reflecting the whole-child perspective, we identify constructs within each of the five domains noted above. Given the focus on education, we emphasize constructs that assess approaches to learning. To organize our work and presentation, we suggest subdomains within each domain. This strategy implies the grid presented in Table 1.

To put these in the context of what NCES has measured at some point, we note constructs in italics have been included in NCES longitudinal surveys in the past in some format. For example, NCES has fielded the Social Skills Rating Scale in the Early Childhood Longitudinal Study–Kindergarten Cohort (ECLS-K). Nevertheless, there

are many other opportunities for inclusion of varied nonacademic outcome measures across the longitudinal program addressing each age group.

Physical Health, Development, and Safety

Physical health and safety are prerequisites for healthy child development. This domain includes health status, chronic health conditions, and health risk and promotion behaviors. Health risk behaviors vary by age and can include screen time, substance use, and risky sexual behaviors. Health promotion behaviors, on the other hand, include a healthy diet, exercise, safety, and sufficient sleep (Bornstein et al., 2003; Conner, 2003). While these constructs are addressed in many health surveys and studies, it is also important to include health constructs in educational surveys because health affects educational outcomes (Zaff et al., 2003).

Psychological and Emotional Development

This domain captures both positive and negative aspects of psychological and emotional development. The importance of these outcomes has received increasing attention (National Research Council & Institute of Medicine, 2009). Internalizing and externalizing problems both undermine development. Internalizing includes depression, anxiety, suicidality, and loneliness. Externalizing refers to negative emotions like ongoing anger and frustration.

Despite the importance of these negative emotions, positive as well as negative measures are needed to provide a balanced perspective on outcomes. Positive social-emotional development includes having a positive self-concept, emotional competence, empathy, hope, goal orientation, academic self-efficacy, internal locus of control, intrinsic motivation, self-regulation, and life satisfaction. Developing an identity is an especially important task in the adolescent age range.

Coping skills are another positive subdomain of psychological and emotional development; this construct includes self-management (including persistence, motivation, initiative, time management, and high expectations). Given that nearly every child faces adversity to some degree, coping skills are very important for a developing child. (There is a question in the National Survey of Children's Health about whether the child "bounces back," which captures a coping orientation.) Self-regulation is also widely recognized as a very important skill for healthy development across age spans. There are a variety of measures available for social-emotional development. For example, the Forum on Child and Family Statistics (www.childstats.gov) is currently creating a compendium of measures of social-emotional development in early childhood.

Social Development and Behavior

The social domain includes subdomains of social competence, activity engagement, positive social behaviors, and negative social behaviors. Clearly, social competence, the ability to collaborate and cooperate, and a prosocial orientation, such as tolerance for the many differences that characterize our diverse country, represent an important skill set.

Activity engagement has been found strongly related to educational outcomes, but the type of activity has varied implications for nonacademic outcomes (Barber, 2005). It is important to encompass a variety of types of activities, such as clubs, sports, and religious activities, because students have diverse interests and participate in different types of activities. Accordingly, items asking about these activities are important to retain in NCES longitudinal surveys.

Positive social behaviors include volunteering or community service, on which NCES has a history of collecting data, and we would add environmental stewardship, which is going to be very important for the next generation.

Negative behaviors include externalizing behaviors such as bullying and fighting, as well as substance use and early sexual activity for adolescents. As noted, according to Child Trends' analysis of NELS, having a baby is by far the largest predictor of dropout. Students are almost three times as likely to drop out if they have a baby by tenth grade (Moore et al., 2014b). Students who have a child in high school are also less likely to complete postsecondary education. According to original analyses of the Beginning Postsecondary Students data, students who have a child during their first year of postsecondary education are also significantly less likely to graduate (Princiotta et al., 2014a). Negative behaviors such as delinquency, substance abuse, and disciplinary problems in school, already collected by NCES (see Appendix, Table A1), need to continue to be collected because of their association with academic outcomes.

Cognitive Development and Education

The cognitive development and education domain refers, of course, to academic attainment, but it also includes the skills, attitudes, and behaviors, and underlying executive functioning, that promote learning and educational success in an educational setting. Educational engagement refers to how students are cognitively, emotionally, and behaviorally engaged in their learning, including cognitive interest in the work, behaviors such as attending class prepared, and emotional attachment to school and teachers.

Approaches to learning reflect *how* students learn—what goes on behind the scenes within a student. Curiosity expands learning to be interactive and includes the desire to learn more about a subject (Kashdan, 2009; Wentworth & Witryol, 2003). Problem solving is a cognitive skill that students may learn in a formal educational setting, or more informally. It is described as developing or planning a sequence of actions to provide varied ways to solve a problem (Smith, 2003). These skills can be viewed as mediators. They would be useful when observing a classroom or trying to understand why children achieve or do not achieve.

Relationships

As discussed above, relationships are critically important to children's well-being and healthy development. Relationships can be between a child and his or her family (parents, siblings, etc.), peers (friends, classmates), other caring adults, or, for some, with a spiritual being. In subsequent sections, we discuss potential measures.

NCES has included measures of relationships in a number of its surveys, including the High School Longitudinal Study (HSLS), NELS, the Educational Longitudinal Study

(ELS), and the ECLS series. These measures include activities and communication with peers, parents, and teachers that relate to school engagement. However, more could be done in measuring relationship *quality* since rigorous measures are now available, e.g., measures of peer relationship quality developed by Child Trends. The ECLS-K:2011 has taken a large step in this direction by including measures of parent–child relationship quality.

Measures of sibling relationships are surprisingly lacking. The longest relationship most people have, for those who have siblings, is with a sibling, and yet we know surprisingly little about siblings and sibling relationships (Volling & Blandon, 2005).

Peers, obviously, can be supportive. They are often viewed as negative, but, actually, most of the effects of peers are positive (Bearman & Bruckner, 1999). For school, obviously, relationships with staff members—not just teachers, but staff in general—can be important (McNeely, 2005). In the community, positive relationships with unrelated adults can similarly be valuable.

An analysis with the National Survey of Children's Health of a single item on whether adolescents have an adult who knows them and cares about them is related to every child outcome examined, except one (Murphey et al., 2013).

Moving on to the macrosystem, relationships to larger entities like the political system, religious organizations, social media, and sports teams or players may be important to some youth, though building brief, reliable measures represents a substantial challenge.

DATA GAPS

There are constructs, of course, that lack good measures. In middle childhood, measures of play and curiosity are needed. For adolescents, self-regulation is still really important, as well as social behaviors. In addition, rigorous measures of soft skills and life skills for young adults are needed.

The federal government has a unique opportunity to test the importance of promising nonacademic factors for educational success on a large, nationally representative sample. A recent review of the literature (see Lippman et al., 2014b) identified a number of promising nonacademic factors that may be related to educational success. These factors have been found to relate to nonacademic outcomes such as prosocial behaviors, delinquency, and depression, but they have not yet been proven to be related to educational outcomes. They include optimism and emotional stability.

Adapted from Lippman et al. (2014b), Table 2 provides a summary of research indicating the extent to which varied noncognitive measures are significant predictors of other outcomes for middle and high school–aged children and youth. The research summarized in this table represents 85 of the most rigorous studies available. In order to be included in the table, studies must have met at least two of the following criteria: a sample size of at least 200, controls for demographic variables, random sampling, and a longitudinal design with a follow-up of at least one year (Lippman et al., 2014b).

TABLE 2 Positive and Protective Factors in Adolescent Well-Being and Associations with Varied Outcomes

Domains/Factors	Prosocial behavior/social contribution	Positive youth development	Life satisfaction/well-being/self-esteem	Academic achievement/school attachment	Positive relationships with peers and/or adults	Substance abuse	Delinquency	Violence/aggression/externalizing behavior	Depression/internalizing behavior	Risky sexual behaviors
Psychological and Emotional Development										
Hope	✔	✔		✔		✔	✔		✔	
Optimism			✔			✔				
Emotional stability			✔							
Self-esteem	✔		✔		✔	✔			✔	
Self-efficacy						✔	✔		✔	
Self-regulation	✔	✔		✔		✔	✔		✔	
Locus of control, motivation	✔			✔			✔			
Life satisfaction			✔	✔	✔	✔	✔	✔	✔	
Social Development										
Social skills	✔			✔	✔	✔	✔		✔	
Social self-efficacy	✔									
Empathy	✔						✔	✔	✔	
Prosocial orientation, values, and reasoning	✔		✔	✔	✔	✔	✔	✔	✔	
Cognitive Development and Education										
School connectedness			✔	✔	✔	✔		✔	✔	✔
School engagement				✔					✔	✔
Academic self-concept	✔		✔	✔					✔	
Educational expectations						✔				
Religiosity and Spiritual Development										
Religiosity	✔		✔	✔	✔	✔	✔	✔	✔	✔
Spirituality	✔		✔	✔	✔	✔	✔		✔	✔

SOURCE: Adapted from Lippman et al. (2014b).

PRIORITY CONSTRUCTS FOR CONSIDERATION

- From the many potential constructs, we highlighted the following:
- Self-regulation,
- Agency/motivation,
- Persistence/diligence/coping skills, and
- Executive functioning.

Self-regulation includes both the control of disruptive emotions as well as the production and regulation of positive emotions. Self-regulation (also referred to as self-control or effortful control) is generally defined as the ability to focus attention, manage emotions, and control behaviors (Halle et al., n.d.). Measures designed to assess children's self-regulation might include adult-report items such as "Child keeps working at something until he/she is finished" or "Child interrupts others when they are speaking." Self-regulation is more well studied than other recommended constructs, and its relationship to education as well as other outcomes is well established. Table 2 summarizes its relationship to multiple outcomes in other rigorous longitudinal and cross-sectional studies of youth, including academic achievement, prosocial behaviors, substance use, delinquency, depression, and positive youth development more generally.

Agency/motivation, or the will power to get something done, needs to be coupled with the necessary self-perception or self-concept, or belief that one can accomplish it. Snyder referred to these two pieces as critical to an overall perception that one's goals can be met (Snyder, 2005). Snyder called this construct "hope"; however, in cognitive interviews with youth and our own reading of the literature, we suggest that these are both aspects of goal orientation. Our Flourishing Children Study, cited above, includes measures of goal orientation that we would recommend for longitudinal surveys of youth (see above for the items). Inclusion of an item on the ability to make viable plans is key. This scale was found in regression analyses to be positively related to grades and negatively related to smoking, fighting, and depression.

Literature on *persistence/diligence/coping skills* as well as reliability/grit/tenacity was already strong at the time of a 2008 review as predictors of college and workforce readiness (Lippman et al., 2008). The literature and applications to schooling continues to grow in strength, and specifically in relationship to academic achievement and attainment (see Duckworth et al., 2011; Dweck et al., 2011, for example). Child Trends has developed a scale of diligence and reliability for consideration for NCES's longitudinal surveys (see below). Our national pilot sample found that diligence and reliability were related in cross-sectional analyses to higher grades, and less smoking, delinquency, and depression and are therefore good candidates for further fielding.

From early childhood onward, *executive function* is critical to measure and monitor over time in education longitudinal surveys, as it underlies so many other aspects of social, emotional, and cognitive development. Executive function involves cognitive processes including working memory, attention, and inhibitory control for the purposes of planning and executing problem solving and goal-directed activity. Strong evidence has emerged underscoring that the development of executive function skills is a crucial contributor to the development of both cognitive and social capacities (Center on the Developing Child, 2011). Executive function differs from self-regulation in that it

focuses primarily on the processes required for the conscious control of thought, emotion, and action, rather than the control itself.

METHODOLOGICAL REFLECTIONS

A number of methodological considerations should be considered in concert with the constructs. We note a few of these considerations here, including the importance of using multiple reporters and repeated and rigorous measures.

Multiple Reporters

Multiple reporters are valuable. Information about a child's behavior, knowledge, attitudes, and values is more accurate if it comes directly from the child or adolescent, if possible. Nevertheless, the perspective of the parent, a teacher, or other observer is also useful. For example, a child might be the best informant about his or her subjective emotional well-being and risky behaviors, but a teacher could report on how frequently the child fights or disrupts the classroom. And a parent can report on a child's behavior and activities in the home. The child can be a primary informant maybe from about age 8 or 9 going forward.

Multiple Methods

Data collection should be multimethod as well as multi-informant. Numerous approaches have been employed. In addition to traditional surveys, both in hard copy or electronic form, data can also be provided by assessments, administrative records, and observations. Biological data are also being collected in many studies funded by the National Institutes of Health, but the cost and difficulty of collecting saliva, urine, or blood samples are substantial and seem less necessary for educational studies.

Brief, Repeated Measures

While many would argue for lengthy instruments with strong psychometrics, brief repeated measures can be a powerful strategy in a longitudinal survey. Moore and colleagues (2002) looked at the Behavior Problems Index in the National Longitudinal Survey of Youth, which has 28 items, and compared the effectiveness of that 28-item scale with 3-item subsets from that scale measured over time. It turns out that a short scale measured over time is just as strong as a long scale measured once (Moore et al., 2002).

Also, the National Survey of Children's Health contains extremely short scales and indices. For example, the educational engagement scale has two items. It might be better if it were a little longer (to assess all elements of the educational engagement construct); but even this two-item scale is related to other outcomes in the ways you would expect (Moore et al., 2011).This is quite important because space is always a constraint in any data collection effort.

Rigorous Measurement

Some contend that it is not possible to rigorously measure nonacademic constructs, particularly subjective and positive constructs, with validity and reliability. In practice, though, income is actually a much harder construct to measure. Many positive constructs can be measured with reliability and validity. In the following section, we present selected findings from Child Trends' work on defining and measuring flourishing (Lippman et al., 2014a).

WHAT MIGHT MEASURES, BASED ON THESE KINDS OF CONSTRUCTS, LOOK LIKE?

The purpose of Child Trends' Flourishing Children Project was to develop short, robust, and usable scales for 19 positive child well-being constructs. Many of these constructs had not been widely or well measured before the scales were developed. The constructs that were previously measured were measured with long, unwieldy scales. The goal was to develop scales that would work with a diverse group of adolescents and their parents and could be used cost-effectively. In order to accomplish this goal, three years were invested in developing measures.

Child Trends conducted three rounds of cognitive interviews with adolescents across the country in order to ensure that items were relevant and salient to them. We conducted a nationally representative web-based survey with adolescents aged 12–17 and their parents. We performed psychometric analyses on the results. A selection of the measures, those that are most highly related to educational outcomes, is presented below. Full results are available in *Flourishing Children: Defining and Testing Indicators of Positive Development* (Lippman et al., 2014a).[1]

Diligence and Reliability

Diligence and reliability is defined as performing tasks with thoroughness and effort from start to finish where one can be counted on to follow through on commitments and responsibilities. It includes working hard or with effort; perseverance and performing tasks with effort from start to finish; and being able to be counted on (see Box 1).

There is a corresponding parent scale, with the same seven items oriented to parents. For example, parents are asked, "How often does your child work harder than others his/her age?"

These scales exhibit relatively strong psychometric properties. Both scales have a Cronbach's alpha above 0.75, at 0.79 for adolescents and 0.89 for parents. The comparative fit index (CFI) and Tucker-Lewis index (TLI) are above the 0.95 threshold for both scales and the root-mean-square error of approximation (RMSEA) is less than the 0.085 threshold for adolescents while it is 0.086 for parents (Hu & Bentler, 1998, 1999). The distributions of adolescent and parent responses cover the continuum of possibilities,

[1] Other sources for measures include CASEL, the 5Cs, Success Highway, Chicago Consortium on School Research, ABCs, DAP, the Holistic Student Assessment, the Montana School MAMAs, and the Socio-Emotional and Affective Landscape in Higher Education project.

BOX 1. Diligence and Reliability

The adolescent diligence and reliability scale is composed of seven items on a frequency scale. Adolescents are asked how often the following happen:

- Do you work harder than others your age?
- Do you do as little work as you can get away with?
- Do you finish the tasks you start?
- Is it hard for you to finish the tasks you start?
- Do you give up when things get difficult?
- Can people count on you to get tasks done?
- Do you do the things that you say you are going to do?

but the parent distribution is positively skewed. This is expected, as positive items are generally highly positively skewed.

In order to test concurrent validity, we examined the relationship between the scale score and outcomes in the areas of health, education, social behavior, and emotional health, while controlling for a variety of demographic variables including teen gender, age, and race, household income and size, parental education, parental marital status, parental home ownership, parental employment, metropolitan area, and region of residence. Diligence and reliability was related to each of the outcomes. Diligent and reliable adolescents are less likely to get in fights, less likely to smoke, less likely to report being depressed, and more likely to earn high grades.

Initiative Taking

Initiative taking is defined as the practice of initiating and manifesting an activity toward a specific goal by adopting the following characteristics: reasonable risk taking and openness to new experiences, drive for achievement, innovativeness, and willingness to lead (see Box 2) (Knight, 1921; McClelland, 1961; Zhao & Seibert, 2006).

The psychometrics for the adolescent and parent scales are strong. Cronbach's alpha is 0.70 for the adolescent scale and 0.73 for the parent scale. The CFI and TLI are above 0.95 and the RMSEA is less than 0.085 for each scale. The distribution of the adolescent responses is positively skewed but covers the full range of responses. This is viewed as a strong distribution because positive items are generally highly positively skewed.

Regarding concurrent validity, students who take initiative are less likely to smoke, are less likely to report being depressed, and are more likely to have good grades. There was no relationship between initiative taking and fighting, however.

Goal Orientation

Goal orientation is defined as children's motivation and ability to make viable plans and take action toward desired goals.

BOX 2. Initiative Taking

The adolescent initiative-taking scale is composed of four items with the following prompt: Please indicate how much these statements describe you:

- I am willing to risk failure to reach my goals.
- When I work at something, I care about doing my best.
- I like coming up with new ways to solve problems.
- I am a leader, not a follower.

The parent version of this scale is made up of corresponding items worded for parents, such as "My child is willing to risk failure to reach his/her goals."

The goal orientation scales (see Box 3) have high Cronbach's alphas: 0.88 for adolescents and 0.93 for parents. The CFI, TLI, and RMSEA make the cutoffs for a strong fit on both scales. The concurrent validity shows that goal orientation is related to all of the outcomes—fighting, smoking, depression, and grades—in the expected directions.

Social Competence

Social competence is defined as a set of positive skills necessary to get along well with others and function constructively in groups, including respecting and expressing appreciation for others; being able to work well with others, present ideas and listen to others' ideas, and work and cooperate in heterogeneous groups; demonstrating context appropriate behavior and ability to behave according to social norms; and using a range of skills or processes aimed at resolving conflict (see Box 4).

The adolescent measure demonstrates strong psychometric properties, with a Cronbach's alpha of 0.79 and the CFI, TLI, and RMSEA meeting thresholds for good fit. The parent measure's CFI, TLI, and RMSEA also meet the appropriate thresholds, but the alpha is a bit low at 0.62. Both adolescent and parent distributions are slightly positively skewed. Regarding concurrent validity, students with social competence are less likely to get in fights, less likely to smoke, less likely to report being depressed, and more likely to get good grades.

Positive Relationships with Parents

Positive relationships with parents is defined as the quality and types of attitudes and interactions between parents and their adolescents, including identification with a parent, affective connection between adolescent and parent, positive interactions, and constructive communication (see Box 5).

The adolescent measure demonstrates strong psychometric properties, with a Cronbach's alpha of 0.92 and the CFI, TLI, and RMSEA meeting thresholds for good fit. The parent measures—CFI, TLI, and RMSEA—also meet the appropriate thresholds, but

BOX 3. Goal Orientation

This scale uses two response scales. Five items ask the respondent how much the statements describe them on the not-at-all-like-me to exactly-like-me scale:

- I develop step-by-step plans to reach my goals.
- I have goals in my life.
- If I set goals, I take action to reach them.
- It is important to me that I reach my goals.
- I know how to make my plans happen.

Two items use a frequency scale:

- How often do you make plans to achieve your goals?
- How often do you have trouble figuring out how to make your goals happen?

The parent version of this scale includes seven corresponding items.

BOX 4. Social Competence

The adolescent and parent measures of social competence differ, as parents are not able to report on all aspects of their children's social lives. In order to approach social competence broadly with a short number of items, two response scales were used. The adolescent measure contains three items asking how much statements describe the respondent:

- I avoid making other kids look bad.
- If two of my friends are fighting, I find a way to work things out.
- When I work in school groups, I do my fair share.

There are also six items on a frequency scale. Respondents are asked how often the following happen:

- Do you get along well with people of different races, cultures, or religions?
- Do you listen to other students' ideas?
- Do you control your anger when you have a disagreement with a friend?
- Can you discuss a problem with a friend without making things worse?
- Do you follow the rules when you are at a park, theater, or sports event?
- Do you respect other points of view, even if you disagree?

Parents were asked corresponding items to most of the adolescent items, but were not asked how often their child listens to other students' ideas, controls his or her anger when having a disagreement with a friend, and can discuss a problem with a friend without making things worse.

BOX 5. Positive Relationships with Parents

The adolescent scale asks six items on a frequency scale:

- My father/mother shows me he/she is proud of me.
- My father/mother takes an interest in my activities.
- My father/mother listens to me when I talk to him/her.
- I can count on my father/mother to be there when I need him/her.
- My father/mother and I talk about the things that really matter.
- I am comfortable sharing my thoughts and feelings with my father/mother.

The parent version of this scale includes six corresponding items plus an additional item:

- Even if my child knows I'd be disappointed, he/she can come to me for help with a problem.

the alpha is a bit low at 0.62. Both adolescent and parent distributions are positively skewed. Regarding concurrent validity, students with strong relationships with their parents are less likely to get in fights, less likely to smoke, less likely to report being depressed, and more likely to report earning good grades.

CONCLUSION AND RECOMMENDATIONS

In this paper, we have sought to provide justification for the inclusion of nonacademic outcome measures in longitudinal education surveys. We have also suggested specific rationales for several research-based constructs to be measured, and we have provided examples of how these rigorous measures might be developed and used. Finally, recognizing that space is at a premium in surveys, we have highlighted those nonacademic constructs that we consider most critical as predictors of educational outcomes and as developmental outcomes in their own right.

To advance the inclusion of nonacademic measures within NCES longitudinal surveys, we propose two specific recommendations:

First, we suggest that NCES support a task force or other mechanism to develop survey-specific recommendations for the inclusion of these constructs and measures. This task force would recommend common metrics as appropriate and suggest strategies to develop rigorous and robust measures.

Second, while robust and brief measures of many nonacademic constructs have been developed, further work is needed to build on valid, reliable measures that are brief and that have strong psychometric qualities across socioeconomic and demographic groups. Since many of these constructs are subjective, developing brief rigorous measures that can be reported by children and youth of varied ages and demographic groups will take time and resources. We suggest that this is a worthwhile investment.

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