Abstract Title Page

Title: *Becoming Effective Learners* Survey Development Project

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Becoming Effective Learners Survey Development Project

Background / Context:

The educational outcomes of low-income and racial/ethnic minority students suggest that there is a fundamental disconnect between contemporary schooling and the needs of students in urban schools. Most attempts to address these problems in K12 schools have focused on increasing students' mastery of content knowledge and skills. This focus is most clearly expressed in state and federal test-based accountability policies. Standardized test scores are taken as reliable measures of how well students have mastered the academic content they will need for success in college and career. But the preponderance of evidence suggests that test scores are mediocre predictors of students' long-term education and employment outcomes, particularly when compared with grades/GPA. Researchers, practitioners, and school reformers are now coalescing around the idea that other ingredients – beyond content knowledge and skills – play a big role in determining how well a student performs in school and how long he or she persists in education. These additional ingredients are broadly referred to as "noncognitive factors" because they are not measured by standard cognitive tests.

The University of Chicago Consortium on Chicago School Research (CCSR) recently published a critical review of the literature on the role of noncognitive factors in students' academic performance (Farrington et al, 2012). Looking at research in middle grades, high school, and college, the authors created a model of the relationships among five categories of noncognitive factors and students' academic performance, as measured by grades (Figure 1). These categories were: academic behaviors (attendance, work completion, studying); academic perseverance (persisting in the face of difficulty); academic mindsets (attitudes and beliefs about oneself in relation to academic work); learning strategies (cognitive and metacognitive strategies that aid in learning); and social skills (interpersonal behaviors). In clarifying the relationships among various factors, the CCSR review illuminates potential leverage points, not only for improving students' grades, but also for deepening their learning of content knowledge and skills. The CCSR model provides testable hypotheses for the mechanisms whereby noncognitive factors lead to school performance.

While the evidence from interventions and other experimental research strongly supports the importance of academic mindsets and learning strategies to students' overall school performance, there is very little research on whether noncognitive factors are situated within students or are products of particular environments, the extent to which they transfer across contexts, or how teachers might intentionally build noncognitive factors as a regular part of their classroom practice. To inform instructional practice, we need a much deeper understanding of the specific mechanisms whereby noncognitive factors interact to affect student performance, how classrooms influence the development of these noncognitive factors, and the role of teachers in that development. Applying existing laboratory and intervention research to classroom practice is predicated on our ability to accurately measure a variety of noncognitive factors as well as classroom conditions and instructional practices that may be related to these factors. We also need to be able to measure change over time.

Unfortunately, the measurement of noncognitive factors is still in its infancy. While researchers have developed instruments in conjunction with individual studies to measure some noncognitive constructs, there are very few reliable, validated tools that could be widely used at the present time. Mathematica Policy Research recently conducted a landscape analysis of

instruments used to measure a subset of noncognitive factors – including mindsets and learning strategies – in youth ages 10-14. Of 196 identified measures, only 17 percent had some evidence of validity. Only 17 of the 196 measures had associations with some kind of measure of achievement (Atkins-Burnett et al., 2012).

The National Research Council noted in its recent report on 21st century learning that we are much farther ahead in measuring cognitive competencies than we are in measuring noncognitive ones, which the NRC refers to as intrapersonal and interpersonal competencies. In light of the evidence, the NRC report recommended support for "research to more clearly define and develop assessments of 21st century competencies," calling specifically for "sustained support for the development of valid, reliable, and fair assessments of intrapersonal and interpersonal competencies" (2012, p. Sum-10). *Becoming Effective Learners* Survey Development Project is designed to move us closer to that goal.

Purpose / Objective / Research Question / Focus of Study:

There is great interest from all quarters in measuring noncognitive factors. Schools and school networks want diagnostic tools to help them better understand and address the needs of their students. Out-of-school and youth development organizations are looking for ways to measure the value added by their programs. Foundations need to be able to measure the impact of their investments. Researchers seek to better understand the relationships among different factors and to test the effects of interventions. All of these purposes require effective measurement tools.

To that end, in collaboration with national and international substantive experts and expert practitioners, we are conducting the *Becoming Effective Learners* survey development project. The centerpiece of work in this project is the creation of a reliable and validated survey instrument for students in grades 6-12 to be made available for free noncommercial use by researchers and practitioners for purposes of basic research and formative/ diagnostic assessment. The survey brings together concepts that represent long lines of research with well-developed instruments, but have not been examined in relationship to other noncognitive factors. The survey has also enabled us to gather data on student noncognitive variables and classroom instructional variables (e.g., support for learning) simultaneously and examine their relationships in order to inform teaching and learning and to contribute to classroom practice and basic research in a crucially important but nascent field of study. (See Appendix B for a listing of constructs measured in the student pilot survey.) It will also allow us to examine their relationship to student course performance. We will be focused on three research questions:

1. To what extent do different concepts within and across our five categories of non-cognitive factors represent empirically distinct constructs?
2. What is the relationship among different noncognitive factors and instructional practices?
3. What is the relationship among different noncognitive factors and student outcomes?

Setting:

This study used of two rounds of a pilot survey. Eleven neighborhood schools and 11 charter schools in Chicago Public Schools (CPS) participated in Round 1 of our pilot study. In addition, 18 charter schools around the country participated. These schools were located in Denver, the

greater Los Angeles area, Boston, Washington, DC, Connecticut, New York, and Pennsylvania. See Table 1 for school-level demographics. All 681 CPS schools with 6th-12th graders were eligible to participate in Round 2 as part of the annual My Voice, My School (MVMS) student survey. See Table 1 for the school-level demographics.

Population / Participants / Subjects:

Round 1. 35,256 students in grades 6-12 were eligible to participate in the pilot. Of these, 27% responded (n=9379). Neighborhood schools in Chicago Public Schools (CPS) were required by school board policy to obtain active parental consent, which resulted in a substantially lower response rate (8%) than charter schools in Chicago (48%) and charter schools outside of Chicago (45%). Table 1 shows demographic characteristics of the three different school groups (CPS neighborhood schools, CPS charter school, non-CPS charter schools) and on eligible schools and students.

Round 2. All 6th-12th grade students in Chicago Public Schools were eligible to participate in Round 2. 144,742 students participated in the MVMS survey (response rate=75%). See Table 1 for more demographic information on these schools and students.

Intervention / Program / Practice:

This study did not include an intervention, program, or practice. Rather, it seeks to identify key concepts among the five categories of noncognitive factors that can serve as leverage points for future interventions, programs and practices.

Research Design/ Data Collection and Analysis:

The *Becoming Effective Learners* Student Survey (BEL-S) was designed to identify and measure constructs within the five categories of noncognitive factors we identified in our research review – academic behaviors, academic perseverance, academic mindsets, learning strategies, and social skills – as well as identifying and measuring classroom conditions and instructional practices correlated with such factors. Before the survey was administered we used one-on-one cognitive interviews with 14 students from grades 6-12 in a neighborhood school and a charter school. This method allows us to quickly identify problems in the survey question wording (Willis, 2005).

We collected pilot data in two separate web survey administrations. The first took place from January-March 2013 and included students in grades 6-12 in charter and neighborhood schools in the Chicago Public schools and in charter school networks across the country. In the second round (February to April 2013), we piloted individual measures by adding these to the My Voice, My School student survey (MVMS) which is administered to all 6th-12th grade students in the Chicago Public Schools. MVMS is an annual survey conducted online. Each student responded to approximately 20 items from the *BEL-S* Survey. These additional data will provide more statistical power as we test our measures and analyze relationships among variables. We asked students items about noncognitive factors in relation to two separate academic classes/subjects in order to gauge within-student variability as well as aggregated classroom-level characteristics.

We designed the survey to measure specific constructs, but since we recognize that certain constructs may be closely related (e.g., locus of control and self-efficacy), we conducted a factor analysis to better understand the extent to which the items form independent constructs as intended or whether they are actually part of the same construct. As we identified subscales based on the factor analysis, we also used Rasch analysis to understand how the items fit together, to account for item missing data, and to create a measure score and a standard error. To answer Research Question 2, we used HLM to construct classroom level measures of instructional practices by aggregating student reports of their classroom, using a measurement model at level 1 and adjusting for student characteristics at level 2.

RQ 1: Relationship among noncognitive factors. At the student level, relationships among noncognitive factors were examined using multiple regression and path analysis.We used both design-based methods of estimating variance (e.g., Taylor series linearization method of variance estimation) and HLM to account for clustering at the classroom and school levels.

RQ 2: Relationship between instructional practices and noncognitive factors. Using HLM, we estimated the relationship between our classroom-level measures of instructional practices and clusters of instructional practices and student reports of noncognitive factors.

RQ3:Relationship among noncognitive factors and student outcomes. CPS and the participating charter schools provided student-level data on grades and demographics which were linked to the survey data (in Rounds 1 and 2). We examined the relationship between specific noncognitive factors and student outcomes (grades) using HLM, using a measurement model at level 1, controlling for student characteristics such as race, gender, free lunch status, language spoken at home, and disability status at level 2 and classrooms at level 3.

Findings / Results:

We are currently conducting analysis and will conclude this analysis by mid-summer.

Conclusions:

There is a growing consensus that noncognitive skills are crucial for academic achievement and educational attainment, however, what this means for classroom practice remain unclear. This study will provide practitioners and researchers insight into the relationships, and potentially, the redundancies among constructs of noncognitive factors. We will further provide insight into what instructional practices promote noncognitive factors and which noncognitive factors are most strongly related to higher grades. We hope that this will allow researchers and practitioners to better focus their efforts on the practices and interventions that promote noncognitive factors and move this interest in noncognitive factors into something truly useful for improving educational achievement and attainment.

Appendices

Appendix A. References

References are to be in APA version 6 format.

Atkins-Burnett, S., Fernandez, C., Akers, L., Jacobson, J., & Smither-Wulsin, C. (2012). *Landscape analysis of non-cognitive measures.* Princeton, NJ: Mathematica Policy Research.

Farrington, C. A., Roderick, M., Allensworth, E. A., Nagaoka, J., Johnson, D. W., Keyes, T. S., & Beechum, N. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in shaping school performance – A critical literature review.* Chicago: Consortium on Chicago School Research.

National Research Council. (2012). *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Committee on Defining Deeper Learning and 21st Century Skills, James W. Pellegrino and Margaret L. Hilton, Editors. Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Willis, G. (2005). *Cognitive Interviewing.* Thousand Oaks, CA: Sage Publications.

Appendix B. Tables and Figures

Figure 1. CCSR Model of Noncognitive Factors in Academic Performance

A Hypothesized Model of How Five Noncognitive Factors Affect Academic Performance within a Classroom/School and Larger Socio-Cultural Context

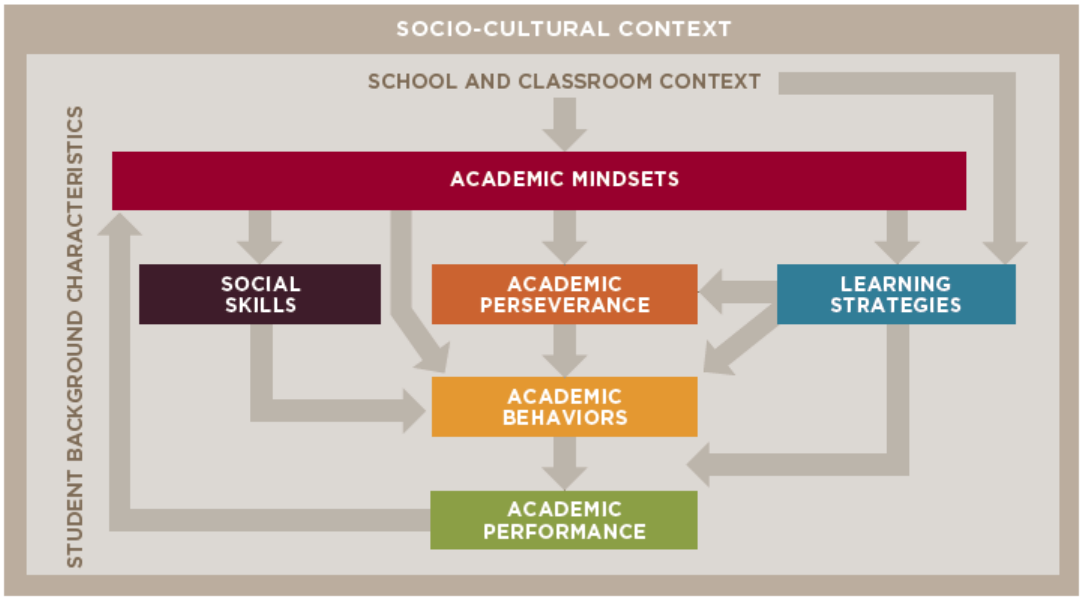

Table 1 – Participating pilot schools: Student demographics

	Round 1		Round 2	
	Public	Charter	Public	Charter
Schools*				
Total # schools	39	25	599	82
# elementary/middle schools	11	11	450	41
# high schools	25	10	138	29
# combination elementary/middle/high schools	3	4	11	12
# schools predominantly African-American (75%+ of students are African American)	15	5	277	42
# schools predominantly Latino (75%+ of students are Latino)	9	5	127	25
# schools Integrated (15%+ of students are white or Asian)	2	8	121	4
# schools predominantly minority	13	7	74	11
Students				
Total # students	26,640	8616	170,417	28,235
% female	51%	52%	50%	50%
% white	6%	16%	9%	2%
% African American	39%	37%	41%	56%
% Native American/Alaska Native	0%	7%	.4%	.3%
% Latino	49%	36%	44%	38%
% multiracial	1%	1%	1%	1%
% Asian	4%	2%	4%	1%
Respondents				
Total # students responding	5526	3853	125,060	19,682
Total # schools with no respondents	17	7	0	0
Overall response rate	21%	45%	79%	69%
Response rate excluding nonresponding schools	33%	62%	79%	69%